Smoking Cessation

Treatment Intensity and Outcome in Randomized Clinical Trials

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Abstract

The primary aim was to compare the effectiveness of smoking cessation interventions of different intensities in a clinical dental and a telephone setting in Sweden.

Methods: A total of 300 smokers were randomized to High or Low Intensity Treatment (HIT or LIT) at the Public Dental Service, County Council of Västmanland. Effectiveness (abstinence rate) was measured after 1yr (paper I) and 5-8yrs (paper III). A cost-effectiveness analysis was conducted, based on intervention costs, number of abstinent participants after 1yr, and a Markov modelling of future costs and health (in QALYs) consequences (paper II). In paper IV, 586 callers to the Swedish National Tobacco Quitline (SNTQ) were randomized to high-intensity proactive or low-intensity reactive service, and effectiveness was measured after 1 yr. Effectiveness measures were self-reported point prevalence, 6-month continuous abstinence, and sustained abstinence.

Results: Absolute quit rates were 7% higher with HIT than with LIT on all measures and increased by 8% from 1yr to 5-8yrs. Point prevalence was 23% vs. 16% (p=.11) after 1yr and 31% vs. 24% (p=.16) after 5-8yrs. Six-month continuous abstinence was 18% vs. 9% (p=.02) after 1yr and 26% vs. 19% (p=.18) after 5-8yrs. Sustained abstinence was 12% vs. 5% (p=.03) after 5-8yrs. Nicotine dependence was a strong predictor for abstinence at 1yr and achieved abstinence at 1yr was a strong predictor for abstinence at long-term follow-up. The cost-effectiveness analysis showed that both HIT and LIT were cost-effective, and LIT was even cost-saving compared with doing nothing. HIT was more costly and more effective than LIT, and the cost of each extra QALY gained by HIT was 100,000SEK, which is considered very cost-effective in Sweden. Proactive and reactive services were equally effective at the SNTQ. Point prevalence was 27% and 6-month continuous abstinence was 21% after 1yr. Being smoke-free at baseline was the strongest predictor for abstinence at 1yr.

Conclusion: Support at high as well as low intensity in a clinical dental setting in Sweden and at the SNTQ was effective in achieving smoking cessation. Both high- and low-intensity interventions were very cost-effective in a clinical dental setting.

Keywords: RCT, cost-effectiveness, dental setting, quitline, long-term follow-up, proactive, reactive, tobacco

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To Anna, Johan, Per and Stig

In memory of
my dear parents

Utan tvivel är man inte riktigt klok

Tage Danielsson
This thesis is based on the following papers, which are referred to in the text by their Roman numerals.


IV Nohlert E, Öhrvik J, Helgason AR. Effectiveness of proactive and reactive service at the Swedish National Tobacco Quitline in a semi-randomized trial. (Submitted)

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Abbreviations and definitions

CA  6-month Continuous Abstinence, not one puff of smoke the past 6 months
CBT  Cognitive Behavior Therapy
CI  Confidence Interval
CUA  Cost-Utility Analysis
Efficacy  Ideal effectiveness (in clinical trials)
Effectiveness  Effectiveness in routine circumstances
FCTC  Framework Convention on Tobacco Control
FHI  Swedish National Institute of Public Health (Statens Folkhälsoinstitut)
HIT  High Intensity Treatment
ICER  Incremental Cost-Effectiveness Ratio
Intervention  “Any health action – any promotive, preventive, curative or rehabilitative activity where the primary intent is to improve health” (World Health Report WHO 2002)
ITT  Intention-To-Treat analysis
LIT  Low Intensity Treatment
MI  Motivational Interviewing
NRT  Nicotine Replacement Therapy
OR  Odds Ratio
PP  Point prevalence abstinence, not one puff of smoke the past 7 days
Proactive  A quitline service with call-backs initiated by the quitline staff
QALY  Quality-Adjusted Life-Year
RCT  Randomized Clinical (or Controlled) Trial
Reactive  A quitline service with calls merely initiated by the client
SA  Sustained Abstinence, not one puff of smoke since the planned quit date
Setting  An arena for e.g., tobacco cessation, such as primary care, hospital, psychiatry, dental care, municipality care
SKL  Swedish Association of Local Authorities and Regions (Sveriges Kommuner och Landsting)
SNTQ  The Swedish National Tobacco Quitline (Sluta-Röka-Linjen, SRL)
Snus  Swedish moist snuff
SoS  The National Swedish Board of Health and Welfare (Socialstyrelsen)
Tobacco products  Products made entirely or partly of leaf tobacco as raw material, which are intended to be smoked, sucked, chewed or snuffed, all containing the highly addictive psychoactive ingredient nicotine
WHO  World Health Organization
## Thesis at a glance

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| I | Treatment effectiveness of HIT and LIT Västmanland Dental setting | RCT, N=300, ≥20 yrs 12 months Questionnaire (86%) | **PP:** HIT=23%, LIT=16%, *p*=.11  
**CA:** HIT=18%, LIT=9%, *p*=.02 | Offering smoking cessation support within dentistry may be an effective model in Sweden. LIT in combination with other support may be a preferable “first treatment option”. HIT may be offered to those who are unable to quit with LIT/other support. |
| II | Cost-effectiveness of HIT and LIT Västmanland Dental setting | RCT, N=300, ≥20 yrs 12 months CUA | ICER=SEK95,900/QALY†  
Compared with no intervention†:  
HIT SEK8400/QALY  
LIT SEK<0/QALY | If decision-makers seek to avoid costs, LIT should be implemented rather than no program. If decision-makers are willing to spend some money to obtain tobacco quitters and related health gains, HIT should be implemented. |
| III | Treatment effectiveness of HIT and LIT, long-term Västmanland Dental setting | RCT, N=284, ≥20 yrs 5-8 years Questionnaire (85%) | **PP:** HIT=31%, LIT=24%, *p*=.161  
**CA:** HIT=26%, LIT=19%, *p*=.177  
**SA:** HIT=12%, LIT=7%, *p*=.030 | Abstinence at 12-month follow-up is a good predictor for long-term abstinence. The difference in outcome between HIT and LIT remained relatively constant and in favor of HIT for at least 5–8 years after the intervention. |
| IV | Treatment effectiveness of proactive and reactive service at the SNTQ National Telephone setting | Semi-RCT, N=586, ≥20 yrs 12 months Questionnaire (59%) | **PP:** proactive=26% reactive=29%, *p*=.331  
**CA:** proactive=20% reactive=22%, *p*=.600 | To optimize resource utilization at the SNTQ, the reactive service may be preferred as the first treatment of choice. |

* Abstinence according to ITT, † for point prevalence abstinence rates
Introduction

In 2003, a study was started to evaluate a smoking cessation programme used and partly developed within the Public Dental Service, County Council of Västmanland. As a new research assistant at the Centre for Clinical Research in Västerås, I was engaged as a study co-ordinator with no intention to start work on a PhD. At that time, I was of the opinion that I had never worked with tobacco cessation during my previous practice as a dentist. Today, I know that I was wrong, since I had actually asked about, looked for and when relevant, discussed tobacco use with all my patients.

Tobacco use causes huge health, economic and environmental effects, completely unnecessarily. Hopefully, this thesis can contribute to the efforts aimed at maximizing the impact of smoking cessation services in a world of limited resources, where optimizing the delivery of effective interventions is crucial. Before approaching questions of interventions, intensity, effectiveness and cost-effectiveness, I will start with some general topics. In the text, the terms ‘tobacco’ and ‘smoking cessation’ are used. To avoid misunderstanding, tobacco refers to different tobacco products, in Sweden mainly cigarettes and snus. The thesis deals with smoking cessation, even though a few participants were cigarette as well as snus users.

Becoming a smoker

Tobacco smoking usually starts as experimentation during the teenage years in a social context and with psychosocial motives. Initiation and transition to regular smoking occurs in a complex interaction of factors at macro (societal, marketing, legislation, pricing), meso (family, peers, school) and micro (individual) levels. The habit is quickly attained through the pharmacological effect of nicotine, which is a very addictive and quick-acting drug. Nicotine causes a release of dopamine and other neurotransmitters in the reward system of the brain, and when physical addiction is established, absence of nicotine in the blood results in withdrawal symptoms. However, tobacco, and especially cigarette addiction, is also a social, psychological and habitual addiction (1-4).
The tobacco epidemic

Globally, an extensive tobacco epidemic is ongoing, an epidemic created by people and spread by the tobacco industry and its business strategies. Use of tobacco products is increasing globally, although it is decreasing in high-income countries, and the epidemic is shifting to the developing world. Tobacco use is the leading global cause of preventable death, and contributes to increased inequalities in health and premature death, poverty, increased health-care and societal costs, and heavy environmental consequences (5-7). Tobacco kills one person every six seconds worldwide, causes one in ten deaths among adults and is a risk factor for six of the eight leading causes of death in the world today. The number of tobacco-related deaths is projected to rise from 5.4 million in 2005 to more than 8 million annually by 2030, and more than 80% of these will occur in low- and middle-income countries. Second-hand smoke causes more than 600,000 premature deaths per year (5, 7, 8). According to the Global Burden of Disease Study 2010, tobacco smoking, including second-hand smoke, remains the leading risk for disease burden in high-income North America and Western Europe, and is the second leading risk factor after high blood pressure for the global disease burden (9, 10).

The tobacco epidemic typically progresses through the following four stages in populations:

1. a steep rise in smoking prevalence among the male population
2. an increase in female smokers and male smoking prevalence of 50% or more
3. a plateau and a slow decrease in smoking among males, and a plateau in female smokers
4. a plateau and decrease in prevalence among females, and a further decrease among males.

During the epidemic, there is a reversal from a positive to a negative association between socio-economic status and smoking. The pattern is delayed by 10–20 years for women (11-13).

Sweden

Sweden is in the fourth stage of the tobacco epidemic, where prevalence rates are slowly declining for both men and women (Figure 1), and smoking progressively becomes more a habit of the lower socio-economic groups.
The prevalence of adult daily smoking has steadily declined since the 1980s to 11% in 2012, and yet 1.6 million Swedes use tobacco (cigarettes and/or snus) every day, and 6400 people die of smoking-related diseases every year (18 per day). Sweden was the first country to reach WHO’s goal for Europe that 80% of the adult population should be smoke free by 2000. In 2012, 10% of men and 12% of women were daily smokers (most common in people 45–64 years of age), and 19% of men and 4% of women were daily snuffers (14-16).

A decline is seen in adolescents, even though 16,000 new smokers are recruited among teenagers every year. The proportion of 15-year-olds who smoke daily has halved between 2000 and 2012. Among 17-year-olds, the proportion of daily smokers was unchanged in girls but somewhat increased in boys between 2004 and 2012. In 2012, 5% of 15-year-old girls were daily smokers and 2% were snuffers; among boys, the corresponding figures were 4% and 14%, respectively. Twelve per cent of 17-year-old girls were daily smokers and 5% were snuffers; among boys, the corresponding figures were 8% and 24%, respectively (17).

In the county of Västmanland, the daily smoking prevalence declined from 16% in 2004 to 12% in 2008, when 14% of women and 11% of men were daily smokers, equal to the national prevalence (18). However, since then no further decline in smoking has been seen, and in 2012 the prevalence was equal to that in 2008. Daily snuffers included 19% of men and 3% of women in 2012, equal to the national prevalence (19).
Risks and consequences

Scientific evidence of the harmful effects of tobacco use became evident at the beginning of the 1950s, and since then an enormous increase in the evidence of risks and consequences has been seen (5, 7, 20-22). Tobacco smoke contains more than 4000 known chemicals, of which at least 250 are known to be harmful and more than 50 are known to cause cancer in humans. Smoking harms nearly every organ in the body, and about 40 diseases are considered to be related to smoking. Lack of oxygen, vaso-constriction and carcinogenesis are the most important disease-causing effects of tobacco use. The most prevalent causes of death are cardiovascular disease, chronic obstructive pulmonary disease, and lung cancer (22-24).

Every second smoker dies prematurely as a result of smoking and loses an average of 10 years of his or her life expectancy (20). Tobacco use is also one important cause of oral problems and diseases, such as oral cancer, oral mucosa lesions and periodontal diseases, and constitutes a prognostic variable for survival of dental implants (25-27).

Tobacco use has great economic consequences for the individual as well as for the society. A smoker in Sweden has, due to his smoking, on average eight more days of reporting in sick per year, and a former smoker has three more days, compared with a person who has never smoked (28). Tobacco smoking is estimated to represent about 8% of the burden of disease (calculated in disability-adjusted life-years, DALYs), which implies that almost 200,000 years in working order are lost in Sweden every year as a consequence of smoking (29). The harmful effects of smoking in Sweden in 2001 were estimated to be 26 billion Swedish kronor (SEK), with 18 billion for temporary illness, 2.2 billion SEK for health-care costs and 6 billion SEK for lost years of work. This sum, which does not include costs for tobacco use except cigarettes or for second-hand smoke, is more than three times greater than the accumulated deficit of all county councils in 2002. The amount of 26 billion SEK ought to be considered in relation to the amount of 8 billion SEK in tobacco tax collected in the same year (30). After adjustment to the corresponding monetary value in 2009, it is equivalent to 30 billion SEK per year for health care, lost production and work absence due to illness, or 6.7% of the total societal costs for all diseases (31). Tobacco-related harm represents at least 1.3% of health-care costs; however, the funds allocated to tobacco prevention and quitting in the county councils in 2009 corresponded to less than 0.25‰ of health-care costs (32). Smoking cessation can result in big profits to society. Reducing the cost of social welfare for serious smoking-related diseases would yield profits in the order of billions of SEK annually (29, 31, 32). The cost for treatment of serious periodontitis is estimated to be 74 million SEK per year, of which 90% (66 million SEK) is considered to be due to smoking (33). The county councils in Sweden can
save 140 million SEK each year by helping their own staff to quit (which corresponds to about 270 full-time jobs), and the local authorities can save closer to three billion SEK each year (5800 full-time jobs) (31, 34).

Smoking cessation

The body restores itself rather quickly after quitting, which reduces the risk for morbidity and mortality, and the public health gains from reduced tobacco use are huge (22, 35). Tobacco control encompasses a range of supply, demand and harm-reduction strategies that aim to improve the health of a population by eliminating or reducing consumption of tobacco products and exposure to tobacco smoke (36). A broad action plan with different strategies and collaboration between a number of actors and at different levels in society is required to achieve an effective tobacco prevention programme. The Swedish model is based on four types of actions: limiting and controlling, preventing, norm-changing and tobacco cessation actions (Figure 2) (31).

This thesis focuses on tobacco/smoking cessation. The supply of smoking cessation support will be the most important component of the effort to reduce smoking-related mortality in the coming decades. Smoking cessation among adults also serves as an essential role model to prevent smoking uptake among adolescents (21, 31). All components of the tobacco preventive strategy are vital, act in co-operation and provide a synergy effect, but it is impossible to discuss each of them. However, something about
legislation and policy documents has to be discussed before approaching tobacco cessation more specifically.

Policy documents
The first globally binding public health treaty, the World Health Organization Framework Convention on Tobacco Control (WHO FCTC), was adopted in 2003 by the 56th World Health Assembly. The Convention was implemented in 2005 and provides the foundation for countries to implement and manage tobacco control programmes to address the growing epidemic of tobacco use (36). In 2011, the WHO FCTC included 173 countries covering 87% of the world’s population. To help countries fulfil their WHO FCTC obligations, a package of six evidence-based tobacco control measures that are proven to reduce tobacco use and save lives was introduced in 2008, the MPOWER. The six key elements are: Monitor tobacco use and prevention policies, Protect people from tobacco smoke, Offer help to quit tobacco use, Warn about the dangers of tobacco, Enforce bans on tobacco advertising, promotion and sponsorship, and Raise taxes on tobacco (5, 7).

The Swedish Tobacco Act was adopted in 1993 and has had several subsequent amendments (37). In 2003, the Swedish government adopted eleven national public health political domains with the overarching aim to create “good health, on equal terms, for the entire population”. The tobacco preventive work is included in goal area number 11 and comprises four intermediate goals to be achieved by 2014: i) a tobacco-free start of life, ii) a halving of the number of adolescents under 18 years of age who start smoking or snuffing, iii) a halving of the proportion of smokers in the groups smoking the most, and iv) ensuring that no one shall be involuntarily exposed to smoke in his/her environment (38). None of the four intermediate goals will be achieved by 2014 according to the Swedish National Institute of Public Health, based on statistics from 2012 (39).

The government proposition “A renewed public health policy” (40) was launched in 2008, with a strong emphasis on the local and regional public health contribution and the importance of evidence-based practice. Public health issues should be viewed in a broader regional developmental perspective, and the health promotion and disease prevention work in the health service will be strengthened. In the official government report “A national cancer strategy” from 2009, the importance of supporting smoking cessation was emphasized in order to meet the expected increase in cancer cases in the next 10–15 years (41). Sweden joined the WHO FCTC in 2005, which further supports the tobacco preventive work. A collective strategy for the alcohol, narcotics, doping and tobacco policies (the ANDT policies) was
The government proposed a policy in 2010, acknowledging a connection between different dependencies (42).

The Health and Medical Service Act’s goal is “good health and health care on equal terms for the whole population”. The health services will work to prevent ill-health, permeating care and treatment with a health-promotional perspective (43).

In 2011, the National Swedish Board of Health and Welfare launched National Guidelines for Methods of Preventing Disease – tobacco, alcohol, physical activity, and diet habits (44).

**Becoming an ex-smoker**

Quitting smoking involves abstinence symptoms to varying degrees, requiring approximately 3–4 attempts before succeeding (21, 31, 35). Between 70 and 85% of smokers (and almost half of snus users) want to quit, with one-third seeking help. Fully 60% of Swedish smokers have tried to quit at some time, 30% in the past year. Relapse rates are high, reducing daily smoking prevalence by 1-2% per year. The majority quit without support from health-care services, with low consumption smokers achieving better results (14, 19, 21, 31, 45, 46). Success is significantly higher using evidence-based counselling and medication (47).

Commonly reported predictors for successful quitting include high motivation, low cigarette consumption, high socio-economic status, previous attempts (number and length), social support, and age. Lower abstinence rates relate to high nicotine dependence (i.e., >20 cigarettes per day), severe withdrawal symptoms, smoking the first cigarette within 30 minutes of waking, psychiatric comorbidity (depression, schizophrenia, alcoholism or other dependence), high stress levels, and living with a smoking spouse (47, 52-55).

Snus is debated as a smoking cessation tool to reduce harmful effects by altering tobacco use or choosing less harmful products (31). Snus is less likely to support quitters compared to those with professional support (54, 56-59).

It has been suggested that smoking prevalence declines in populations where remaining smoking populations face harder challenges. 
time quitting, probably because they are more dependent and more difficult to help, the so-called hardening hypothesis. Differences in personal characteristics between former and remaining smokers have also been reported, where socio-economic status and educational level are lower and psychiatric comorbidities and alcohol consumption are higher among remaining smokers. In a comparison of 13 countries, an inverse correlation was found between higher dependence scores (Fagerström Test for Nicotine Dependence, FTND) and lower smoking prevalence ($r=-0.73$, $p=.001$). The authors concluded that remaining smokers may be more hard core and may need more intensive treatment (60).

Smoking cessation in Sweden

In Sweden, as in the USA (61), smoking cessation started to be organized in the late 1950s, focusing on relatively intensive group behaviour interventions, often with the emphasis on the aversive effects of smoking in combination with group pressure and support. Concurrently with increased research, smoking cessation has become more and more evidence based. On behalf of the Nordic Cancer Foundations, analyses were performed within primary and dental care to discover the best way for the Cancer Foundations to support smoking cessation in the Nordic countries. Some main findings were that personnel wanted and/or should, but did not have the time and competence to work on smoking cessation. A consequence of an evident major need to refer patients for qualified counselling was the establishment of local smoking cessation clinics, mainly within primary care, and the further development of the Swedish National Tobacco Quitline (SNTQ), which was increasingly used as a clinical referral unit (62-65).

The county councils, municipalities and non-governmental organizations (NGOs, e.g., A Non Smoking Generation, the Swedish Cancer Society, the Swedish Heart Lung Foundation, the Swedish Heart and Lung Association) are presently the most active actors in tobacco preventive work, with a primary responsibility for prevention, counselling and cessation. Policy work is an important part, and so is tobacco cessation, the latter dealing with supply of counsellors and systematic use of current evidence-based methods. Cessation support is provided in various sectors. Each year, about 70% of Swedish smokers visit a dental office and about 40% visit a medical centre. Dental service and health care are thus important actors (21, 31). A mapping of cessation support in the county councils in 2009 exposed a discrepancy between supply and demand, and also great regional differences in the supply of cessation support. Between 56 and 73% of primary care centres offer tobacco cessation therapy, generally at a low intensity, and 47% of hospitals have their own tobacco cessation programme. Sixteen out of 21 county councils estimate that their tobacco cessation service is undersized (31, 32).
About 200,000 smokers and 100,000 snus users want help to quit. In 2009, about 12,000 people received tobacco cessation treatment at primary care centres and an equal number received treatment through the SNTQ (32).

The importance of tobacco prevention and smoking cessation has been stressed by the launching of the National Guidelines for Methods of Preventing Disease lifestyle habits in 2011. The basis for all methods is some form of advice or counselling at three possible levels; brief advice, counselling and advanced counselling. The health-care system should offer advanced counselling to patients who are daily smokers and to more sporadic smokers who are pregnant, breastfeeding or facing surgery. Advanced counselling should be structured, theory-based, given by health-care professionals trained in the methods used, preferably supplemented with various tools and devices as well as a special follow-up and have sessions longer than 15–30 minutes (44). The formation of six regional cancer centres and the commission of SKL to develop the tobacco preventive work according to the national cancer strategy (41), will probably carry the tobacco preventive work and smoking cessation support forward (66).

Outcome measures

At least 6-, but preferably 12-month follow-up is recommended, however, reporting of 12-month or longer outcomes may equate more closely to lifelong tobacco abstinence and be less likely to give false positive results (47, 67, 68). There is no consensus on the duration of abstinence that should be reported in trials of interventions for tobacco use. A number of measures of abstinence are found in trials, i.e., point prevalence, continuous abstinence, prolonged abstinence and repeated abstinence. Furthermore, they are not always equally defined, which can make comparisons difficult and lead to confusion. The most common primary outcome is point prevalence with complete abstinence in the week before follow-up. Continuous abstinence sometimes has a 6-month definition, but sometimes refers to sustained abstinence between quit day and follow-up, with or without an initial grace period, and with or without permitting some occasional cigarettes. A 6-month continuous abstinence corresponds with the Transtheoretical Model’s definition of the maintenance stage, in which abstinence has become rather stable (69). Follow-up data analysed according to ITT is recommended (21, 47, 68, 70). A systematic review found a high correlation (r=.88) between point prevalence (PP) and prolonged abstinence (PA) rates in smoking cessation studies, and an average PA that was 0.74 of the PP. They produced identical ORs for abstinence; however, the absolute difference in the percentage of abstinence was less when PA was used (71).

Self-reported abstinence is the most common method of recording smoking status and may overestimate quit rates. However, it is considered
accurate in most smoking cessation studies and rarely differs across intervention conditions. Furthermore, the conservative ITT approach where non-responders are treated as smokers does not overestimate treatment effects (72).

Biochemical verification is another way, which can be used to validate self-reported data and also be a valid index of dependence level, medication need or both. A common method involves measurement of cotinine, a breakdown of nicotine with a longer half-life, in saliva, blood or urine. Another method is measurement of carbon monoxide concentration in exhaled air or blood (21, 72).

Nordic studies have shown high validity for self-reported data (73-76). Self-reports underestimate the true national smoking prevalence estimates by 2.8% in England, 0.6% in the USA and 4.4% in Poland compared with cotinine analyses (77). Despite smoking’s decreased social acceptability, a systematic review by Gorber et al. in 2009 found no change in self-reporting bias over time (78).

According to recommendations from the Society for Research on Nicotine and Tobacco Subcommittee on Biochemical Verification (72), biochemical verification is not required and may not be desirable in studies where the optimal data collection methods are through mail, telephone or the Internet. However, biochemical verification is recommended for small-population, high-demand clinical trials of new interventions and in most or all studies of smoking cessation in special populations, and is mandatory for studies evaluating novel nicotine-delivery products and in most new product and all harm-reduction studies. The American guidelines and the Cochrane Collaboration consider both studies with and without biochemical verification, since meta-analyses have shown that they provide similar results (47, 79).

Effectiveness and intensity

Tobacco use is a chronic disease that deserves treatment. It is expected that smokers may have periods of relapse and remission, so it is important to continue smoker education, counselling and advice over time. Effective treatments have been identified and should be used with every current and former smoker. As with other chronic diseases, the most effective treatment of tobacco dependence requires the use of multiple clinical modalities, and medications are vital elements of a multicomponent approach (47).

The first step in all tobacco cessation programmes is to identify tobacco users by simply asking if they use tobacco. “The five As” is a useful approach to systematize the work in clinical practice, especially in primary care; 1) Ask about tobacco use and document it, 2) Advise briefly and clearly to quit, 3) Assess the willingness to try to quit at that moment, 4) Assist those who are willing in their quit attempts by giving support, setting a quit date
and offering counselling and pharmaceutical treatment, and 5) Arrange follow-up. Persons identified as recent quitters by “Ask” should receive support to reduce the risk of relapse, and persons not willing to try to quit at the moment should receive support to motivate them to quit (47). Alternative approaches may be three As (Ask, Advise, and Assess) plus a referral to stop-smoking services or a quitline (80-82).

Effectiveness
There is a vast literature and strong evidence for the effectiveness of tobacco control programmes, e.g., tobacco cessation programmes and policies (47). Since smoking cessation interventions can prevent a number of costly chronic diseases, they are also highly cost-effective compared with most other health promotion measures. Health economic evaluation is described on pages 26-28.

Methods for smoking cessation focus on relieving the effects of nicotine abstinence and applying behaviour modification strategies. Effective methods include brief advice from physicians, individual or group behaviour treatment and pharmaceuticals (21, 47, 79, 83-87). Smoking cessation in primary and dental care can be expected to have the greatest numerical impact, as a majority of smokers have regular contact with these kinds of care. Self-help materials are better than doing nothing, but do not improve the outcome of other actions such as advice from health-care personnel or NRT (88). Telephone counselling can reach big groups of smokers, and supporting telephone calls as well as follow-up are effective (21, 47, 54, 89, 90). Smoking cessation at least 4 weeks before surgery reduces intra- and postoperative complications (91, 92). The abstinence rates 1 year after quitting vary with different methods: on one’s own, 2–3%; brief counselling, 5%; brief counselling + NRT, 10%; the SNTQ + NRT, 25%; and intensive treatment by a smoking cessation counsellor + NRT, 30–40% (21, 31, 47).

Intensity
Uncertainty remains regarding the optimal intensity of interventions, overall and for different groups of smokers, but most studies indicate that high-intensity programmes lead to higher cessation rates (21, 31, 47). The natural quit rate of about 2% can be increased by a further 1–3% through brief advice from physicians, and more intensive advice can provide somewhat higher quit rates (85). However, a Cochrane review on individual counselling finds insufficient evidence for more intensive counselling being more effective than counselling of less intensity (84). In the case of telephone counselling of smokers by helplines, multiple proactive counselling increases quit rates by 25–50% compared with brief advice and support during the initial call or with sending self-help materials. However, the quit rate in the study controls are quite low, so the absolute increase is only 2–4 percentage
points. A 2006 Cochrane review concluded that there is evidence of a dose–response relation (≥3 calls increases the chance of quitting), but according to updates in 2009 and 2013 there is mixed evidence of a relation between quitting success and the number of calls (but most trials used >2 calls). Offering a greater number of calls increases the effect of telephone counselling “not initiated by calls to helplines” (89, 93). However, the message in the most recent update of the American guidelines is clear; more intensive treatments are more effective than less intensive treatments, and there is a strong dose–response relation between counselling intensity and quit rates. In addition, there is no conclusive evidence for the effectiveness (or cost-effectiveness) being limited to specific populations of smokers. However, the guidelines emphasize that even minimal interventions (<3 minutes) increase quit rates and should be offered to all smokers regardless of a potential intensive intervention later on (47).

Classification of intensity

No uniform classification of intervention intensity exists. Intensity in the American guidelines (47) is determined by length per call and number of calls. Length per call is minimal when ≤3 minutes, low intensity when 3–10 minutes, and of higher intensity when >10 minutes. Number of calls is grouped into 0–1, 2–3, 4–8 and >8. The current guidelines state that recommended treatment intensity should include i) calls of more than 10 minutes in length and ii) at least four calls. In the guidelines from 2000, the total contact time was included and had to be more than 30 minutes. Increasing the total time up to 90 minutes increases quit rates, but no obvious additional effect is seen (94). In addition to the above, other components are included in intensive interventions, such as assessment of the smoker’s willingness to participate in an intensive programme and the use of different types of personnel. Also that individual, group and telephone counselling are all effective and ought to be combined with self-help materials and follow-up, that the counselling includes practical problem solving/technical training, and that pharmaceuticals are offered to all smokers (47).

Different classifications of intensity are used in different Cochrane reviews. For individual counselling, the lowest intensity is stated to consist of one 30-minute call (control programme), medium intensity includes four calls, and high intensity includes 12 additional calls for relapse prevention. The length of all calls should be more than 10 minutes (84). In the review of physician advice, Stead et al. distinguish minimal intervention (one single visit of <20 minutes, maximum of one follow-up visit) and intensive intervention (longer first visit, more than one follow-up visit, and more support material than a brochure) (85). For telephone support, the number of calls is grouped into ≤2, 3–6 and ≥7; however, there is no strong a priori rationale for this choice (89). A review of self-help programmes distinguishes
between programmes with minimal face-to-face contact and programmes with brief advice in addition to self-help materials (88).

The Swedish National Institute of Public Health (Folkhälsoinstitutet, FHI) and The National Swedish Board of Health and Welfare (Socialstyrelsen, SoS) describe three levels of effort. *Simple advice* (very short, simple advice performed by everyone, maximum 5 minutes), *brief counselling* (longer and more structured calls, from 10 to about 60 minutes, possible follow-up), and *qualified counselling* (more extensive treatment in time, individually or in groups) (95). The National Guidelines for Methods of Preventing Disease include *brief advice* (information, short advice and recommendations, possible addition of written information, usually less than 5 minutes), *counselling* (dialogue, adaptation to the specific person, possible addition of various tools and special follow-up, usually 10–15 minutes, occasionally up to 30 minutes) and *advanced counselling* (as for counselling but often longer, plus ordinarily theory-based or structured and by health-care professionals with training in the method used) (44).

Practical psychological theories and methods/models

Behaviour therapy is a psychotherapeutic approach aimed at identifying and modifying the behaviours associated with human problems. It is not limited to one specific method, but includes a wide range of techniques. Behaviour modification methods often include behaviour/functional analysis, extinction by exposure and skills training. Explaining and identifying classical and operant conditioning are important methods in this therapy (96). Conditioning with positive and negative reinforcement is illustrated in Appendix C (97). The belief in or perception of one’s ability to complete tasks and reach goals, the concept of “self-efficacy”, is an important factor for health behaviour change (98).

*Cognitive behaviour therapy* (CBT) comprises a range of relatively reliable psychological treatment methods to effect behaviour change by addressing thoughts and feelings that influence behaviors (99). A range of CBT methods is applied in smoking cessation and CBT is a central aspect of the SNTQ support protocol (65).

*Motivational interviewing* (MI) is a collaborative, client-centred counseling approach to elicit and strengthen motivation for change of lifestyle behaviours (100, 101). It has been reported to enhance treatment outcomes in tobacco cessation, e.g., at the SNTQ (102).

*The Transtheoretical Stages-of-change Model* states that a smoker moves through a number of stages on the way to becoming an ex-smoker. The stages are pre-contemplation (no intention to quit within 6 months), contemplation (intention to quit within 6 months), preparation (intention to quit within 1 month), action (are in a quit attempt and up to 6 months after)
and maintenance (after 6 months of abstinence). The smoker can move forwards and backwards a number of times; a relapse is not regarded as a failure, but provides knowledge for the next attempt. Different kinds of support are needed in the different stages (69).

A study of the behaviour change techniques used by the English Stop Smoking Services found that they can be based on a specific theory, but that “It is noteworthy that such a broad range of BCTs has emerged in the field of smoking cessation without obvious theoretical underpinning; this suggests that clinical experience has led those designing interventions in the direction of broadly based implicit theories” (103). The treatment protocols in the present studies are a mixture of behaviour therapy, coaching and pharmacological advice, and these are described further on pages 34-35.

Pharmacological treatment

The underpinning principles for pharmaceutical treatments are, alone or in combination: i) to mitigate the craving and withdrawal symptoms, ii) to reduce the reward derived from smoking by indirectly disrupting dopamine release or by desensitizing receptors, and iii) to deliver positive reinforcement other than from cigarettes/tobacco (47, 83, 104).

Three first-line licensed pharmaceuticals for smoking cessation exist. Nicotine replacement therapy (NRT) aims to replace some of the nicotine from cigarettes to reduce motivation to smoke and withdrawal symptoms. NRT is available as patches, chewing gum, nasal and oral sprays, inhalers and tablets/lozenges. Bupropion (Zyban®) is an anti-depressant that reduces craving by regulating the release of dopamine, noradrenaline and serotonin, and may work by blocking nicotine effects, relieving withdrawal or reducing depressed mood. Varenicline (Champix®) is a nicotine receptor partial agonist that may work by a combination of maintaining moderate levels of dopamine to counteract withdrawal symptoms and reducing smoking satisfaction. NRT and bupropion are equally effective and increase the chance of quitting by about 80% compared with placebo, and varenicline more than doubles the chance of quitting. Combining two types of NRT is more effective than single therapy, and is as effective as varenicline (83).

Settings

At present, clinically based cessation support in Sweden is delivered in a variety of health-care settings.

Dentistry may be a possible setting for different clinical public health interventions, including tobacco cessation, due to its regular recall system, which creates possibilities to help people change their lifestyle. There is an increasing interest in many countries in evolving tobacco cessation support
within dentistry (63, 79, 105-108). A recent Cochrane review of interventions for tobacco cessation in the dental setting (79) found a significant increase in benefit compared with an earlier version published in 2006 (109). Behavioural interventions delivered by oral health professionals to tobacco users in the dental office or community setting increases abstinence by 40–200% compared with controls (e.g., usual care, self-help). In a subgroup of trials in adult smokers at general dental practices (where the present study I was included), the effect was even better; OR 2.38 (95% CI 1.70–3.35).

During one year about 70% of the Swedish smokers attend a dental office (21, 31). Many Swedish dentists and dental hygienists see tobacco cessation support as a natural part of their work and have ambitions to develop cessation support at their clinics. However, effectiveness, cost and time are central and important factors regarding the implementation of different interventions. The main reasons for dental personnel not working with tobacco cessation are: a lack of cessation specialists to refer patients to, economic issues, the amount of time required and a lack of knowledge (63, 110).

The Swedish National Guidelines for Adult Dental Care include recommendations for treatments within seven guideline areas, e.g., “Methods for influencing behaviour”. Individuals with signs of or a manifest disease where smoking is a risk factor should be offered qualified counselling, i.e., theory-based behavioural medicine prevention and treatment. However, generally dentistry today can offer standardized counselling but lack the knowledge to work with qualified counselling, so a realization of the recommendation has both organizational and economic consequences.

Qualified counselling related to smoking cessation is presently carried out primarily within the health service, where tobacco users pay a medical service charge (“sjukvårdsavgift”). Whether the role of the dental service is solely to establish contact between patients and the health service or whether it should play a more active role in tobacco cessation is a policy question. A more active role implies that either additional resources have to be supplied, or resources must be diverted from their ordinary core activity (111).

The Public Dental Service (Folktandvården) in Västmanland has, in co-operation with a private company, developed a tobacco cessation programme “NIX” that has been in use since 1995 and has spread to other county councils. The programme was primarily developed for use at a group level, but has subsequently been developed for individuals (112).

Telephone quitlines have been established in many countries since the late 1980s. There are considerable differences in quitline treatment protocols, organization and techniques in different countries; however, most are free of charge for the client (or charge only for the calls) and include individualized counselling, instructional materials and referral to local cessation programmes. Some offer free or subsidized NRT as well. There are reactive
services that only reply to incoming calls and proactive services that follow up the first call with a number of callbacks. Comprehensive evidence exists for their effectiveness, especially the proactive services. There is evidence of a dose-response relation and clearer evidence for smokers who are motivated to quit; however no difference is found between different types of counselling methods and adjunctive self-help materials. Quitlines are also a very cost-effective way to provide smoking cessation support (47, 89, 93, 113-116).

The Swedish National Tobacco Quitline (SNTQ) started in 1998, and today is one of the most advanced quitlines in the world. It is operated by Stockholm County Council and mainly financed by the government/FHI (5 million SEK per year in 2013). Besides handling incoming client calls, the SNTQ receives referrals for tobacco cessation from the health-care system and offers supervision support to health-care personnel. Presently, the SNTQ replies to about 10,000 calls per year, of which fully 6000 are “treatment calls”. Other calls are about advice and support to parents/relatives, information on tobacco facts, laws and related information, orders of SNTQ materials and supervision of tobacco cessation. The quitline has continuously developed through ongoing evaluation and adoption of new research findings. Evaluations are made possible through data journal and postal questionnaires. After 12 months, about 30% of smokers become abstinent at a cost of SEK10,000 per abstinent client and SEK3000 per life-year saved. The SNTQ functions at its best in co-operation with the health-care service, and accounts for about half of the successful high-quality professional tobacco cessation support in Sweden, although increasing patient pressure may require adoption of more effective treatment methods (31, 54, 65, 113).

According to a survey in the county of Stockholm in the early 2000s, 24% of dentists and 65% of dental hygienists knew of the SNTQ, and of these, 48% and 60%, respectively, had referred at least one patient (63). Stimulation of connections between dental care personnel and quitlines may be of advantage to patients, and may also reduce the burden on personnel required to supply tobacco cessation support (117).

Health economic evaluations

Health economic evaluation is the comparative analysis of alternative courses of action in terms of both their costs and consequences. The aim is to provide a basis for decision-makers for the efficient allocation of societal resources. The basic tasks of any health economic evaluation are to identify, measure, value and compare the costs and consequences of comparative analyses. A so-called incremental analysis provides the differences in costs compared with the differences in health consequences of the alternatives being assessed, and the results are expressed as an incremental cost-
effectiveness ratio (ICER). The total costs of a treatment or another intervention differ depending on the perspective used in the analysis, e.g., the societal perspective (118).

Health economic evaluations are used to aid in decisions on the allocation of health-care resources. Decisions on resource allocation involve choices and prioritizations, and can be based not only on economic considerations like cost-effectiveness, but also on, e.g., equity considerations. Health economic evaluations serve as a basis for decisions based on cost-effectiveness. An intervention is defined as “dominant” when it costs less and is at least as effective as the comparator. When an intervention costs more and is no more effective than the comparator, it is termed “dominated”.

There are four main types of economic evaluations (Table 1). They measure costs similarly, but differ in the way in which they measure the consequences of the compared alternatives.

<table>
<thead>
<tr>
<th>Type of analysis</th>
<th>Consequences</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost analysis (CA)/Cost-minimization analysis (CMA)</td>
<td>None, considered equivalent in the alternatives</td>
<td>Identifies the least costly alternative</td>
</tr>
<tr>
<td>Cost-effectiveness analysis (CEA)</td>
<td>Disease-specific measures (e.g. number of quitters) or life-years saved, relevant and common to the alternatives</td>
<td>Cost/effect Allows comparison of alternatives with common consequences</td>
</tr>
<tr>
<td>Cost-utility analysis (CUA)</td>
<td>A generic, not disease-specific measure incorporating both quantity and quality of life QALY</td>
<td>Cost/QALY Similar to CEA but allows comparison of alternatives across different health care areas</td>
</tr>
<tr>
<td>Cost-benefit analysis (CBA)</td>
<td>Monetary values Maximum willingness to pay (WTP) for a consequence or scenario</td>
<td>Disclose whether the calculated benefits exceed the costs. Does not require a comparison of alternatives. Allows comparisons between different societal sectors.</td>
</tr>
</tbody>
</table>

There are international and Swedish guidelines for health economic evaluations (118, 119). They should be performed with a societal perspective,
which means that all relevant costs and consequences are included regardless of payer or beneficiary. The recommended method is cost-effectiveness analysis with QALY as the outcome measure. The method is thus a cost-utility analysis, but for interventions affecting survival, both QALYs and life-years saved ought to be reported. Discounting should be done to adjust for differential timing of costs and consequences (3% per year is recommended in Sweden). Since economic evaluations include some degree of uncertainty, sensitivity analyses of central assumptions and parameters are important. The specified alternatives should be compared in an incremental analysis, where difference in costs is divided by difference in health effects to arrive at an incremental cost-effectiveness ratio (ICER). The choice of time horizon is important, and should be long enough to capture the major health and economic consequences. This may require extrapolation using decision analytic models, so-called Markov models.

This kind of model provides an opportunity to estimate costs and health outcomes over time beyond the time frame of the original evaluation and incorporates data from several sources and/or expert opinion that is normally found in a wide range of sources (118). Such models use mathematical relationships to define a series of possible consequences that can arise from the different options being considered. Based on the inputs to the model, the likelihood of each consequence is expressed in terms of probabilities, and each consequence has a cost and an outcome. Expected costs and outcomes of different interventions can subsequently be calculated (120).

Markov models are often used to calculate future health and societal effects of smoking cessation interventions. They estimate how smoking cessation affects the incidence of smoking-related diseases. Decreased morbidity implies decreased societal costs and increased health.

Smoking cessation interventions are cost-effective compared with the majority of medical and public health interventions, and have been referred to as the “gold standard” of health-care cost-effectiveness. The cost per life year gained for smoking cessation support is estimated to about SEK3000-15000, compared with, e.g., the cost for antihypertensive drugs which is estimated to from SEK100,000 and upwards (21, 31, 47, 113, 116, 121-125).

Intervention intensity is also an issue for cost-effectiveness. As more intensive methods are more costly, there is a trade-off between cost and effectiveness. Previous studies are divergent as to whether cost-effectiveness increases or decreases with increased intervention intensity (123, 124, 126-128).
The present studies

General aims
The primary aim of the studies included in this thesis was to compare the effectiveness of smoking cessation interventions of different intensity in a clinical dental and a telephone setting.

The secondary aim was to investigate cost-effectiveness of smoking cessation interventions of different intensity in a clinical dental setting.

Study-specific aims
Study I. To assess the effectiveness of a high-intensity treatment (HIT) compared with a low-intensity treatment (LIT) using the local dental service as a setting for cessation support.

Study II. To assess the cost-effectiveness of HIT and LIT for smoking cessation.

Study III. To assess the long-term effectiveness of HIT and LIT for smoking cessation and to analyse to what extent 12-month abstinence predicted long-term abstinence.

Study IV. To compare the effectiveness of the high-intensity proactive service with that of the low-intensity reactive service at the SNTQ.
Methods

Design

Studies I–III were performed in the county of Västmanland, Sweden, which has 250,000 inhabitants, is a mixture of urban and rural areas, and is considered to be a representative area of Sweden. Västerås, the largest city, has 140,000 inhabitants (19, 112, 129). The studies were based on a randomized controlled trial (RCT) in a dental setting of a population living in the county of Västmanland. Two programmes were compared; a high-intensity treatment (HIT) and a low-intensity treatment (LIT), and the randomization was performed by an independent person using an envelope technique in blocks of four. Study I analysed treatment effectiveness after 12 months, while study III analysed treatment effectiveness after 5–8 years (mean, 77 months). Study II analysed cost-effectiveness after 12 months.

Study IV was a semi-randomized clinical trial of callers to the Swedish National Tobacco Quitline (SNTQ), which is a nationwide service, and Sweden has a current population of 9.5 million (130). Two services were compared; a proactive and a reactive service, and the randomizations were performed on even and odd dates. The study analysed treatment effectiveness after 12 months. The four studies are outlined in Figure 3.

Figure 3. An overview of the four studies
Participants

Study I included 300 adult daily smokers ≥20 years of age living in the county of Västmanland in 2003–2005. They were recruited mainly by dental and health care personnel in Västerås with surroundings encouraged to screen for daily smokers and offer all smokers over 20 years of age smoking cessation support. Some recruiting was performed by industrial health service and advertising in Västerås with surroundings. Those interested in smoking cessation and fluent in the Swedish language were then randomized. Combined users were not excluded. Six participants did not reply to the baseline questionnaire, leaving 294 in the study population with complete information. Three participants were smoke free at the time they answered the baseline questionnaire and ten were not daily smokers any longer. Women constituted 80%, the mean age was 49 years with 85% in the interval 35-64 years, and the mean number of cigarettes smoked per day was 15. The response rate in study I was 86% (252/294). Study II was based on study I. In study III, 284 of the recruited participants in study I were still alive and living in Sweden, and the response rate was 85% (241/284). A flowchart of study I and III is presented in Figure 4.

Study IV included 586 smokers/recent quitters who i) called the SNTQ between February 2009 and September 2010, ii) had their calls classified as treatment calls and iii) agreed to be followed up and returned the baseline questionnaire. There is no requirement for being “fluent in the Swedish language” at the SNTQ, since the service offers printed material in different languages and is able to offer support in other languages besides Swedish. However, problems with reading and writing Swedish have always been an exclusion criterion in all research at the SNTQ, since the questionnaires used are only available in Swedish. Women constituted 78%, the mean age was 50 years with 64% in the interval 35-64 years, and the mean number of cigarettes smoked per day was 11. The response rate at 12-month follow-up was 59% (347/586). A flowchart of study IV is presented in Figure 5.
Figure 4. Flowchart of the Västmanland studies. (Through returned unanswered questionnaires with comments, information about smoking status at long-term follow-up was given for one in HIT (who was smokefree) and four in LIT (one was smoke-free). That is the reason for $N = 284$ while the sum of the lower boxes is 282).
Figure 5. Flowchart of the SNTQ study.
(* internal drop-out for outcome variables in the follow-up questionnaire for one individual)
Some baseline characteristics of the participants in studies I–IV are presented in Table 2. There were no statistically significant differences between the programmes for any of the variables.

Table 2. Baseline characteristics of participants in the studies (%)

<table>
<thead>
<tr>
<th></th>
<th>Västmanland*</th>
<th>SNTQ†</th>
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<th></th>
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<tbody>
<tr>
<td></td>
<td>Total (N=294)</td>
<td>HIT (n=146)</td>
<td>LIT (n=148)</td>
<td>Total (N=586)</td>
</tr>
<tr>
<td>Gender: women</td>
<td>80</td>
<td>82</td>
<td>78</td>
<td>78</td>
</tr>
<tr>
<td>Age groups:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤ 34</td>
<td>10</td>
<td>6</td>
<td>14</td>
<td>20</td>
</tr>
<tr>
<td>35-49</td>
<td>41</td>
<td>47</td>
<td>36</td>
<td>25</td>
</tr>
<tr>
<td>50-64</td>
<td>44</td>
<td>42</td>
<td>45</td>
<td>39</td>
</tr>
<tr>
<td>≥ 65</td>
<td>5</td>
<td>6</td>
<td>5</td>
<td>17</td>
</tr>
<tr>
<td>Education in years:</td>
<td></td>
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<td></td>
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<tr>
<td>0 – 9</td>
<td>23</td>
<td>21</td>
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<td>25</td>
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<tr>
<td>10 -12</td>
<td>40</td>
<td>42</td>
<td>38</td>
<td>42</td>
</tr>
<tr>
<td>≥ 13</td>
<td>37</td>
<td>38</td>
<td>37</td>
<td>33</td>
</tr>
<tr>
<td>Number of smoked</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>cigarettes/day:*†</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥ 20 / ≥15</td>
<td>34</td>
<td>31</td>
<td>36</td>
<td>39</td>
</tr>
<tr>
<td>10-19 / 1-14</td>
<td>51</td>
<td>52</td>
<td>51</td>
<td>34</td>
</tr>
<tr>
<td>0-9 / 0</td>
<td>15</td>
<td>17</td>
<td>13</td>
<td>27</td>
</tr>
<tr>
<td>Smoke-free at baseline</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>28</td>
</tr>
</tbody>
</table>

*Information from all 294 subjects. † Information from all 586 subjects for gender, from 576 for age, from 570 for education, from 583 for smoke-free at first call, and from 482 for number of cigarettes/day. (For numerators and denominators see tables in papers).

‡ Grouping in Västmanland / SNTQ.

Treatment protocols and processes

Study I-III

All counselling to support smoking cessation was carried out by three dental hygienists who had been educated and trained in smoking cessation support methods in general and especially for the specific programmes used in this study. They were calibrated before the intervention programmes started.

The High-Intensity Treatment (HIT) programme comprised eight 40-minute individual sessions at the local dental clinic over a period of 4 months. The programme was a traditional state-of-the-art smoking cessation programme based on a mixture of behaviour therapy, coaching and pharmacological advice. The programme was based on a group session programme previously used by the Public Dental Health Service in Västmanland and adapted for individual support.
The Low-Intensity Treatment (LIT) programme consisted of one 30-minute counselling session focusing on explaining the content of a traditional self-help programme (in Swedish “Fimpa dig fri”). The leaflet contained an 8-week programme with instructions and tasks to perform each week. The self-help programme included several tests and behaviour registration exercises suggesting different action plans for different outcomes. In general, the self-help programme and the clinic-based programme were based on similar treatment protocols. Information on the possible benefits of nicotine replacement therapy (NRT) was included in both programmes, but the participants got no recommendation regarding use or no use. Both programmes were free of charge.

At the first meeting, a smoking cessation date was fixed for all participants in both groups. The participants were informed that they would be followed up through a questionnaire 12 months after their fixed smoking cessation date. Non-responders to the 12-month follow-up received up to two reminders, one by mail and one by telephone (I). Non-responders to the long-term follow-up received up to two written reminders, and those still not answering were contacted and interviewed by telephone by a dental hygienist (III).

The health economic evaluation (II) that was based on these programmes and the method for the evaluation is described on pages 38-39.

Study IV

The counsellors at the SNTQ are trained health professionals, such as nurses, dentists, dental hygienists or psychologists, with previous experience of primary and secondary prevention. Additionally, all counsellors receive approximately 6 months of training in tobacco cessation methods. Regular call monitoring with supervision is performed for quality assurance.

The structured treatment protocol is a mixture of motivational interviewing, cognitive behaviour therapy and pharmacological consultation. The treatment is based mainly on the following principles: i) continuity (via data-based client notes), ii) alliance (to establish a relation with the client), iii) goals (intermediate, final, realistic), iv) treatment intensity (reactive vs. proactive support), v) behavioural science theory, vi) motivational interviewing (including continuous supervision for the counsellors), vii) pharmaceutical counselling and viii) follow-up.

Standard SNTQ process

In the reactive service, only incoming calls are attended to, while in the proactive service, a number of callbacks are offered. The only difference between the services is the offer to provide callbacks. All calls are registered in a computerized database. When a tobacco user calls to discuss his/her tobacco behaviour, the counsellor asks whether the client would like to sign
up for cessation support. If the client give verbal consent, their preference for callback or no callback is recorded, and a registration form, which includes the baseline questionnaire, is mailed to them. A returned baseline questionnaire is regarded as informed consent and the client is included in the study base. The baseline information is registered in computerized client records in accordance with common rules of confidentiality. Printed material tailored to the client’s motivation to quit (“stages of change”) is offered free of charge. Twelve months after the first call, a follow-up questionnaire is mailed to the client. Non-responders to the baseline or follow-up questionnaire receive up to two reminders, one by mail and one by telephone.

The present study
In this study, clients were not offered a choice between callback and no callback but were assigned to the proactive or reactive service on even and odd dates, respectively. Clients were not informed that a randomization process was used to determine those who would be offered callback and those who would be told that they could call back whenever they liked.

Data collection/questionnaires
Data collection was done through postal questionnaires. The questions were developed and tested for face and construct validity by means of in-depth interviews and focus groups at the Centre for Tobacco Prevention in Stockholm. The questions used in the Västmanland studies were established questions used at the SNTQ and in many other studies, and grouping of variables was adapted to existing grouping at the SNTQ to facilitate comparisons.

A baseline questionnaire and a 12-month follow-up questionnaire were used in studies I and IV.

For the long-term follow-up in study III, a questionnaire was developed that completed the data collected in study I. The questionnaire included 13 questions, of which 11 were used in the baseline and 12-month questionnaires. There was a desire to capture what had happened during the past 5–8 years according to abstinence periods (relapse, new quit attempts, etc.) and pharmaceutical use. Therefore two questions were developed in which the participants were asked to mark on a time axis periods of abstinence and pharmaceutical use, respectively. The questionnaire was pre-tested in a pilot study on 10 ex-smokers and subsequently somewhat revised.

In study II, the data collected in study I was completed with information for the health economic evaluation through interviews with key personnel in study I. All questionnaires can be found in the appendices.
Outcome measures

Self-reported point prevalence and continuous abstinence were used as primary outcome measures, and in study III also sustained abstinence. The definition of 7 days abstinence for point prevalence is the most commonly used. The chosen 6-month limit for continuous abstinence corresponds with the Transtheoretical model’s definition of the maintenance stage when abstinence has become rather stable. For sustained abstinence in the long-term follow-up (III), there were no acceptance of any smoked cigarette since the quit date.

Statistical and health economic analyses

Statistical analyses

The statistical analyses were performed using SPSS version 14.0 (I, II) and SPSS version 20.0 (III, IV). Two-sided p-values less than 0.05 were considered significant in all analyses.

Descriptive statistics were used for presenting percentages and distribution of variables. Categorical variables were summarized by percentages and numbers. Continuous variables were summarized by mean, SD, median and quartile.

For comparison of programmes/services and subgroups such as men/women, depending on variable scale level and distribution, parametric as well as non-parametric tests were used. Chi-square tests or Fisher’s exact tests were used for categorical variables. The Student’s t-test was used for normally distributed continuous variables. The Mann–Whitney U-test was used for non-normally distributed continuous variables. The Wilcoxon Signed Rank Test was used to test change in number of smoked cigarettes at baseline and at long-term follow-up in people who were still smokers (III).

To study the effect of different variables (independent) on the outcome (abstinence, dependent), logistic regression analyses were performed. In the analyses, odds ratios (ORs) with 95% confidence intervals (CI) for the different abstinence measures were calculated. The ORs express a risk or a chance of an event or state occurring, such as number of events in a group of individuals exposed to a (risk) factor divided by number of events in an unexposed group. The reference value is 1.0. ORs >1.0 imply an increased risk/chance of the event occurring and ORs <1.0 imply a decreased risk/chance. A 95% CI that includes 1.0 implies a statistically non-significant result. First, univariable analyses of all relevant independent variables were performed. Variables with a \( p < 0.05 \) (I), and \( p < 0.2 \) (III, IV) in the univariable analyses plus programme/service, gender and age were included in the multivariable analyses to obtain adjusted ORs.
The choice of $p<.2$ in study III and IV was based on experience that multicollinearity can make variables significant at $p<.05$ in the multivariable analyses. To detect potential collinearity that could disturb the analyses, the multivariable analyses were performed with forward and backward stepwise likelihood ratio test. In cases of multicollinearity, the variable considered to be of highest quality was chosen (e.g. written information from baseline questionnaire instead of from data journal at the SNTQ), with lowest $p$-value, or with most observations (as the stepwise model only include individuals with observations on all the variables). In the present analyses results have been considered valid when forward and backward models were equal, the ORs biologically likely, and the CIs reasonably wide. Furthermore, Hosmer and Lemeshow goodness of fit test was used for testing the overall fit of the logistic regression model.

Depending on the aim of a study, multivariable logistic regression can be used for prediction of an outcome or for description of those who have achieved the outcome. In the included studies, both variants are used. In the Västmanland study, a description was made of those who had achieved abstinence after 1 year (I) and a prediction was made of abstinence after 5–8 years (III), when variables from baseline and 12-month follow-up were included. At the SNTQ, two regression models for each abstinence measure were performed, one predictive (included variables known at baseline) and one descriptive (included all variables known until 12-month follow-up) (IV).

Tests of homogeneity were performed on the ORs from the univariable analyses in study I using the Breslow–Day test. The same test was used to determine whether outcomes in the present semi-randomized SNTQ study (IV) differed from outcomes in the non-randomized SNTQ database with the first call between 1999 and 2007 (N=6997). In the absence of heterogeneity of the ORs, a Cochran–Mantel–Haentzel common OR for the two data sources was calculated to validate the result from study IV.

**Health economic evaluation**

The health economic evaluation was based on the costs of implementing the programmes, effectiveness measured by the number of abstinent participants according to the point prevalence and a previously produced Markov model that estimates the future health and cost consequences of smoking cessation. The cost-effectiveness analysis followed Swedish and international recommendations: performed in a societal perspective, health effects expressed as QALYs and programmes explicitly compared in an incremental analysis (ICER), with discounting (3% per year) and sensitivity analyses (118, 119). All costs were measured in Swedish kronor (SEK) in the year 2004 (exchange rate: SEK9.13=EUR1, SEK7.35=USD1).

To enable comparisons with other smoking cessation interventions, two analyses compared the cost-effectiveness of HIT and LIT with no
intervention. These analyses were performed in a societal as well as in a health-care perspective. Another analysis compared HIT and LIT with each other to obtain the ICER of the more costly HIT against LIT. In a sensitivity analysis, the ICER was also calculated employing the 6-month continuous abstinence.

Ethical considerations

Ethical approval was obtained from the Regional Ethical Review Board at Uppsala University for studies I–III (Dnr: Ups 02-457, Dnr: 2010/172) and from the Regional Ethical Review Board at Karolinska Institutet, Stockholm for study IV (Dnr: 00-367).
Results

Study I

HIT was significantly more effective than LIT according to continuous abstinence (18% vs. 9%, \( p = .02 \)), but not according to point prevalence (23% vs. 16%, \( p = .11 \)).

According to the logistic regression analyses, the number of cigarettes smoked at baseline was the only variable with a significant effect on point prevalence, while type of programme and number of smoked cigarettes (0–9/day compared with \( \geq 20 \)/day) were the only variables with a significant effect on continuous abstinence after controlling for sex, age and education level (Table 5, paper I).

Access to other support had no or minor additional effect on abstinence among participants in HIT. However, among participants in LIT who reported no access to other support, none reported continuous abstinence, compared with 14% of those reporting access to other support (\( p = .184 \)). Half of the participants had used NRT, and there was no difference in NRT use between HIT and LIT. Twelve participants used snus at follow-up, seven in HIT (two men and five women) and five in LIT (three men and two women).

Non-responders

Baseline characteristics of the participants answering the complete follow-up questionnaire (N=218) were compared with those of either the participants who did not respond to the follow-up questionnaire at all (N=33) or the non-completers in the HIT group who responded to a short follow-up questionnaire (described in paper I) (N=34). The only difference was that the non-responders had a higher cigarette consumption at baseline (\( p < .05 \)).

Conclusion

Screening for willingness to quit smoking within the health-care system and offering smoking cessation support within dentistry may be an effective model for smoking cessation support in Sweden. The LIT approach is probably less expensive and time consuming per quitter, and may be a preferable “first treatment option”. However, it should be integrated with other kinds of available support. The more extensive and expensive
HIT protocol is more effective in terms of the proportion of smokers who are smoke free after 12 months, and should be offered to those who are unable to quit with LIT support in combination with other support.

Study II

Intervention costs per quitter
The intervention costs per quitter, obtained by dividing the programme-specific costs by the number of quitters for each programme, amounted to SEK26,100 for HIT and SEK9100 for LIT. Only considering the costs to implement the programmes would favour the low-cost LIT programme, as it achieved a tobacco quitter at a lower cost.

Cost-effectiveness of HIT and LIT versus no intervention
The cost-effectiveness analysis of HIT and LIT compared with no intervention showed that HIT implied a net societal cost of about SEK100,000, which translates into SEK8400/QALY. The LIT was estimated to result in net cost savings as well as QALY gains. From a health-care perspective, the intervention costs, as well as the costs avoided for both programmes, were lower, and amounted to SEK27,000/QALY for HIT and SEK70/QALY for LIT (Supplemental Table 2, paper II). Compared with no intervention, both programmes are considered very cost-effective in Sweden, with costs/QALY below SEK100,000 (131). Either programme should thus be implemented.

Cost-effectiveness of HIT versus LIT
To enable a choice to be made between the two programmes, an incremental analysis (ICER) was provided. The more costly HIT programme led to a higher number of quitters, which translates into larger health gains and costs avoided than LIT. However, the difference in intervention costs was not fully balanced by the societal costs avoided, so HIT implied an incremental net cost of about SEK380,000 compared with LIT. HIT was estimated to lead to four more QALYs, so the incremental cost/QALY of HIT compared with LIT amounted to about SEK100,000 (Table 3, paper II), which is considered very cost-effective in Sweden (131). When quitting was measured as continuous abstinence, the higher effectiveness of HIT compared with LIT led to a decreased ICER of SEK50,000 for HIT vs. LIT. The incremental analysis favours the more costly HIT if decision-makers are willing to spend around SEK100,000/QALY for tobacco cessation programmes.
One-way and multi-way sensitivity analyses were performed using alternative model parameters and on the intervention costs (increased patient time consumption in LIT vs. increased price for the HIT material). The ICER of HIT vs. LIT was somewhat sensitive to some model parameters, in particular the disease risks, where alternative data tended to increase the ICER (Figure 1, paper II). The methodological choice to include societal costs during added life-years affected the ICER the most, while increased intervention costs had a minor effect. No analysis reached the Swedish threshold of cost-effectiveness of SEK500,000 (131). The probabilistic sensitivity analysis indicated that if decision-makers are willing to pay more than about SEK50,000/QALY, HIT is the preferred programme, even if the effectiveness of HIT is allowed to vary according to the 95% confidence interval of the difference in effectiveness between the programmes (Figure 2, paper II).

Conclusion

Intensive tobacco cessation support is often more effective, but also more costly, than low-intensity support. This trade-off between cost and effectiveness is highlighted in cost-effectiveness analyses. The low-intensity programme was less costly in the long run than having no programme. If decision-makers seek to avoid costs, the low-intensity programme should be implemented rather than no programme at all. If decision-makers are willing to spend some money to obtain tobacco quitters and related health gains, the high-intensity programme should be implemented. Likewise, if smoking cessation programmes are judged according to the same standards as other Swedish health-care measures, the high-intensity programme should be preferred by decision-makers.

Study III

After 5–8 years, there were no statistically significant differences between the programmes, either in point prevalence (ITT 27% and responder-only 31%) or in 6-month continuous abstinence (ITT 22% and responder-only 25%). Every tenth participant had been smoke free since the planned smoking cessation date, with a significant difference between the programmes in favour of HIT ($p=.03$) The abstinences were 8% higher in the long term than at 12-month follow-up, and the 7% absolute differences in abstinence rates between HIT and LIT had not changed between the two follow-ups (Table 1, paper III). Outcomes at 12-month and at long-term follow-up are illustrated in Figure 6.
According to the logistic regression analyses, point prevalence and 6-month continuous abstinence at the 12-month follow-up were strong predictors (ORs between 14 and 19) for point prevalence as well as for 6-month continuous abstinence at the long-term follow-up when controlled for programme and gender. Programme (HIT) was the only significant predictor of sustained abstinence, controlled for gender and NRT use between baseline and 12-month follow-up (Table 2, paper III).

Two-thirds of the participants reported access to other support, mainly social, and this was equal in both programmes. Point prevalence and continuous abstinence were significantly higher among those with other support than among those without. These differences were seen in LIT, but not in HIT. Access to other support was significantly higher among women than among men. Half of the participants had used NRT since the start of the programme, with similar figures in HIT and LIT. Eight per cent used snus during the week before the long-term follow-up compared with 6% at the 12-month assessment and 7% at baseline, with no significant differences between the programmes. The reduction in number of smoked cigarettes per day from baseline to long-term follow-up in people who were still smokers was significantly higher in HIT than in LIT.
Non-responders
The only difference between responders (N=241) and non-responders (N=43) to the long-term follow-up was a higher cigarette consumption at baseline and at the 12-month follow-up ($p=.010$ and $p=.025$) by non-responders. More non-smokers were found among the questionnaire responders and more smokers among the telephone responders ($p=.001$). Five participants who did not reply to the 12-month follow-up were smoke free at the long-term follow-up.

Conclusion
Abstinence at the 12-month follow-up is a good predictor for long-term abstinence. The difference in outcomes between HIT and LIT for smoking cessation, although non-significant except for sustained abstinence, remained relatively constant and in favour of HIT for at least 5–8 years after the intervention. A 12-month follow-up may be a suitable end-point for assessment of smoking cessation programmes with fixed quit dates.

Study IV
There were no statistically significant differences in outcomes between proactive and reactive services at the 12-month follow-up, in either point prevalence or continuous abstinence, or in either ITT or responder-only analyses. According to ITT, 27% were point prevalent and 21% were continuously abstinent, and among those who responded to the 12-month follow-up, point prevalence and continuous abstinence were 47% and 35%, respectively (Table 1, paper IV).

According to the logistic regression analyses, the outstanding variable for both predicting and describing abstinence was smoking status at baseline. The probability of being smoke free 1 year later was 3–5 times higher for a caller who had not smoked during the past week than for a smoker. The ability to handle stress and depression without smoking also significantly predicted abstinence. Other variables that described abstinence differed between the two outcomes. The ability to handle stress and depression without smoking, a high level of client satisfaction at the first call and female gender were significant for point prevalence. Baseline assessment of the probability of being smoke free in 1 year and not using NRT in the week before follow-up were significant for continuous abstinence (Table 3, paper IV).

The test of homogeneity of outcomes in the present RCT study compared with outcomes of 6997 clients in the SNTQ database with first call 1999–2007 showed no significant difference in outcome between the
two data sources. The Cochran–Mantel–Haentzel common OR for point prevalence was 1.02 (95% CI 0.92–1.14) and for continuous abstinence was 1.09 (95% CI 0.96–1.23) (unpublished and not included in paper IV).

Non-responders
The response rate at the 12-month follow-up was significantly higher in the reactive service than in the proactive service (64 vs. 55%, $p=.015$). A comparison of baseline characteristics between responders (N=347) and non-responders (N=239) showed some significant differences. Responders were older, smoke free at the first call to a higher degree, pharmaceutical users and unexposed to second-hand smoke. They also smoked fewer cigarettes per day, but had been smokers for a greater number of years.

In a separate unpublished analysis of contacted responders and non-responders to the 12-month follow-up (74% response rate), 54% (36/67) of responders were point prevalence abstinent 2.5–4 years after the first call compared with 32% (14/44) of non-responders ($p=.023$). For 6-month continuous abstinence, the corresponding rates were 49% (33/67) and 21% (9/43) ($p=.003$).

Conclusion
To optimize resource utilization at the SNTQ, the reactive service may be preferred as the first treatment of choice. However, more research is needed to assess whether the proactive service may be favourable for subgroups of clients.
Discussion

This thesis deals with issues of intensity, effectiveness and cost-effectiveness of smoking cessation programmes in two different settings, a clinical dental setting with personal contacts and a quitline setting with telephone contacts.

In the following discussion, the studies in the clinical dental setting will be referred to as the Västmanland studies, and the quitline study will be referred to as the SNTQ study.

Main findings

Both high- and low-intensity programmes were effective in the clinical dental setting as well as the telephone setting. HIT was significantly more effective than LIT according to continuous abstinence after 1 year and according to sustained abstinence after 5–8 years. Number of daily smoked cigarettes at baseline predicted abstinence at 1 year and abstinence at 1-year follow-up was a very strong predictor for abstinence after 5–8 years (I, III).

Compared with no implementation of any smoking cessation intervention, it is a societal waste not to implement the LIT programme, as it results in lower societal costs. However, if smoking cessation programmes are judged according to the same standards as other Swedish health-care measures, the HIT programme should be preferred by decision-makers, as the incremental cost per QALY for HIT versus LIT was around SEK100,000 (II).

Proactive and reactive services at the SNTQ were equally effective after 1 year. Smoking status at baseline was the strongest predictor for abstinence at 1 year (IV). The quit rates are summarized in Table 3.

Table 3. Quit rates summarized (%, ITT)

<table>
<thead>
<tr>
<th></th>
<th>2004-2006</th>
<th></th>
<th>2010-2011</th>
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<tbody>
<tr>
<td></td>
<td>PP(^{\dagger})</td>
<td>CA(^{\dagger})</td>
<td>PP(^{\dagger})</td>
<td>CA(^{\dagger})</td>
</tr>
<tr>
<td>Västmanland</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HIT/LIT</td>
<td>23/16</td>
<td>18/9(*)</td>
<td>31/24</td>
<td>26/19</td>
</tr>
<tr>
<td>5-8 yrs</td>
<td>1 yr</td>
<td></td>
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<tr>
<td>SNTQ</td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>Proactive/reactive</td>
<td>26/29</td>
<td>20/22</td>
<td>26/29</td>
<td>20/22</td>
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<tr>
<td>1 yr</td>
<td></td>
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\(^{\dagger}\)PP= point prevalence, CA= 6-month continuous abstinence, SA= sustained abstinence

*\(p<.05\)
Treatment effectiveness

In the *Västmanland studies* (I, III), HIT was more effective than LIT in absolute rates for all measurements; however, the differences did not always reach statistical significance. The 7% higher abstinence for HIT than LIT can be considered clinically relevant, because of the large health and economic gains resulting from quitting smoking.

In terms of the most prolonged periods of abstinence, 6-month continuous abstinence at the 12-month follow-up and sustained abstinence at the long-term follow-up, HIT was significantly more effective than LIT. This probably arose from the nature of the programmes. The HIT programme includes structured, repeated long-term personal contact with the counsellor and presumably gives participants more exposure to positive reinforcement, skill training and encouragement to maintain their programme targets. This would increase the proportion of people quitting smoking by a fixed date. Zhu et al. showed that multiple-session compared with single-session telephone counselling, and especially self-help intervention, significantly lowered the relapse rate during the first week, which in turn translated into a higher 12-month abstinence rate (132). It has also been suggested that the self-regulatory skills required to withstand the urge to smoke might be better learned, rehearsed and retained under direct supervision from a therapist than through self-help materials (88, 133).

The spontaneous quitting rate in this population is 1–2% per year, and among motivated smokers trying to quit without assistance the prevalence of abstinence is 7–10% 12 months later (47). Overall, the LIT group was approximately twice as likely (16%) to report abstinence after 12 months (Table 3, paper I). However, the LIT programme not only included self-help material, but also comprised screening for tobacco use, offering support, one 30-min treatment session, and a 12-month follow-up.

Between the 12-month and the long-term follow-up, abstinence rates increased by 8% in both programmes, giving a 31% point prevalence abstinence in the HIT group and 24% in the LIT group (Table 1, paper III). To our knowledge, there are no non-pharmacological clinical studies with long-term follow-up, so it is difficult to compare these abstinence rates. However, our results are similar to those reported from intensive treatments including NRT in Sweden (55), the USA (134, 135), and Iceland (136). Of course, one question is what would have happened to the present smokers if they had not participated in the study, and this will be discussed further on page 53.

In the *SNTQ study* (IV), the equal effectiveness of the proactive and the reactive services was surprising, as it contrasts with a number of studies and meta-analyses (47, 89, 93). However, a recent study from the English smoking quitline showed the same result, equal effectiveness of reactive and proactive services after 6 months and furthermore no effect from offering
free NRT. Yet, the completed numbers of calls in the English study were similar for the two services offered (137), which was not the case in our study. The effectiveness of the SNTQ programme has improved continuously over time, from below 30% to almost 40% in point prevalence among clients responding to the 12-month follow-up (102). The present study indicates a further improvement, as almost half of those who responded to the 12-month follow-up had been smoke-free in the previous 7 days, and one-third had been smoke-free for the past 6 months, in both the proactive and reactive service groups (Table 1, paper IV). Comparisons with other quitline programmes are difficult because of considerable differences in treatment protocols, organization and techniques (90, 114, 115); however, the effectiveness in the present study compares favourably with most other reports, even those including NRT (47, 90, 93, 115, 137-140). Nevertheless, the SNTQ approach is one of the most advanced in the world, and the present results from 586 clients were confirmed through a comparison with data from the 1999–2007 SNTQ report based on 6697 clients using tests of homogeneity.

Approximately 20% of callers are smoke-free when they first call the quitline, and this proportion has remained relatively stable over time (54). Those callers are probably the highest motivated, which is supported by “smoke-free at baseline” being the most important factor for abstinence after 1 year in our regression analyses (Table 3, paper IV). This is one possible explanation to the relatively high success rates at the SNTQ and a factor that has to be taken into account when trying to compare these results with those of other smoking cessation programmes. In addition, the specific definition used to define the study base at the SNTQ is a factor to be considered when comparing results with those of other services.

The high number of smoke-free clients at baseline may dilute the differences between the proactive and the reactive service. Our results contrasts with most studies in the Cochrane review of telephone counselling (89) and the US Guidelines (47) which show better outcomes for multiple proactive counselling, and one explanation might be that many of these reports only included smokers. It is also possible that the counselling delivered during the first call, which was of similar duration in both services, maintained a high level of quality and efficacy, and by that diluted the differences between the services. Indeed, high-quality MI skills as an addition to the behaviour therapy-based treatment protocol are integral to the SNTQ treatment. In a previous controlled clinical trial, adding high-quality MI to the SNTQ approach was found to enhance the treatment outcome significantly (102). It is certainly possible that a high level of MI skill in the initial interview might dilute the differences between reactive and proactive treatment because of clients experiencing high empathy and alliance from the counsellor. This would create a feeling of being welcome to contact the SNTQ again.
whenever the need arose. Indeed, the present results show that those clients experiencing a high level of satisfaction at their first contact were twice as likely to be abstinent after 1 year (Table 3, paper IV), independent of treatment protocol. Also, the reactive service at the SNTQ has, to some extent, a proactive element as all clients are followed up after 12 months. The effect of the 12-month follow-up per se is, however, unknown, but follow-up is one core element of a tobacco intervention (47). Why the response rate at 12-month follow-up was higher in the reactive service group than the proactive service group is yet un-explained and somewhat surprising, since recruitment and follow-up routines were exactly the same for both groups. However, it is possible that these differences may underestimate the effect of the proactive service compared with the reactive, since responders may be more likely to be smoke-free at follow-up as demonstrated in higher abstinence rates in responder-only compared with ITT-analyses (Table 1, paper IV).

The rationale for the present SNTQ study was the need to make the best use of limited resources, and one way would be to provide treatment related to individual performance. No differences were found between the two services for gender or for different age groups. However, this issue calls for more research, especially because it contrasts with a previous non-randomized SNTQ study where the proactive service was found to be more effective in women than in men (54). It is possible that the present study lacked statistical power to detect subgroup differences.

Reported effectiveness data on smoking cessation intervention programmes are important for making decisions. But is a percentage really a percentage? And is it clinically relevant? And why do success rates vary between different units and studies? The latter will in part arise from variations in smoker characteristics but might also result from variations in delivery of the services (103). Present-day smokers might also differ from those in the past. For example, today smokers are to a great extent people with poor socio-economic conditions and more co-morbidity, whereas previously more of a cross-section of the population smoked.

There are a number of possible explanations as to why individuals respond differently to the same treatment. These range from psychological factors, such as expectations or co-operation with the therapist, to known and unknown biological variations. Just by participating in an experiment or study, individuals can change or improve a given behaviour, referred to as the Hawthorne effect. This might partially explain why a large proportion of participants in control groups of smoking cessation studies stop smoking (141). Participation in a survey acts as an intervention in itself, markedly reducing reported cigarette consumption initially (142). Learning mechanisms and expectations of benefits powerfully affect the brain, mind and body. Both positive and negative effects might occur based on
one’s expectations or prior experiences, known as placebo and nocebo effects, respectively. Nocebo effects can be attributable to the communication of potential adverse effects, memories of past unsuccessful therapeutic experiences and negative psychosocial contexts and clinical encounters (143, 144).

Both smoking and quitting smoking are not only an individual’s choice of behaviour associated with nicotine dependence, but take place in a complex interplay with several economic, social and societal factors, such as cigarette price, social norms, marketing and legislation. Such factors can also decrease or erase real differences between different intervention groups, because they affect individuals equally (145, 146). Examples are the effects of smoke-free restaurants, bars and workplaces on stopping smoking in general.

Possible confounders for abstinence in the present studies
Variables commonly reported to be associated with higher smoking abstinence rates include high motivation, low nicotine dependence, high socio-economic status and social support (47, 53). Some of the variables associated with abstinence in the present studies will be discussed here.

High motivation and low nicotine dependence were important factors for abstinence. In the Västmanland studies, the daily number of smoked cigarettes at baseline had a significant influence on the probability of abstinence after 12 months (Table 5, paper I), and achieved abstinence at 12 months was the strongest predictor for abstinence at the long-term follow-up with ORs of 14–19 in multivariable logistic regression analyses (Table 2, paper III). In the SNTQ study, smoking status at baseline was the strongest predictor for abstinence at 12 months. Being smoke-free in the week prior to baseline increased the odds for abstinence by 3–5 times (Table 3, paper IV).

Social support, for example from family and friends, was associated with abstinence in the Västmanland studies. Access to other support was greater in women than in men, but equivalent in both programmes, and seemed to improve the LIT but not the HIT approach. Social support is often given during treatment, and the provision of intra-treatment social support, besides practical counselling (e.g., problem solving/skill training), is a counselling strategy shown to increase abstinence rates significantly of intensive interventions (47). Thus low-intensity and self-help interventions might be improved by encouraging participants to seek additional support from different sources such as family and friends, pharmacies, quitlines (147, 148), and the Internet. Blogging offers a unique platform for informal conversations about quitting smoking and is shown to provide social support through personal stories or experiences, emotional support or congratulations given to other users (149).

The effectiveness of NRT seen in clinical trials (83, 150) has been questioned when used in real-world settings and in general populations
(137, 151, 152). No obvious support for the effect of NRT was found in the present Västmanland studies. At the long-term follow-up, no difference was detected in abstinence rates between those who had used NRT for ≥5 weeks and those who had not used NRT at all; however, those who had used NRT for <5 weeks were significantly less likely to be abstinent. There were indications that NRT was more valuable for participants in the LIT than in the HIT programmes (Additional Tables S1 and S2, paper III); however, the study was not designed to assess NRT use as such, so we were unable to draw conclusions regarding its real effect. In the SNTQ study, no effect of NRT use was found between the first call and the 12-month follow-up by multivariable analyses, which contrasts with previous findings at the SNTQ (54), but is consistent with results from the English national quitline study (137). However, those who used NRT in the week before the follow-up were significantly less likely to be continuously abstinent (Table 3, paper IV).

The use of snus was low (≤8%) in the present studies and was not a significant predictor for abstinence in the multivariable analyses for the Västmanland or SNTQ studies.

Specifically significant factors emerging from the SNTQ study were that clients with a high belief at baseline in their own ability to cope with different situations without smoking (“self-efficacy”) and clients who reported a high level of satisfaction with the counsellor at first contact were significantly more likely to be abstinent after 1 year (Table 3, paper IV).

This thesis deals with issues of treatment intensity, but what actually defines intensity? According to previous accounts, it is not an unambiguous concept. In the American guidelines, intensity is determined by the session length and number of sessions. However, a number of other components also form part of intensive interventions: for example, practical problem solving and skills training, combinations of self-help material and follow-up, and pharmacotherapy (47). The heterogeneity of reported intensity classifications (page 22) means that it is difficult to study, describe and discuss the optimal levels of programme intensity. Another concern is whether the intensity of programmes is reflected appropriately in trials. Many participants in the Västmanland study received social support from family and friends, and no LIT programme smoker achieved a 6-month continuous abstinence after 1 year without this informal “other support”. In the SNTQ study, significantly more calls and longer counselling durations were found in the proactive than in the reactive services: thus, the proactive service was of higher intensity. However, differences in call volume are not obvious in practice, because callers using a reactive service can call many times and callers using a proactive service do not always accept or receive all scheduled calls (90, 137, 139). Even though it is impossible to define what a high- or a low-intensity intervention means, the interventions compared in the present studies were clearly of different intensity.
Long-term abstinence

Achieving lifelong abstinence is an important public health goal, and thus is the ultimate aim of treatments aimed at stopping smoking. Is it possible to predict who will remain abstinent? The majority of smokers quit and relapse a number of times before they achieve sustained abstinence (35, 47). The estimated annual incidence of relapse to smoking after one year of abstinence is 2–15% in retrospective studies (with recall problems) and about 10% in prospective studies (153). Studies report that, among 12-month abstainers, 60–70% remain abstinent for at least 8 years (154, 155). In the comprehensive American Lung Health Study with long-term follow-up of smokers with mild airway obstruction, participants with sustained abstinence for the first 5-year period were very likely to remain abstinent after 11 years (134).

The present long-term follow-up found that abstinence rates increased by 8% between the 12-month and the long-term (5–8 years) follow-up in both programmes, and that abstinence at the 12-month follow-up was the strongest predictor of long-term abstinence. However, regarding differences between the programmes, the group who had achieved point prevalence but not 6-month continuous abstinence at the 12-month follow-up was found to be crucial; the LIT programme had more smokers and fewer abstinent participants at the long-term follow-up than the HIT programme (Additional Figure 2, paper III). Thus, it might be possible to offer some kind of renewed support after 1 year to participants in this group, but this needs to be studied further.

Significantly more participants in the HIT than in the LIT programme achieved sustained abstinence, and the repeated contacts between counsellors and participants in the former approach offer a possible explanation. A condition for defining “sustained abstinence” is the lack of any relapse after the quit date, and as shown by Zhu et al., multiple compared with single counselling significantly lowers the relapse rate during the first week (132).

We are not able to comment on how the participants in the present study possibly quit and relapsed, because we decided not to use information on the number of quitting attempts (described on page 36). The reasons were the long follow-up period, adherent recall bias problems (156), a considerable number of internal drop-outs on the question of quitting attempts, and the study design, with no measurements taken between the baseline, 12-month and long-term follow-ups.

However, what happened according to the participants’ intention to quit from the 12-month to the long-term follow-up is interesting. Among smokers at the 12-month follow-up who intended to make a new quit attempt within the following 6 months, 18% were smoke-free at the long-term follow-up.
However, among those who had not intended to quit at the 12-month follow-up, 36% were smoke-free at the long-term follow-up ($p=.001$). Of the participants responding to the long-term follow-up who were still smoking, 63% (105/166) were actually trying to quit at that time or intended to make a new attempt within the following six months, with no significant differences between the programmes.

As previously mentioned, a relevant question is how these results are related to general quitting in society, and this is an issue open to speculation. Abstinence rates increased by 8% from the 1-year to the long-term (5–8 years) follow-up in both programmes, and during that period the daily smoking prevalence among adults in Sweden declined from 15% (2005) to 11% (2011) (14) and in Västmanland it declined from 16% (2004) to 12% (2008, 2012) (18). The reduction in daily smoking prevalence in the population has been rather stable at 1–2% per year, but in recent years it has been rather less than 1% (46).

Not all smokers are able or willing to quit completely, but they might reduce their daily number of cigarettes smoked. Whether reducing daily cigarette consumption will bring health benefits is still somewhat doubtful (157); however, reduced smoking appears to increase the likelihood of future cessation (158). A linear decline in reported daily cigarette consumption of continuing smokers was reported in four countries studied in a survey covering 2002–2007 (USA, UK, Australia, and Canada) (142). A greater rate of decline was seen among those who had made at least one quit attempt, so the authors concluded that continuing smokers should be encouraged to persevere at trying to quit, as this should help to minimize their consumption. A meta-analysis of interventions aimed at reducing smoking before quitting and interventions aimed at abrupt quitting without prior reduction showed similar quitting rates (159). In the Västmanland studies, those subjects who were still smoking at the long-term follow-up had reduced their daily number of smoked cigarettes significantly, which can be seen as a step in the process towards quitting (69, 160). Two-thirds of this group intended to make a new quit attempt within the following 6 months. The reduction in number of smoked cigarettes per day from baseline to long-term follow-up in people who were still smokers was significantly higher in the HIT than in the LIT programmes.

**Cost-effectiveness**

*On method*

The cost-effectiveness analysis followed Swedish and international recommendations: performed in a societal perspective, health effects expressed as
QALYs and programs explicitly compared in an incremental analysis (ICER), with discounting (3% per year) and sensitivity analyses (118, 119). However, analyses which compared the cost-effectiveness of HIT and LIT with no intervention were also performed, to enable comparisons with other smoking cessation interventions. These can be valuable, not least since they were performed in a societal as well as in a healthcare perspective.

The effectiveness of the programs is important for assessing the cost-effectiveness and validity increases as it was derived from a RCT with comparable study groups at baseline. However, effectiveness may be overestimated as abstinence was self-reported and it was not adjusted for the natural quit rate, i.e., cessation even in the absence of the programs, and nor for relapse after final follow-up. Hence, abstinence according to ITT was used, which avoids overestimated effectiveness. Importantly, none of these factors are expected to affect the quit rates differently over the programs, and thus not the relative cost-effectiveness (the ICER). Also, the 12-month point prevalence abstinence of 23% for HIT and 16% for LIT is comparable with previous studies (47).

The external validity of the study might be affected by higher intervention costs than if the programs had been implemented as normal practice. The costs were calculated based on the trial protocol, which probably implies higher project management costs. Costs for staff training were also included, which could be considered as start-up costs and not to be included in normal practice costs. This has probably overestimated the costs per quitter and the costs per QALY for the programs compared with no program. However, the ICER for HIT versus LIT could be underestimated, since the joint costs were disregarded but a more intensive program would probably require more management.

The use of a model to estimate future effects on costs and health always raises uncertainty and validity issues (118), but modelling is necessary to capture the full economic implications of tobacco cessation.

A number of factors make it possible that the societal effects of smoking cessation from the model are underestimated; i) only four disease groups are modelled, ii) no effects of passive smoking are included, iii) the probable diffusion of smoking cessation beyond the study groups is not included, nor are any changes in quality of life from increased or decreased self-esteem and anxiety among the participants. Taking these factors into consideration would have decreased the costs per QALY for both programs. However, costs in added life-years which increase the costs of smoking cessation considerably were not included in the model and thus would tend to overestimate the societal benefits of smoking cessation (as seen in sensitivity analysis K in Figure 1, paper II). Importantly, the potential bias arising from incorrect model estimates decreases when the relative cost-effectiveness is calculated in the ICER. The model indicates considerably lower health gains and cost savings from tobacco cessation for women than for men. This is
due to lower smoking-related disease risks for women reported by large epidemiological studies (161) initiated during a period when smoking was more common among men than women. This is contrary to the present situation in, e.g., Sweden, which implies that health benefits and cost savings from tobacco cessation probably are underestimated among women. However, since there were no gender differences in effectiveness between the two programs, the ICER is unaffected.

There are several used simulation models for economic evaluations of tobacco cessation programs. Because of different structure and content, it is difficult to validate and compare the results. However, in a review of such models, the model used in the present study received a favourable rating (162).

On results
From a policy perspective, the choice of whether to implement one particular treatment or intervention will depend on the available resources, alternative uses of resources and other constraints. The ethical principles for prioritization in Swedish health policy are: first, human dignity; second, necessity and solidarity; and third, cost-effectiveness (163). New medical technologies and treatments can often be more effective, safe, humanitarian, and improve medical results; however, it is not evident that they are cost-effective. If the costs are in a reasonable proportion to the benefits or utility generated are determining for cost-effectiveness (164).

A more expensive programme must be more effective than a cheaper one to be labelled cost-effective, i.e., to achieve health gains that balance the extra costs. A central issue in cost-effectiveness analyses is the choice of comparator; another is what is considered cost-effective. In Sweden no definitive limit exists, but in general interventions costing less than SEK100,000/QALY are considered very cost-effective and interventions costing less than SEK500,000/QALY are considered cost-effective by the National Board of Health and Welfare (131). Compared with no intervention, both the HIT and LIT programmes were very cost-effective. Even more, it would be a societal waste not to implement LIT, as it resulted in both cost savings and health gains. HIT was more expensive and more effective than LIT, but the model’s estimate of societal costs that were avoided did not balance the higher intervention costs, so the extra cost per QALY gained (shown by the ICER) amounted to SEK100,000 for HIT versus LIT, and this was very cost-effective. According to our sensitivity analyses, HIT should be preferred if the decision-maker’s willingness to pay exceeds SEK50,000 to gain an extra QALY. The intervention cost per quitter in the present study is comparable to the SEK10,000/abstinent client at the SNTQ reported in 2004 (113).
The explicit objective of smoking cessation policies, as for all health-care interventions, is to produce longer and healthier lives. As smoking cessation reduces disease rates, it results in reduced health-care costs. However, the initial health-care savings turn over and increase as the population ages and with varying speed in different countries (165). This apparently negative cost result is in reality a positive result because it is the direct result of people living longer. Furthermore, other aspects of society are affected in a complex manner, such as productivity, sick leave, early retirement pensions and consumption. Whether or not societal costs during added life-years should be included in health economic evaluations are discussed (166, 167). These costs were included in a sensitivity analysis and they mostly affected the ICER (Figure 1 in paper II).

Methodological considerations

Striving for high quality is important in all research, which gains value from the quality of the methods used. In quantitative research, factors that are important for quality include valid and reliable measuring instruments, a sample that reflects the population and drop-out rates that are analysed and accounted for (168).

Strengths and limitations

The main strength of the present studies is the RCT design. Further strengths are analyses of follow-up data according to both ITT and in responders only, and also the high response rate and the long-term follow-up in the Västmanland studies (I–III). The health economic evaluation (II) followed Swedish and international recommendations and used a model that was based on Swedish cost and quality of life (QoL) data and partly on Swedish epidemiological data.

The major limitations and threats to the validity and generalizability of the results are non-response and self-reported smoking status. These issues will be discussed in the following sections.

Study design

RCTs are widely considered the most reliable form of scientific evidence, and the gold standard for a clinical trial. This is the best-known design for elimination of bias that regularly compromises the validity of research. A proper randomization balances both known and unknown prognostic factors in the assignment of treatments (169-171).

A problem with clinical trials may be the sometimes strict selection of participants. Efficacy, the ideal “effectiveness”, may be a necessary
criterion for evaluating smoking cessation programmes, but it may not be sufficient for developing public health policies and clinical guidelines. Efficacy studies involve recruitment of motivated participants, random assignment, intensive assessment and methods designed to keep participants in treatment (47). The impact of programmes is important if they are to be useful and effective for broader groups of individuals. Impact has been defined as effectiveness × reach (172) or efficacy × participation rate (173, 174). The discussion of impact is relevant regarding highly intensive interventions that may have limited reach.

As opposed to efficacy, effectiveness arises in routine circumstances, the outcome achieved from a treatment provided in a “real-world setting” (a clinic or community setting). Effectiveness studies typically involve participants who do not seek out the study or treatment, and the treatment is delivered in a manner consistent with its likely use in real-world settings (47).

There are some differences between the RCTs included in this thesis that need to be discussed. The study of HIT and LIT in the clinical dental setting was an RCT with a proportionately high degree of control; however, it was less than, for example, typical efficacy pharmaceutical trials with frequent follow-ups and biochemical verification of abstinence. Thus, this study is regarded as an effectiveness study. The randomization was performed with an envelope technique in blocks of four and the allocation was concealed until enrolment was complete. This minimized the risk for bias, which is acknowledged in the Cochrane review where paper I is included (79). Blinding for bias control was not feasible due to the nature of the interventions.

Quitline trials are, in most cases, effectiveness trials because they are conducted within the context of operating quitlines, and therefore under relatively real-world conditions (93, 114). The study was the first attempt at the SNTQ to randomize clients within the usual running activities of the service, with the rationale of needing to make the best use of limited resources. At the SNTQ, clients normally choose between a proactive and a reactive service. However, in the present study, the clients were not informed that a randomization process was used to determine whether they would be offered callbacks or simply informed that they could call back whenever they wanted. Randomization was performed by using even and odd dates, determined at the time of the client’s first call. This implies that the intervention had started before the client was included in the study, because a returned completed baseline questionnaire was required for inclusion in the study base. This also implies that the client knew the service when deciding to return the baseline questionnaire and thus be included in the study. This is the reason for our decision to label the study as semi-randomized. The definition of the study base used at the SNTQ has remained
constant to enable comparisons of changes in outcome with changes in the treatment protocol over time, but it may be a potential problem when comparing SNTQ results with other smoking cessation services.

In a real-life study, many practical factors such as invalid phone numbers and missed appointments influence the intervention actually delivered. Furthermore, in the present semi-randomized study, even human factors such as forgetfulness, specific wishes and the considerations of callers and counsellors can result in a protocol violation. Thirteen per cent of those randomized to reactive service actually received proactive service, a figure that ought to be zero, and those clients had to be excluded from the study. A possible explanation is the randomization procedure to proactive service on even-numbered dates and to reactive service on odd-numbered dates, which required the counsellors to remember and then strictly abide by what was stated in the protocol. Some counsellors expressed a feeling of frustration in not being able to offer callbacks. The randomization procedure used might possibly imply a risk for clients to see through the system with every two days, especially in a geographically restricted study population. This was not the case in the present study because the SNTQ is nationwide, but a block randomization with closed envelopes would have been preferable, not least for the practical handling to be perceived as more “scientific” by the counsellors.

Participants

Both studies were “aid to cessation studies” (which provide support to smokers who are ready to quit) and not “cessation induction studies” (which attempt to encourage a cessation attempt in smokers who are not ready to quit). However, as callers to a quitline are actively seeking help, they are likely to be highly motivated to quit, which was reflected in the high number of smoke-free clients at baseline in the SNTQ study. Participants in the Västmanland study were recruited mainly by dental and health care personnel screening for daily smokers and offering them smoking cessation support. Half of the participants was, according to the stages-of-change (69), in contemplation stage, 35% in preparation stage, and 15% in action stage. This means that they were more motivated to quit than smokers in the general population but less motivated than for example smokers calling a quitline (54, 175). Eighty per cent of the participants in both studies were women, which reflects previous findings that Swedish women are more willing than men to seek and accept support for smoking cessation (54).

As described on page 34, the study groups were comparable at baseline, in the Västmanland as well as the SNTQ study. The representativeness of the samples will be further discussed on page 62.
Questionnaires

The value of a questionnaire depends on its validity and reliability. \textit{Validity} implies measuring the right thing, whether and how an assessment instrument measures what is intended, and is central when developing an instrument such as a questionnaire in order to minimize the risk of systematic errors. Content validity deals with whether the assessment instrument covers all relevant facets of a given construct. Face validity refers to the opinion of experts regarding the usefulness and relevance of an assessment instrument. It is also an assurance, through in-depth interviews with people representing the target group, that the questions are correctly understood and that the response alternatives are easy to understand and include all possible response alternatives. Criterion validity can be explored by correlating the assessment instrument with some other measure of the studied factor (such as an already validated assessment instrument or a diagnostic system). Construct validity is concerned with the degree of measurement of a theoretical construct or trait. \textit{Reliability} implies measuring in the right way; it deals with the precision of a measurement and is an indication of the absence of random errors. Can be measured, e.g., through inter-observer reliability, test–retest reliability, and internal consistency. High validity usually implies high reliability, whereas high reliability does not necessarily imply high validity (168, 176).

Many studies have shown a high level of agreement between self-reported smoking status and biochemical verification (criterion validity) (73-76). However, tests of reliability by, e.g., the test–retest method may not be meaningful for smoking status questions, since there is a high probability that changes in answers actually depend on true changes in the responder’s situation.

The questions used in the present studies are established and valid questions with exception of the two questions developed for the long-term follow-up (III) as an attempt to catch abstinence and pharmaceutical use during the past 5-8 years (question number 6 and 9). Though pre-tested in a pilot study, the questions’ main value was shown to be a form of validation.

For some of the questions in the questionnaires (e.g., number of years as a daily smoker or number of earlier smoke-free periods), there is a possibility for recall bias yielding over- or underestimated answers. The memory factor is of less importance for major life events than for minor, and less frequent events are over-reported, while more frequent events are under-reported in a questionnaire. Furthermore, people have a tendency to place recent events further back and events that occurred long ago closer in time, the so-called “telescope effect” (177). However, reliability of adult retrospective recall of lifetime tobacco use is high for important tobacco use information, with few differences in the reliability of recall between sexes and age groups (178).
The risk of memory bias increases with length of time to follow-up, and in the long-term follow-up study (III), discrepancies were noted between baseline, 12-month and long-term follow-up questionnaires in information regarding last date of smoking and number of smoke-free days for 22 participants in HIT and 17 in LIT (16% of all responders).

Nicotine dependence is certainly measured by questions on number of smoked cigarettes per day and time to first cigarette in the morning (179-181). Number of smoked cigarettes per day was included in all three questionnaires in the Västmanland studies, but unfortunately it is not included in the SNTQ questionnaires. However, the information is recorded in the data journal at the first call, although it has been shown to be rather invalid information, and was only used for description. The question in the baseline questionnaire assessing smoking status in the past 7 days (daily, occasional, none) was used for statistical analysis, i.e., logistic regression. It may be an appropriate alternative, because callers to a quitline are more prepared and motivated to quit than smokers in the general population and smokers in clinical trials (54, 175), and therefore can often be relatively smoke free at first contact. As a side issue, the inclusion of “Time to first cigarette in the morning” in future questionnaires would complement “Number of smoked cigarettes/day”, because other research has shown this to be probably the best indicator of nicotine dependence and predictor of quitting behavior and outcome (179, 181-183).

Internal drop-out (missing or useless responses to questions in a questionnaire) may potentially influence results. In the Västmanland studies, the internal drop-out rate was 1-14%, and highest for snus use in the past week at 12-month follow-up. In the SNTQ study, the highest internal drop-out rate was for snus use in the past week at 12-month follow-up (23%) and for number of smoked cigarettes/day in the data journal (18%). Those variables were used in the descriptive statistics but were excluded from the logistic regression.

Outcome measures and statistics

Different abstinence assessments may complement each other in studies with no follow-up before 12 months. While continuous and sustained abstinence represent and probably predict more permanent abstinence, point prevalence can capture delayed effects of an intervention and also repeated quit attempts that may predict eventual success. The measures of abstinence used are therefore considered relevant and useful in the present studies.

The main reasons for not using biochemical verification in the present studies were practical difficulties and cost. As the participants were free to use NRT and snus, biochemical verification is complicated. Furthermore, we had no reason to assume a different distribution of untruthful answers in the
two arms. Treatment effects were not overestimated, as ITT analyses, where non-responders are treated as smokers, were reported in all studies.

Logistic regression analyses constituted an important part of the statistics in the present effectiveness studies. It is a natural choice when the outcome variable is binary (e.g., smoker vs. non-smoker). The frequently used logistic regression analysis includes a lot of choices, standpoints, sources of error, interpreting, etc. In the present analyses, results have been considered valid when forward and backward models were equal, the ORs biologically likely and the CIs reasonably narrow. Furthermore, the Hosmer–Lemeshow goodness-of-fit test was used to test the overall fit of the logistic regression model. The explanation values of the regression models calculated by Nagelkerke R² were, however, rather low (all below 40%), which confirms the complexity of smoking and smoking cessation. In planning for the analyses of the long-term follow-up (III), survival analyses were considered but were not feasible because of the lack of repeated follow-up data.

Response rate

It is important that the drop-out rate, besides being kept as low as possible, is random and not systematic. In the Västmanland studies (I, III), high response rates were achieved at the 1-year as well as the long-term follow-up (86% and 85%, respectively) by up to two postal and one telephone reminders, which can be considered very satisfying. At the long-term follow-up, 63% of subjects returned an answered questionnaire after up to two postal reminders. To try to improve the response rate, a decision was taken to perform a telephone interview with the non-responders. This was successful, and resulted in a final response rate of 85%. Not surprisingly, questionnaire responders included significantly more non-smokers than did the telephone responders (p=.001). Our finding that five participants who did not reply to the 12-month follow-up were smoke-free at the long-term follow-up was interesting, and confirms the cyclical process of quitting smoking. The only significant difference found in the drop-out analyses was higher cigarette consumption in non-responders than in responders. The equal response rate in both HIT and LIT programmes was important for comparing them.

In the SNTQ study (IV), the response rate at the 12-month follow-up was 59%, which was frustratingly low, even if relatively normal in studies and evaluations like this one. Furthermore, there was a significantly higher response rate in the reactive than in the proactive service (64 versus 55%, p=.015). This was surprising, and could have been a problem if the abstinence rates had differed in the two services; however, that was not the case. Yet, it is possible that the difference in response rates may underestimate the effectiveness of the proactive service compared with the reactive service,
because responders may be more likely to be abstinent at follow-up (as demonstrated in the higher abstinence rates in responder-only than in ITT-analyses, Table 1, paper IV). The “normal” drop-out analysis, with comparison of baseline characteristics between responders and non-responders, showed some significant differences. Responders tended to be older, had been smokers for longer and smoked fewer cigarettes per day, as also seen in a recent SNTQ study (102). These differences, combined with the disappointing 59% response rate, led to a decision to perform a separate drop-out study at the SNTQ. In this still unpublished study, significantly higher abstinence rates were found 2.5 – 4 years after the first call among responders (54%, 36/67) than among non-responders (32%, 14/44, \( p = .023 \)) to the 12-month follow-up. This contrasts with a previously reported telephone interview survey with 46 SNTQ non-responders in 2002, concluding that treating non-responders as smokers might underestimate the true effect of cessation treatment (184).

**Generalizability**

Generalization is about being able to draw conclusions of a population from a random sample, if a study has the power to give rise to conclusions without bias for a certain studied population (168). A number of factors influence generalizability, and most of these have been discussed above. However, there remains a need to discuss the question of sample representativeness. All samples of smokers in smoking cessation studies are merely representatives of those who are ready to try to quit and who are also willing to participate in a study (demand for informed consent).

Generalizability (the external validity) of a study is highly influenced by exclusion and eligibility criteria, which can result in selection bias. Common exclusion criteria in smoking cessation trials include age, minimal levels of tobacco use, low motivation, current or past psychiatric disorders or drug use, and medical conditions. Le Strat et al. compared common eligibility criteria from clinical trials of pharmacotherapies for smoking cessation with a large general population sample and found that over 60% with nicotine dependence were excluded by at least one criterion. Smoking \( \leq 10 \) cigarettes per day and lack of motivation were the two criteria leading to exclusion for the greatest percentage of individuals (185).

The Västmanland study included adult daily smokers fluent in the Swedish language and interested in quitting smoking without any particular demand for a certain number of smoked cigarettes per day. The participants were more motivated to quit than smokers in the general population but less motivated than, for example, smokers calling a quitline (54, 175). As in other studies, the proportion of women was higher in the study than in the daily
smoking population in the county. However, the mean age was 49 years and 85% of subjects were aged 35–64 years, the age interval hosting most daily smokers in Västmanland (186) and also in the country (187). The only indicator of socio-economic status included was the participants’ educational level, and the groups were well educated (Table 2, page 34). The education level was similar to that of Västerås, the largest city in the region and from where the majority (about 85%) of the participants were recruited, which improved the generalizability of these studies. Lindtröm et al. reported in 2003 that just socio-economic status measured as educational level was the most decisive factor for differences in daily smoking habits among 6000 Malmö inhabitants (188). However, for a broader illustration of the socio-economic conditions it would have been interesting if other social questions had been included, such as marital status, working situation and country of birth. Having a high level of education is not automatically equivalent to having a favourable socio-economic situation. The fact that the study only approached Swedish-speaking and Swedish-reading subjects impairs the generalizability, especially as smoking is prevalent in many immigrant groups (14, 15). Thus, we can assume that the results are representative for Swedish-speaking smokers in Sweden who are willing to quit. The programmes were implemented in a dental service setting, where oral examination components have been shown to affect outcomes (79). The present study did not contain such a component, which makes it possible to generalize to other settings.

The age distribution of the clients in the SNTQ study is comparable to national data. However, the education level of the SNTQ clients seems to be somewhat higher than that of the daily smoking population (46). The SNTQ questionnaires are only available in Swedish which impairs the generalizability, as in the Västmanland study. However, though the results of the SNTQ study are valid only for clients contacting the SNTQ, they might probably be generalized to Swedish-reading smokers in general motivated to quit.

According to Friedman et al (189), it is to a great extent up to the individual reader to judge whether results are valid for his or her population.

Implications and future studies

A further reduction of tobacco use in Sweden is essential to achieve the overall public health goal of creating “good health on equal terms for the whole population” (38). The supply of cessation support is a vital part of the tobacco preventive work, and accordingly it is vital to continue the identification of effective and cost-effective interventions.

The overall aim and questions for the project included more issues than have been dealt with in this thesis, so the work will continue. The study
performed at the SNTQ of responders and non-responders to the 12-month follow-up who were contacted 2.4–4 years after their first contact will be reported. Analyses of the SNTQ database to describe developments from 1999 to 2008 have also begun. Two more cost-effectiveness studies will be performed: one on the long-term results of the Västmanland study and one on the SNTQ study.

Besides these planned works, there remain a number of major and minor issues and unanswered questions calling for action. The most urgent is probably how to reach and design programmes for groups smoking the most (e.g., lower educated, unemployed, immigrants, and psychiatric patients). Focus group interviews with different populations might be helpful in designing appropriate programmes. Reaching these groups can be done in arenas/settings where they may be found, such as youth centres, prenatal clinics, employment offices, psychiatric clinics and different networks and interest groups. Specific concerns related to the care are the implementation of tobacco cessation within ordinary care routines, including effective follow-up systems, the use of specific learning and motivational situations such as in connection with disease and before surgery, deciding on effective referral pathways (e.g., to the SNTQ), and the debiting question in dental vs. health care.

The National Guidelines for Methods of Preventing Disease, launched in 2011, stress the importance of tobacco prevention and smoking cessation and will probably influence future actions within health services. Almost 80% of the Swedish population has a positive attitude towards doctors and other health-care personnel discussing life style habits, and over 90% think that medical care practitioners can insist on a smoking break before certain operations to reduce the risk of complications (190). Thus, there is no excuse for not acting.
Conclusions

The huge consequences of smoking prompt the need for smokers to stop smoking. The present thesis have confirmed that there are effective methods and they function in different settings. Because resources are scarce, effectiveness and cost-effectiveness are important issues. The question of intensity of smoking cessation programmes is important, because if a minimal intervention could result in even a small increase in cessation rates, this would have a large public health impact.

The conclusions from the present studies were:

- Support at high as well as low intensities in a clinical dental setting in Sweden and at the Swedish National Tobacco Quitline were effective in achieving smoking cessation (I, III, IV).

- A high-intensity intervention was more effective than a low-intensity intervention in a clinical dental setting but not in a telephone setting (I, III, IV).

- High-intensity proactive service and low-intensity reactive service were equally effective at the Swedish National Tobacco Quitline (IV).

- A high-intensity intervention and a low-intensity intervention were both cost-effective in a clinical dental setting (II).

- A high-intensity intervention was a cost-effective alternative when compared with a low intensity intervention in a clinical dental setting (II).

- A high-intensity intervention remained more effective than a low-intensity intervention in a clinical dental setting after up to 8 years (III).

- Abstinence from smoking at 1-year follow-up might help predict long-term abstinence (III).

- High motivation to quit smoking and a low level of nicotine consumption at baseline predicted success of abstinence (I, III, IV).
Rökavvänjning - Behandlingsintensitet och utfall i randomiserade kliniska studier

Även om Sverige är ett av de höginkomstländer som lyckats minska andelen rökare i populationen allra mest så röker eller snusar 1,6 miljoner svenskar dagligen. Tobak är fortfarande den största enskilda riskfaktorn för sjukdom och för tidig död i Sverige och årligen dör cirka 6 400 personer, eller 18 per dag av sin rökning. Tobaksbruk är också en viktig orsak till orala problem och sjukdomar. Rökningsens skadeverkningar i Sverige har uppskattats till cirka 30 miljarder kronor/år för sjukvård, produktionsbortfall och sjukfrånvaro.

Under det senaste decenniet har ökade krav ställts på att de metoder som används inom såväl hälso- och sjukvården som inom folkhälsoarbete skall ha dokumenterad effekt och vara kostnadseffektiva. Samhällets resurser är begränsade och bör användas där de ger största möjliga nytta och även små förändringar, i t.ex. rökslut, i befolkningen kan leda till betydande vinster för folkhälsan.

Tillgången till rökavvänjningsstöd kommer att vara den viktigaste komponenten i det tobaksförebyggande arbetet när det gäller att minska den rökningsrelaterade dödligheten under kommande decennier, eftersom de flesta förta dödsfall kommer att inträffa bland dem som röker idag. Behovet av avvänjningsstöd är dock större än vad dagens vårdresurser klarar av och det finns dessutom stora regionala skillnader i tillgången till detta stöd. Ett sätt att öka behandlingsutbudet/behandlingskapaciteten för rökslutning i landet är att, genom analyser av olika behandlingsformers effektivitet och kostnadseffektivitet, optimera resursutnyttjandet. Tandvården har regelbundna kontakter med majoriteten av befolkningen och kan vara en potentiell arena för tobaksslutarstöd, men också för andra kliniska folkhälsointerventioner.

Det primära syftet med forskningsprojektet har varit att utvärdera effektiviteten hos rökslutprogram med olika intensitet, dels lokalt inom Folktandvården Västmanland och dels nationellt på Sluta-röka-linjen.

Samtliga delarbeten grundas på randomiserade kliniska studier av rökavvänjningsprogram med olika intensitet. De tre första är genomförda inom Folktandvården Västmanland, där 300 vuxna rökare deltog i en intervention med uppföljning efter 1 respektive 5-8 år. Ett delarbete är genomförts på material från Sluta-röka-linjen på 586 vuxna med uppföljning efter 1 år. Uppföljning har skett med frågeformulär som skickats till deltagarna.
Delarbete I:
Syftet var att jämföra behandlingseffektiviteten hos ett hög- och ett låg-intensivt rökslutsprogram (High Intensity Treatment, HIT respektive Low Intensity Treatment, LIT). HIT innefattade 8 individuella besök under 4 månader hos en tandhygienist samt ett skriftligt material. LIT innefattade ett individuellt besök och ett självhjälpshäfte med ett 8-veckors program. Uppföljningen gjordes 12 månader efter planerat rökstopp med en svarsfrekvens på 86%. Utfallsmått var självrapporterad punktprevalens (rökfri senaste 7 dagarna) och kontinuerlig abstinenens (rökfri senaste 6 månader). Det var ingen signifikant skillnad mellan programmen i punktprevalens (23 respektive 16%, \( p=.11 \)), men däremot i den längre kontinuerliga abstinenensen (18 respektive 9%, \( p=.02 \)). Logistisk regressionsanalys visade att nikotinberoende, mätt som daglig rökkonsumtion vid baseline, var en viktig faktor för rökfrihet efter 1 år.

Delarbete II:
Syftet var att undersöka och jämföra kostnadseffektiviteten hos det hög- och det låg-intensiva programmet i studie I. Den ekonomiska utvärderingen baserades på interventionskostnaderna för att genomföra de två programmen och antalet rökfria vid 1-årsuppföljningen. Hälsoekonomiska beräkningar genomfördes med hjälp av en tidigare utvecklad Markov-modell som skattar framtidiga konsekvenser av rökslut (i både kostnader och hälsa [uttryckt i kvalitetsjusterade levnadsår, QALYs]). Utvärderingen genomfördes i både ett samhällsekonomiskt och ett hälso- och sjukvårdsperspektiv samt inkluderade diskontering och känslighetssanalyser.

Jämfört med ingen intervention medförde LIT besparingar i ett samhällsekonomiskt perspektiv, medan HIT kostade 8400SEK/QALY. HIT var effektivare än LIT (resulterade i fler QALYs), men till betydligt högre interventionskostnader. Varje extra QALY som HIT genererade jämfört med LIT kostade 100,000SEK (incremental cost-effectiveness ratio, ICER), vilket anses vara väl kostnadseffektivt i Sverige. Alla känslighetsanalyser visade en ICER under 300,000SEK. Programmet HIT betraktas som ett primärt alternativ om beslutsfattares betalningsvilja överstiger 50,000SEK/QALY.

Delarbete III:
De flesta studier avseende rökslut använder 1-årsuppföljning, men det är oklart hur väl de resultaten förutsäger långtids eller livslång rökfrihet, vilket är ett viktigt folkhälsomål. Syftet var att jämföra effektiviteten efter 5-8 år hos det hög- och det lågintensiva programmet i studie I och att analysera i vilken utsträckning rökfrihet vid 1 år kan förutsäga långtidsabstinens. Utfallsmått var självrapporterad punktprevalens, 6-månaders kontinuerlig abstinenens och oavbruten (sustained) abstinenens. 85% (\( n=241 \)) svarade på enkäten bland dem som fortfarande levde och var bosatta i Sverige.
Rökfriheten var 8% högre i båda programmen vid långtidsuppföljningen än vid 1-årsuppföljningen. Den 7%-iga skillnaden mellan HIT och LIT var oförändrad, 31% respektive 24% för punkt prevalens (p=.16) och 26% respektive 19% för 6-månaders kontinuerlig abstinens (p=.18). Signifikant fler deltagare i HIT (12%) än i LIT (5%) hade dock varit rökfria ända sedan det planerade rökslutsdatumet vid programmets start (p=.03). Logistisk regressionsanalys visade att rökfrihet vid 12-månadersuppföljningen var en stark prediktor för rökfrihet vid långtidsuppföljningen.

Delarbete IV:

Sammanfattningsvis har dessa studier bekräftat att det finns effektiva och kostnadseffektiva metoder för rökavvänjning som fungerar inom olika arenor i Sverige. Eftersom våra gemensamma resurser är begränsade är effektivitet och kostnadseffektivitet viktiga frågor. I ett större perspektiv är frågan om intensitet av rökavvänjningsprogram viktig, för om en minimal intervention kan resultera i bara en liten ökning av antalet som slutar röka skulle det få stor effekt på folkhälsan.

I have made a journey, a journey impossible to make alone. I would like to express my sincerely gratitude to all who have supported and helped me, directly and indirectly, with the work underlying this thesis. In particular I wish to thank:

Åke Tegelberg, for opening the door to research and to the Centre for Clinical Research, Västerås in 2001 when life had taken a turn, making further dentistry impossible, and for acting as a supervisor at the research assistant education in 2001 and right up to the finish line. Although you are not an expert in smoking cessation, you have an extraordinary ability to provide exactly the kind of support and encouragement I needed on different occasions, not at least to help me handle setbacks. You have shared with me your impressive knowledge in a variety of fields, and also helped me to see things in a broader perspective (a dentist’s perspective may be rather narrow). I don’t how many times you have said: “Nu måste vi lyfta blicken”; however, less frequently in recent times!

Ásgeir R Helgason, my main supervisor, for your careful and patient guidance, for sharing your wisdom and excellent knowledge of smoking cessation in general and of quitlines in particular; and, by your calm approach, for keeping misfortunes at a distance. Thank you also for widening my perspective by letting me into the world of quitlines; I hope I may stay there. And, not least, thank you for showing me parts of your amazing homeland!

Per Tillgren, supervisor, for giving me parts of your impressive knowledge of public health, policies, methods, implementation, etc. You gave me a large amount of guidance at the beginning, ever since the master thesis and then diminishing but valuable support to the very end. And you must be supplied with “hawk-eyes” allowing you to see details in what I had written that no one else noticed!

John Öhrvik, supervisor in the final phase and co-author of paper III and IV, for sharing your impressive knowledge of statistics and methods; and, with the patience of Job, for guiding me through the mystery of logistic regression.
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Jerzy Leppert, former Head of the Centre for Clinical Research, Västerås, for giving me the opportunity to work at CKF and for always being interested and supportive in every situation of life; and Mats Enlund, current Head, for giving me continuous confidence and opportunity.

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Michaela Eriksson, for your, always with a kindly smile, immediate help with different issues. Nothing feels impossible when one comes to you. You are the most service-minded person I can imagine!

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Monica Löfvander, for sharing and agreeing with my feelings during periods of writing the thesis that “this is the worst work I have ever done”. It was encouraging to hear that at least one other person did not think that “this is the funniest work I have ever done”! I hope we can meet in the Falun woods in future.

I give warm thanks to all other personnel and doctoral students (present and former) at CKF for assistance, support, encouragement, and discussions.

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Ann-Cathrine Engström-Stangfors, Lena Storholm, and Agneta Wedelstam, for performing the counselling in the Västmanland study, and Ann-Cathrine for also conducting the telephone interviews at the long-term follow-up.
All staff at the SNTQ, especially the counsellors who let me “sit beside” them and listen to their calls with clients, and Mats Toftgård, statistician, for valuable information about the database and for providing data.
Marianne Leissner, for your incredible helpfulness in things great and small, and for conducting the specific dropout study at the SNTQ.
Helena Lindqvist, for sharing thoughts and information about the SNTQ and for jointly controlling the database.

Margaretha Koch, newly appointed PhD in Odontology, for sharing ups and downs and feelings of frustration during our doctoral work together.

I also wish to express my gratitude to the essential components of the thesis, namely all smokers who participated in the studies; and to those who provided financial support, the County Council of Västmanland (in particular the Department of Public Health), the Swedish Heart and Lung Association, Capio Research Foundation, the Swedish Heart Lung Foundation, the Swedish Cancer Society, the Swedish Research Council, and the Swedish Research Council for Health, Working Life and Welfare.

 Relatives and friends who, in different ways, have followed and supported me on this journey.

My late parents Karin and Carl-Erik (Dad who died from a smoking-related disease), who laid the basis for me being able to carry out this work, through teaching me the importance of never giving up and always doing one’s best, never doing something by halves. I know you would have been, and I actually think you are, so proud today.

Last but definitely not least, thanks to the most important part of my life, my family!
Anna, Johan, and Per, our beloved children, my greatest happiness and pride in life. Thank you for sharing my happiness during ups and supporting me during downs. If you could know what your short encouraging messages, such as “You fix it, mum”, “You are best, mum” have meant for me (I have saved them)! What would life have been without you?
Stig, my beloved husband and my best friend in life for over 36 years (oj!). Today I’m so grateful that you never went along with me at all those times when I said I couldn’t go on any longer. Thank you for never complaining, although this journey has taken so much of our joint time. Thank you for all times you have been waiting for me with dinner ready when days at work had been far too long. Thank you for your endless support and love, although I really have not always deserved it!
References


108. Engström S. Dental health care cooperating with Primary health care as a resource in early case finding of patients with diabetes or hypertension. Uppsala: Uppsala University; 2012.


129. CDUT. Liv & Hälsa i Mellansverige 2012 - Resultat från folkhälsoundersöknngen "Hälsa på lika villkor?" [Health on equal terms in Central Sweden?]. 2012.


Appendix A

Baseline questionnaire study I-III

12-month follow-up questionnaire study I-III

Long-term follow-up questionnaire study III
Löpnummer: _________

BASENKÄT

FOLKTANDVÅRDEN VÄSTMANLANDS
SLUTA-RÖKA-PROGRAM

Datum: _____________
Besvara enkäten genom att kryssa för ett alternativ per fråga om inte annat anges. Några frågor besvaras med siffror.

1) Kön: _____ man, _____ kvinna

2) Födelseår: 19_____

3) Har du rökt under den senaste veckan?
   ____ Nej, jag har inte rökt alls (gå vidare till fråga 5)
   ____ Ja, men inte dagligen
   ____ Ja, dagligen

4) Hur mycket har du rökt under den senaste veckan?
   Jag röker dagligen, ca _____ cigaretter per dag
   Jag röker inte dagligen, ca _____ cigaretter per vecka

5) Hur länge har du rökt dagligen?
   Jag har rökt dagligen i ca _____ år
   Jag har rökt dagligen i mindre än ett år, i ca _____ månader

6) Du som fortfarande röker idag, vad har du för planer när det gäller att försöka sluta?
   ____ Jag håller på att försöka sluta helt, just nu
   ____ Jag tänker försöka sluta helt inom en månad
   ____ Jag tänker försöka sluta helt inom de närmaste sex månaderna
   Annat, vad?________________________________________________________

7) Hur många gånger har du lyckats vara helt rökfri i en vecka eller mer?
   Aldrig _____ (Har du kryssat här, gå vidare till fråga 9)
   Cirka _____ gånger
8) Du som lyckats vara helt rökfri i en vecka eller mer; hur länge har du som längst varit rökfri i sträck?

____ år
____ månader
____ veckor

9) För ungefär hur länge sedan tog du ditt senaste halsbloss?

____ Jag har INTE tagit ett enda halsbloss de senaste 6 månaderna
____ Jag har tagit ett eller flera halsbloss de senaste 6 månaderna

10) Är du utsatt för andras tobaksrök (passiv rökning) inomhus?
Kryssa för de alternativ som stämmer för dig.

<table>
<thead>
<tr>
<th></th>
<th>Nästan varje dag</th>
<th>Någon gång i veckan</th>
<th>Någon gång i månaden</th>
<th>Mindre än en gång i månaden</th>
<th>Aldrig/nästan aldrig</th>
</tr>
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<tbody>
<tr>
<td>I ditt hem</td>
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<td></td>
</tr>
<tr>
<td>På jobbet</td>
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<tr>
<td>På andra ställen</td>
<td></td>
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</tbody>
</table>

11) Har du använt snus under den senaste veckan?

____ Nej, inte alls
____ Ja, men inte dagligen
____ Ja, dagligen

12) Har du använt något nikotinläkemedel (t.ex. nikotintuggummi) under den senaste veckan?

____ Ja
____ Nej
13) Finns det någon annan än Folk tandvården Västmanland som stöttar dig i ditt försök att sluta röka? *Kryssa för ALLA som städjer dig.*

____ Någon i familjen  
____ En vän/vänner  
____ En arbetskamrat/arbetskamrat  
____ Personal från hälso- och sjukvården  
____ Personal från apoteket  
____ Sluta-röka-linjen  
____ Övrig professionell tobaksavvänjare

14) Under din skolgång, tycker du att du fick undervisning om hälsoriskerna med att röka?

____ Ja  
____ Nej  
____ Vet ej

15) Hur lång utbildning (antal år) har du totalt?

____ 0-9 år  
____ 10-12 år  
____ 13-17 år  
____ 18 år eller mer

16) Det rökslutsstöd du nu ska få av Folk tandvården Västmanland är kostnadsfritt. Om du skulle få betala själv, vilket är det högsta belopp du skulle vara beredd att betala?

____ upp t.o.m. 500 kronor  
____ mer än 500 och upp t.o.m. 1000 kronor  
____ mer än 1000 och upp t.o.m. 2000 kronor  
____ mer än 2000 och upp t.o.m. 3000 kronor  
____ mer än 3000 och upp t.o.m. 4000 kronor  
____ mer än 4000 och upp t.o.m. 5000 kronor  
____ mer __________ kronor

Tag med din ifyllda enkät till besöket hos tandhygienisten.
UPPFÖLJNINGSENKÄT

FOLKTANDVÅRDEN VÄSTMANLANDS
SLUTA-RÖKA-PROGRAM

Datum: |___|___| |___|___| |___|___|

Dag    Mån    År
Besvara enkäten genom att kryssa för ett alternativ per fråga om inte annat anges. Några frågor besvaras med siffror och några med egna ord (v g texta).

1. **Kön:**
   - Man
   - Kvinna

2. **Födelseår:** 19____

3. **Har du rökt under den senaste veckan?**
   - Nej, jag har inte rökt alls.
   - Ja, men inte dagligen
   - Ja, dagligen
   - Hur länge sedan är det du rökte senast? Cirka_______ dagar (Gå vidare till fråga 6)

4. **Hur mycket har du rökt under den senaste veckan?**
   - Jag röker dagligen, ca______ cigaretter per dag
   - Jag röker inte dagligen men har rökt ca______ cigaretter den senaste veckan

5. **Du som fortfarande röker, vad har du för planer när det gäller att försöka sluta?**
   - Jag håller på att försöka sluta helt, just nu
   - Jag tänker försöka sluta helt inom en månad
   - Jag tänker försöka sluta helt inom de närmaste sex månaderna
   - Jag tänker inte sluta
   - Annat, ange vad?______

---

2013-10-11
6. Du som inte har rökt alls den senaste veckan – när tog du ditt senaste halsbloss?

☐ Jag har INTE tagit ett enda halsbloss de senaste 6 månaderna

☐ Jag har tagit ett eller flera halsbloss de senaste 6 månaderna

7. Är du utsatt för andras tobaksrök (passiv rökning) inomhus? Sätt ett kryss på varje rad

<table>
<thead>
<tr>
<th>Nästan varje dag</th>
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<tr>
<td>På jobbet</td>
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<tr>
<td>På andra ställen</td>
<td></td>
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</tr>
</tbody>
</table>

8. Har du använt snus under den senaste veckan?

☐ Nej, inte alls

☐ Ja, men inte dagligen (Gå vidare till fråga 10)

☐ Ja, dagligen (Gå vidare till fråga 10)

9. Du som inte använt snus den senaste veckan – när använde du det senast?

☐ Inte aktuellt, jag har aldrig använt snus regelbundet

☐ Det är mer än 6 månader sedan

☐ Det är mindre än 6 månader sedan

10. Har du använt något nikotinläkemedel (t ex nikotintuggummi) under den senaste veckan?

☐ Ja

☐ Nej
11. Vilket eller vilka av nedanstående läkemedel mot rökning har du använt sedan första kontakten med sluta-röka-programmet inom Folktandvården Västmanland? Försök ange ungefär hur länge du använt läkemedlet?

☐ Inga
☐ Nikotin-tuggummi ungefär ___ ___ veckor
☐ Nikotin-plåster ungefär ___ ___ veckor
☐ Nikotin-inhalator ungefär ___ ___ veckor
☐ Nikotin-nässpray ungefär ___ ___ veckor
☐ Nikotin-tabletter ungefär ___ ___ veckor
☐ Zyban-tabletter ungefär ___ ___ veckor

12. Har du varit ovanligt stressad under någon period efter din första kontakt med sluta-röka-programmet?

☐ Ja
☐ Nej

13. Har du varit ovanligt nedstämd under någon period efter din första kontakt med sluta-röka-programmet?

☐ Ja
☐ Nej

14. Du som svarat ja på fråga 12 och/eller 13 – har något annat, än att du försökt sluta röka, hänt i ditt liv som kan ha orsakat din stress eller nedstämdhet?

☐ Ja
☐ Nej

15. Har du följt de råd du fått i programmet?

☐ Ofta
☐ Då och då
☐ Sällan
☐ Aldrig
16. Finns det någon annan än Folk tandvården Västmanland som har stöttat dig i ditt försök att sluta röka? Kryssa för ALLA som stöttat dig.

☐ Någon i familjen
☐ En vän/vänner
☐ En arbetskamrat/arbetskamrater
☐ Personal från hälso- och sjukvården
☐ Personal från apoteket
☐ Sluta-röka-linjen
☐ Övrig professionell tobaksavvänjare
☐ Annan

17. Har några andra personer i din nära omgivning slutat röka det senaste året, utan att ha deltagit i Folk tandvården Västmanlands sluta-röka-program?

☐ Ja Ungefär hur många?  
☐ Nej

18. Hur bedömer du ditt allmänna hälsotillstånd nu jämfört med för cirka ett år sedan?

☐ Mycket sämre
☐ Lite sämre
☐ Oförändrat
☐ Lite bättre
☐ Mycket bättre

19. Hur värderar du din livskvalitet nu jämfört med för cirka ett år sedan?

☐ Mycket sämre
☐ Lite sämre
☐ Oförändrat
☐ Lite bättre
☐ Mycket bättre
20. Du som har varit rökfri 6 månader eller mer – vilka är de största förändringarna du märker i ditt liv?

☐ Inte aktuellt, jag har inte varit rökfri så länge

**Områden för förändring: Sätt ett kryss på varje rad**

<table>
<thead>
<tr>
<th></th>
<th>Positiv förändring för mig</th>
<th>Ingen förändring för mig</th>
<th>Negativ förändring för mig</th>
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<tbody>
<tr>
<td>Ork / kondition</td>
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<td>Sinnesstämning / humör</td>
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<td>Sömn</td>
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Annat:

1. _____________________________________________________________

Annat:

2. _____________________________________________________________

21. Har något annat, än att du slutat röka, hänt i ditt liv som kan ha bidragit till dessa förändringar?

☐ Ja

☐ Nej

Om Ja, vilken eller vilka av faktorerna är det som har påverkats?

1. _____________________________________________________________

2. _____________________________________________________________
22. Du som har slutat röka - tycker du att det varit värt det ur ett livskvalitetsperspektiv?

☐ Ja
☐ Nej

Om Ja, vad har främsta vinsten / nytten varit med att sluta röka?

1. _______________________________________________________________________________________
2. _______________________________________________________________________________________
3. _______________________________________________________________________________________

23. Det sluta-röka-stöd du fått av Folk tandvården Västmanland har varit kostnadsfritt. Om du skulle ha fått betala behandlingen själv, vilket är det högsta belopp du skulle vara beredd att betala?

☐ upp t o m 500 kronor
☐ mer än 500 och upp t o m 1000 kronor
☐ mer än 1000 och upp t o m 2000 kronor
☐ mer än 2000 och upp t o m 3000 kronor
☐ mer än 3000 och upp t o m 4000 kronor
☐ mer än 4000 och upp t o m 5000 kronor
☐ mer ________ ________ kronor

Tack för din medverkan. Returnera enkäten i det portofria svarskuvertet.
HUR HAR DET GÅTT PÅ LITE LÄNGRE SIKT?

FOLKTANDVÅRDEN VÄSTMANLANDS SLUTA-RÖKA-PROGRAM

Datum för ifyllnad: ______ | ______ | ______
Besvara enkäten genom att kryssa för ett alternativ per fråga om inte annat anges. Några frågor besvaras med siffror, några med egna ord och några med streck (v.g. texta).

A. Rök- och snusvanor

1. Har du rökt under den senaste veckan?
   - Ja, dagligen (Gå vidare till fråga 2)
   - Ja, men inte dagligen (Gå vidare till fråga 2)
   - Nej, jag har inte rökt alls den senaste veckan.

   När rökte du senast (svara så exakt du kan)?
   - 2__0____, ____, ____(Gå vidare till fråga 4)

   År  Månad  Dag

2. Hur mycket har du rökt under den senaste veckan?

   Jag röker dagligen, ca ______ cigaretter per dag

   Jag röker inte dagligen, men har rökt ca ______ cigaretter den senaste veckan
3. Du som fortfarande röker - har du några planer att försöka sluta?

☐ Ja, jag håller på att försöka sluta helt, just nu
☐ Ja, jag tänker försöka sluta helt inom en månad
☐ Ja, jag tänker försöka sluta helt inom de närmaste sex månaderna
☐ Jag tänker i alla fall inte sluta inom de närmaste sex månaderna
☐ Nej, jag har inga planer alls på att sluta, i alla fall inte inom det närmaste året

4. Du som inte har rökt alls den senaste veckan – när tog du ditt senaste halsbloss?

☐ Jag har inte tagit ett enda halsbloss de senaste 6 månaderna
☐ Jag har tagit ett eller flera halsbloss de senaste 6 månaderna

5. Har du snusat under den senaste veckan?

☐ Ja, dagligen
☐ Ja, men inte dagligen
☐ Nej, inte alls

Hur länge sedan är det du använde snus senast?

☐ Inte aktuellt, jag har aldrig använt snus regelbundet
☐ Det är mer än 6 månader sedan
☐ Det är mindre än 6 månader sedan
6. Du som har *varit rökfri hela tiden eller någon/några perioder* under de här åren – försök markera när dessa perioder inföll och hur länge de varade


*Exempel:* Slutade röka 17 februari 2007 och var rökfri ca 3 veckor. Slutade röka igen i mitten av november och var då rökfri ca 3 månader till 20 februari

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B. Läkemedel

7. Har du använt något läkemedel mot rökning (nikotinläkemedel (t ex tuggummi, plåster), Champix eller Zyban) under den senaste veckan?

☐ Nej
☐ Ja

8. Vilket eller vilka av nedanstående läkemedel mot rökning har du använt sedan du gick med i sluta-röka-programmet?
Försök att skatta ungefär hur länge du använt läkemedlet totalt?

☐ Nikotin-tuggummi ungefär _______ veckor
☐ Nikotin-plåster ungefär _______ veckor
☐ Nikotin-inhalator ungefär _______ veckor
☐ Nikotin-nässpray ungefär _______ veckor
☐ Nikotin-tabletter ungefär _______ veckor
☐ Champix (Vareniklin-tabletter) ungefär _______ veckor
☐ Zyban (Buproprion-tabletter) ungefär _______ veckor

(Gå vidare till fråga 9)

☐ Inte aktuellt (Gå vidare till fråga 10)
9. Du som har använt något läkemedel mot tobakssug (nikotinläkemedel, Champix eller Zyban) någon/några perioder under de här åren – försök markera när dessa perioder inföll och hur länge de varade


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C. Övrigt

10. Finns det någon annan än tandhygienisterna vid Folkandvården Västmanland som har stöttat dig i ditt försök att sluta röka, sedan du först var i kontakt med dem?

Kryssa för alla som stöttat dig.

☐ Familjemedlem
☐ Vän/vänner
☐ Arbetskamrat/arbetskamrater
☐ Personal från hälso- och sjukvården
☐ Personal från apoteket
☐ Sluta-röka-linjen (telefon-stödlinje)
☐ Annan professionell tobaksavvänjare
☐ Annan

☐ Nej, ingen

11. Finns det några andra personer i din nära omgivning (hemma, vänner, på arbetet) som har slutat röka sedan du var i kontakt med tandhygienisterna vid Folkandvården Västmanland?

☐ Nej
☐ Ja. Ungefär hur många?  [_____]  

12. Du som har slutat röka - tycker du att det varit värt det ur ett livskvalitetsperspektiv?

☐ Ja, absolut
☐ Ja, till viss del
☐ Nej, delvis inte
☐ Nej, absolut inte

13. Har du någon egen kommentar som du vill framföra?

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

Tack för din medverkan. Sänd tillbaka enkäten i det portofria svarskuvertet.
Appendix B

Baseline questionnaire study IV

12-month follow-up questionnaire study IV
Enkät
från
Sluta-Röka-Linjen

Du har varit i kontakt med oss på Sluta-Röka-Linjen. För att kunna ge det bästa stödet till dig och andra som vill förändra sina vanor ber vi dig om hjälp.

**OBS!** Dina svar är värdefulla för oss vare sig du röker/snusar idag eller inte.

Alla svar är sekretessbelagda och resultat från utvärderingen redovisas endast i form av siffror och tabeller.

Fyll i och sänd tillbaka enkäten i bifogat kuvert.

Tack på förhand och ring oss gärna om du har några frågor. Om ett år skickar vi ytterligare en enkät för att se hur stödet vid rök- och snusstoppet har fungerat.
1. Kön:       2. Födelseår:  

- Man
- Kvonna

Ar__________________

3. Var den du talade med förstående och lyhörd?  

- Mycket
- Ganska
- Till viss del
- Inte alls

4. Kände du att den du talade med försökte förstå dina behov?  

- Mycket
- Ganska
- Till viss del
- Inte alls

5. Kände du att den du talade med visade respekt för dina egna mål och beslut?  

- Mycket
- Ganska
- Till viss del
- Inte alls

6. Kommer du att ha en fortsatt kontakt med Sluta-Röka-Linjen?  

Du kan kryssa för flera orsaker om du vill.

- Ja, troligen
- Nej, jag är rökfri/snusfri och behöver därför inte ringa tillbaka.
- Nej, jag fick all den hjälp jag behövde vid första samtalet.
- Nej, jag klarar mitt rökstopp/snustopp på egen hand.
- Nej, jag fick inte den hjälp jag behövde.
- Annat, vad?______________________________________________
7. Förutom Sluta-Röka-Linjen, vilket stöd har du för att sluta röka/snusa?
Kryssa för samtliga alternativ som stämmer för dig.

- [ ] Inget stöd
- [ ] Familjemedlem, vän, arbetskamrat
- [ ] Personal från hälso- och sjukvården
- [ ] Personal från tandvården
- [ ] Personal från apoteket
- [ ] Övrig professionell tobaksavvänjare
- [ ] Annat, vad? __________________________________________________
    __________________________________________________

8. Har du använt något läkemedel för rök/snusavvänjning under den senaste veckan?
Kryssa för samtliga alternativ som stämmer för dig.

- [ ] Nej
- [ ] Ja, nikotintuggummi
- [ ] Ja, nikotinplåster
- [ ] Ja, annat nikotinläkemedel, nämligen______________________________
- [ ] Ja, Zyban
- [ ] Ja, Champix
- [ ] Annat, vad __________________________________________________
    __________________________________________________

9. Vistas du i andras tobaksröker (passiv rökning) inomhus?
Kryssa för samtliga alternativ som stämmer för dig.

- [ ] Aldrig/nästan aldrig
- [ ] Nästan varje dag
- [ ] Någon gång i veckan
- [ ] Någon gång i månaden
- [ ] Mindre än 1 gång i månaden
10. När du gick i skolan fick du undervisning om hälsoriskerna med att röka?

☐ Ja
☐ Nej
☐ Vet ej

11. Hur många hela årskurser har du gått i skolan? (räkna grundskola + övriga)

Antal år  

12. Röker du eller har du någonsin rökt regelbundet?

☐ Ja, jag har rökt dagligen/så gott som dagligen i sammanlagt ca. _____ år.
☐ Ja, jag har rökt "av och till"/"feströkt" i sammanlagt ca. _____ år.
☐ Nej  ➔ Om nej, gå till fråga 20

13. Har du rökt ett bloss eller mer under de senaste 7 dagarna?

☐ Ja, dagligen
☐ Ja, men inte dagligen
☐ Nej, jag har inte rökt alls  ➔ Om nej, gå till fråga 15

14. Om du röker idag, har du planer på att sluta röka?

☐ Jag håller på att försöka sluta helt, just nu
☐ Jag tänker försöka sluta helt inom en månad
☐ Jag tänker försöka sluta helt inom de närmaste 6 månaderna
☐ Jag har inga planer på att försöka sluta inom de närmaste 6 månaderna

15. När tog du ditt senaste bloss?

☐ 0-7 dagar sedan
☐ Mer än 7 dagar men mindre än 6 månader sedan
☐ 6-12 månader sedan
☐ Mer än 12 månader sedan
16. Tänder du en cigarett när du känner dig nedstämd?
Om du är helt rökfri idag, svara som det var när du fortfarande rökte.

☐ Ja, alltid/nästan alltid
☐ Ibland
☐ Sällan
☐ Nej, aldrig

17. Hur troligt är det att du kommer att vara helt rökfri om ett år?
Försök att placera dig på skalan 1-10 genom att ringa in en siffra.

1———2———3———4———5———6———7———8———9———10

Inte alls troligt
Mycket troligt

Försök att placera dig på skalan 1-10 genom att ringa in en siffra.

1———2———3———4———5———6———7———8———9———10

Inte alls troligt
Mycket troligt

Försök att placera dig på skalan 1-10 genom att ringa in en siffra.

1———2———3———4———5———6———7———8———9———10

Inte alls troligt
Mycket troligt
20. Snusar du eller har du någonsin snusat regelbundet?
   - Jag har snusat dagligen/så gott som dagligen i sammanlagt ca. _____ år.
   - Jag har "snusat av och till" (inte dagligen) i sammanlagt ca. _____ år.
   - Nej ➔ Om nej, kan du avstå från resten av formuläret

21. Har du tagit en eller flera prillor under de senaste 7 dagarna?
   - Ja, dagligen
   - Ja, men inte dagligen
   - Nej, jag har inte snusat alls ➔ Om nej, gå till fråga 23

22. Om du snusar idag, har du planer på att sluta snusa?
   - Jag håller på att försöka sluta helt, just nu
   - Jag tänker försöka sluta helt inom en månad
   - Jag tänker försöka sluta helt inom de närmaste 6 månaderna
   - Jag har inga planer på att försöka sluta inom de närmaste 6 månaderna

23. När tog du din senaste prilla?
   - 0-7 dagar sedan
   - Mer än 7 dagar men mindre än 6 månader sedan
   - 6-12 månader sedan
   - Mer än 12 månader sedan

24. Hur troligt är det att du kommer att vara helt snusfri om ett år?
   Försök att placera dig på skalan 1-10 genom att ringa in en siffra.
   1———2———3———4———5———6———7———8———9———10
   Inte alls troligt ➔ Mycket troligt
Tack för din medverkan!

Gå gärna in på Sluta-Röka-Loggen. Där kan du dela med dig av dina erfarenheter och få stöd av andra i samma situation. 
Du hittar till loggen via Sluta-Röka-Linjens hemsida www.slutarokalinjen.org
12-månaders-uppföljning

från

Sluta-Röka-Linjen


**OBS!** Dina svar är värdefulla för oss vare sig du röker/snusar idag eller inte.

Det är naturligtvis frivilligt att svara. Alla svar är sekretessbelagda och resultat från utvärderingen redovisas endast i form av siffror och tabeller.

Fyll i och sänd tillbaka enkäten i bifogat kuvert.

Tack på förhand och ring oss gärna om du har några frågor.

Med vänlig hälsning

Sluta-Röka-Linjen
1. Är du eller har du någonsin varit rökare?
   - Ja
   - Nej  ➔ Om nej, gå till fråga 9 (frågor om Snus)

2. Hur många år ungefär har du varit rökare?
   - Mindre än ett år
   - 1 - 5 år
   - 5 - 10 år
   - 10 - 15 år
   - 15 - 20 år
   - Mer än 20 år

3. Har du rökt (tagit ett halsbloss eller mer) under de senaste sju dagarna?
   - Nej, inte alls
   - Ja, men inte dagligen
   - Ja, dagligen

4. När tog du ditt senaste bloss?
   - 0-7 dagar sedan
   - Mer än 7 dagar men mindre än 6 månader sedan
   - 6-12 månader sedan
   - Mer än 12 månader sedan

5. Om du röker idag, har du planer på att sluta röka?
   - Jag håller på att försöka sluta helt, just nu
   - Jag tänker försöka sluta helt inom en månad
   - Jag tänker försöka sluta helt inom de närmaste 6 månaderna
   - Jag har inga planer på att försöka sluta inom de närmaste 6 månaderna

6. Hur länge har du varit röktfri som längst i ditt liv, när du har försökt sluta röka?
   - SVAR: ca __________ år, __________ månader, ________ dagar

- Mindre än 24 timmar.
- 1-6 dygn
- 1-2 veckor
- 3-4 veckor
- 1-5 månader
- 6 – 11 månader
- 12 månader

8. Oberoende av om du lyckats sluta eller inte, bidrog Sluta-Röka-Linjen till att öka din motivation till att sluta röka?

- Mycket
- Ganska
- Till viss del
- Inte alls

Frågor om SNUS:

9. Är du eller har du någonsin varit snusare?

- Ja
- Nej  ➔ Om nej, gå till fråga 17 (Övriga frågor)

10. Hur många år ungefär har du snusat?

- Mindre än ett år.
- 1-5 år.
- 5-10 år.
- 10-15 år.
- 15-20 år.
- Mer än 20 år.
11. Har du snusat under de senaste sju dagarna?
- Nej, inte alls.
- Ja, men inte dagligen.
- Ja, dagligen.

12. När tog du din senaste prilla?
- 0-7 dagar sedan
- Mer än 7 dagar men mindre än 6 månader sedan
- 6-12 månader sedan
- Mer än 12 månader sedan

13. Om du snusar idag, har du planer på att sluta snusa?
- Jag håller på att försöka sluta helt, just nu
- Jag tänker försöka sluta helt inom en månad
- Jag tänker försöka sluta snusa helt inom de närmaste 6 månaderna
- Jag har inga planer på att försöka sluta inom de närmaste 6 månaderna

14. Hur länge har du varit snusfri som längst i ditt liv när du har försökt sluta snusa?
SVAR: ca. _____ år, ______ månader, _____ dagar

15. Hur länge har du varit snusfri som längst de senaste 12 månaderna?
Kryssa bara för ett alternativ d.v.s den tid du har varit snusfri som längst utan avbrott de senaste 12 månaderna:
- Mindre än 24 timmar.
- 1-6 dygn
- 1-2 veckor
- 3-4 veckor
- 1-5 månader
- 6 – 11 månader
- 12 månader
16. Oberoende av om du lyckats sluta eller ej, bidrog Sluta-Röka-Linjen till att öka din motivation till att sluta snusa?

- Mycket.
- Måttligt.
- Lite.
- Inte alls.

Övriga frågor:

17. Vistas du i andras tobaksrök (passiv rökning) inomhus?
Kryssa för det alternativ som stämmer för dig, de senaste sex månaderna.

- Aldrig/nästan aldrig
- Nästan varje dag
- Någon gång i veckan
- Någon gång i månaden
- Mindre än 1 gång i månaden

18. Har du använt nikotinläkemedel den senaste veckan?

- Ja
- Nej

19. Vilket/vilka av nedanstående läkemedel har du använt efter din första kontakt med Sluta-Röka-Linjen?

- Inte aktuellt, jag har inte använt något av nedanstående läkemedel.
- Nikotin-tuggummi i ______ dagar, ______ månader.
- Nikotin-plåster i ______ dagar, ______ månader.
- Nikotin-inhalator i ______ dagar, ______ månader.
- Nikotin-nässpray i ______ dagar, ______ månader.
- Nikotin-tablett i ______ dagar, ______ månader.
- (sugtablett/microtab)
- Zyban i ______ dagar, ______ månader.
- Champix i ______ dagar, ______ månader.
- Annat, vad? ________________________________
  ____________________________________
20. Har du varit ovanligt stressad eller nedstämd under någon period efter din första kontakt med Sluta-Röka-Linjen?

☐ Nej.
☐ Ja.

21. Har någonting hänt i ditt liv (annat än att du har försökt sluta röka eller snusa) som kan ha orsakat din stress eller nedstämdhet?

☐ Inte aktuellt, jag har inte varit ovanligt stressad eller nedstämd.
☐ Nej, inte vad jag kan komma på.
☐ Ja något annat har hänt i mitt liv, än mitt rökstopp/snusstopp, som kan ha orsakat min stress eller nedstämdhet.

22. I vilken utsträckning följde du behandlaren/behandlarnas råd på Sluta-Röka-Linjen?

Försök att placera dig på skalan 1-10 genom att ringa in en siffra:

1-----------2-----------3-----------4-----------5-----------6-----------7-----------8-----------9-----------10

Inte alls Mycket

23. Hur stort stöd/hjälp fick du av Sluta-Röka-Linjen?
Försök att placera dig på skalan 1-10 genom att ringa in en siffra:

1-----------2-----------3-----------4-----------5-----------6-----------7-----------8-----------9-----------10

Ingen alls Mycket

24. Har det funnits någon annan än personalen på Sluta-Röka-Linjen som stöttat dig i ditt beslut att sluta röka eller snusa de senaste 12 månaderna?
Kryssa för ALLA alternativ som stämmer in på dig.

☐ Någon i familjen.
☐ En vän (-er) / arbetskamrat (-er)
☐ Personal från häls- och sjukvården / tandvården.
☐ Personal från apoteket.
☐ Annan professionell tobaksavvänjare.
☐ Ingen.
25. Oberoende av om du har lyckas vara rökfri eller ej, har du haft några nedanstående besvär de senaste 12 månaderna?

<table>
<thead>
<tr>
<th>SYMPTOM</th>
<th>Inget besvär</th>
<th>Lite besvär</th>
<th>Måttligt besvär</th>
<th>Mycket besvär</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sug efter tobak</td>
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<tr>
<td>Irriterad, arg</td>
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<td>Oro</td>
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<tr>
<td>Koncentrationssvårigheter</td>
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<tr>
<td>Rastlösset</td>
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<tr>
<td>Huvudvärk</td>
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<tr>
<td>Svårt att sova</td>
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<tr>
<td>Sömnighet/dåsighet</td>
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<tr>
<td>Mardrömmar</td>
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<tr>
<td>Nedstämdhet/deprimerad</td>
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<tr>
<td>Blåsor/ sår i munnen</td>
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<td>Yrsel</td>
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<td>Svettningar</td>
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<tr>
<td>Muskelvärk</td>
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<td>Kramper</td>
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<tr>
<td>Förstoppning</td>
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<tr>
<td>Andra magbesvär</td>
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<tr>
<td>Viktuppgång</td>
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</tr>
</tbody>
</table>

26. Kommer du att ringa tillbaka igen till Sluta-Röka-Linjen?

☐ Ja, absolut.
☐ Ja, troligen.
☐ Nej, troligen inte.
☐ Nej, absolut inte.

Skriv gärna om du har några synpunkter på Sluta-Röka-Linjen:

____________________________________________________________________________

____________________________________________________________________________

Tack för din medverkan!
Appendix C

Reinforcements

Examples of positive and negative reinforcements in smoking and smoking cessation (97).

<table>
<thead>
<tr>
<th>Positive reinforcements</th>
<th>Negative reinforcements</th>
</tr>
</thead>
<tbody>
<tr>
<td>To continue smoking</td>
<td></td>
</tr>
<tr>
<td>Dopamine kick</td>
<td>Remove abstinence</td>
</tr>
<tr>
<td>Split up the day/breaks</td>
<td>Reduce anxiety</td>
</tr>
<tr>
<td>Social interaction</td>
<td>Reduce stress symptoms</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>To quit smoking</td>
<td></td>
</tr>
<tr>
<td>New or more intensive taste experiences</td>
<td>Avoid worry for disease</td>
</tr>
<tr>
<td>New or more intensive scent experiences</td>
<td>Avoid nagging from people around</td>
</tr>
<tr>
<td>Praise from people around</td>
<td>Avoid pangs of conscience</td>
</tr>
<tr>
<td>A sense of control and independence</td>
<td>Avoid feeling accused</td>
</tr>
<tr>
<td>A positive role model to children</td>
<td>Avoid feelings of serving as a negative role model to the children</td>
</tr>
</tbody>
</table>

Conditioning

*Classical conditioning* (also Pavlovian conditioning) is a form of learning that deals with the conditioning of reflex behaviours, and a conditioned response is a learned response to a previously neutral stimulus. It can arise, for example, when smoking is connected to something else, such as drinking coffee. In this example, classical conditioning has taken place when coffee makes a smoker crave a cigarette.

*Operant conditioning* is a type of learning in which an individual’s behaviour is modified by its consequences (i.e., reward or punishment). It can arise, for example, when smoking achieves something positive such as a dopamine “kick” or avoids negative consequences such as abstinence symptoms or stress (97, 191).
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