



PROMOTING HEALTH IN ADOLESCENTS - PREVENTING THE USE OF TOBACCO

MARIA NILSSON



Epidemiology and Public Health Sciences
Department of Public Health and Clinical Medicine
Umeå University, SE-901 87 Umeå, Sweden
www.umu.se/phmed/epidemi/

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ABSTRACT

There is a robust evidence base for the negative health effects from smoking. Smoking is linked to severe morbidity and to mortality, and kills up to half of its regular users. Tobacco use and production also bring other negative consequences such as economic loss for countries, poverty for individuals, child labour, deforestation and other environmental problems in tobacco growing countries.

A combination of comprehensive interventions at different levels is needed to curb the tobacco epidemic. Tobacco control strategies at national levels in the western world often include components of information/education, taxation, legislative measures and influencing public opinion. Two approaches have dominated at the meso and micro levels: cessation support for tobacco users and prevention activities to support young people refraining from tobacco use. Smoking uptake is a complex process that includes factors at the societal level as well as social and individual characteristics. At national level, taxation and legislation can contribute to a societal norm opposing tobacco and creating a context for primary prevention aimed at tobacco free youth. There is no magic bullet in primary prevention. At the meso and micro levels, a continued development of knowledge on the underlying mechanisms and primary prevention methods is essential to prevent young people from starting to use tobacco.

The overall aim of this thesis was to gain knowledge about factors that influence young people's use of tobacco and of preventive mechanisms. The specific aims included to study the relation between Tobacco Free Duo, an intervention program targeting youth in Västerbotten County, and tobacco use prevalence. A specific interest was to explore the role adults can play in supporting young people to refrain from tobacco use.

The thesis is based on four studies with three separate sets of data, two were quantitative and one was qualitative. The studies were conducted among adolescents (aged 13-15 yr) in Västerbotten County and on national level in Sweden (aged 13, 15 and 17 yr).

Tobacco Free Duo is a school-based community intervention that started in 1993. An essential component of the intervention was to involve adults in supporting adolescents to stay tobacco free. Results showed decreased smoking in adolescents among both boys and girls in the intervention area during the study period of seven years. There was no change in a national reference group during the same time period. A bonus effect was a decrease in adult tobacco use in the intervention area. One out of four adults who supported a young person taking part in the intervention stopped using tobacco. In a qualitative assessment of young smokers, starting to smoke was described as a means of gaining control of their feelings and their situation during early adolescence. They expected adults to intervene against their smoking and claimed that close relations with caring adults could be a reason for smoking less or trying to quit smoking. In a quantitative study that used three decades of national data, over time adolescents became more positive toward parental action on children's smoking. The adolescents strongly supported the idea of parental action, regardless of whether or not they themselves smoked. Adolescents preferred that actions from parents were dissuading their children from smoking, not smoking themselves, and not allowing their children to smoke at home.

These results suggest that the Tobacco Free Duo program contributed to a reduction in adolescent smoking among both boys and girls. Using a multi-faceted intervention that includes an adolescent-adult partnership can decrease adolescent smoking uptake. Engaging adults as partners in tobacco prevention interventions that target adolescents has an important tobacco reducing bonus effect in the adults. The intervention has proven sustainable within communities. A growing majority of adolescents support parental interventions to help them refrain from tobacco. The findings dismiss the notion that adolescents ignore or even disdain parental practices concerning tobacco. A common and consequent norm against tobacco from both schools and parents using a supportive attitude can prevent tobacco use in young people.

KEYWORDS: Smoking, tobacco, prevention, intervention, adolescents, schools, evaluation, parents.

SAMMANFATTNING

De vetenskapliga bevisen för rökningens negativa hälsokonsekvenser är obestridliga. Rökning har samband med sjuklighet och dödlighet, varannan rökare dör av sin rökning. Tobaksbruk och tobaksproduktion medför också andra negativa konsekvenser som ekonomisk förlust för länder och fattigdom för individer, barnarbete, skogsskövling och andra miljöproblem i länder där tobak odlas.

För att bemästra tobaksepidemin krävs en kombination av åtgärder på olika nivåer i samhället. Strategier på nationell nivå i västvärlden har ofta inkluderat komponenter som information/utbildning, skattepolitik, lagstiftning samt opinionsbildning. Två strategier har dominerat på meso- och mikronivå; tobaksavvänjning för tobaksbrukare som önskar sluta använda tobak samt primärpreventiva satsningar för att unga inte ska börja använda tobak. Att börja med tobak är en komplex process inkluderande faktorer på samhällsnivå likväl som sociala och individuella karakteristika. Arbetet på nationell nivå med t ex en aktiv skattepolitik och lagstiftning kan bidra till att skapa en samhällsnorm för tobaksfrihet som bildar en bas och ett sammanhang för det primärpreventiva arbetet mot tobak. Det finns inget trollspö i det förebyggande arbetet mot ungas tobaksbruk. På meso- och mikronivå är en fortsatt kunskapsutveckling av underliggande mekanismer och preventiva arbetssätt nödvändig.

Det övergripande syftet med detta avhandlingsarbete var att få kunskap om faktorer som påverkar ungas tobaksbruk och om mekanismer som kan verka förebyggande. Ett specifikt syfte var att studera relationen mellan Tobaksfri Duo, ett interventionsprogram riktat till unga i Västerbottens län, och tobaksanvändning. Ett annat specifikt syfte var att undersöka vuxnas roll och betydelse i arbetet med att stödja ungdomar att inte börja med tobak.

Avhandlingen baseras på fyra studier utgående från tre separata dataset, två kvantitativa och ett kvalitativt. Studierna gjordes bland ungdomar i åldern 13-15 i Västerbottens län samt på ett nationellt urval bland ungdomar som var 13, 15 och 17 år gamla.

Tobaksfri Duo, en skolbaserad intervention på samhällsnivå, startade i Västerbotten 1993. En central komponent i interventionsarbetet var att inkludera vuxna med uppgiften att stödja ungdomar att vara tobaksfria. Ungas rökning, både pojkars och flickors, sjönk enligt studierna i interventionsområdet under utvärderingsperioden som uppgick till sju år medan ingen förändring gick att finna i den nationella referensgruppen. En bonuseffekt rapporterades i interventionsområdet gällande en sänkning av vuxnas tobaksbruk. En vuxen av fyra som stödde en ung medlem i Tobaksfri duo, var en tobaksbrukare som slutade använda tobak för att kunna delta. I en kvalitativ studie av unga rökare beskrevs rökning som ett sätt att få kontroll över sina känslor och sin situation under de tidiga tonåren. De förväntade sig att vuxna skulle ingripa mot deras rökning och sa att nära relationer med vuxna som brydde sig om kunde vara en anledning för att röka mindre eller för att försöka sluta röka. I en kvantitativ studie på nationellt data från tre årtionden blev tonåringarna över tid mer positiva till att föräldrar ingrep mot barns rökning. Ungdomarna stöttade detta tydligt, oberoende av om de själva rökte eller inte. De föredrog att föräldrar ingrep genom att övertala sina barn att inte röka, genom att föräldrarna inte skulle röka själva samt genom att de inte skulle tillåta sina barn att röka hemma.

Resultaten tyder på att Tobaksfri Duo har bidragit till en minskning av ungas rökning, bland både flickor och pojkar. Att använda en mångfacetterad interventionsmodell som inkluderar tobaksfria par bestående av vuxen - tonåring kan minska ungas tobaksbruk. Genom att engagera vuxna i tobaksförebyggande interventionsprogram kan en bonuseffekt med ett sänkt tobaksbruk bland vuxna fås. Interventionen har varit bärkraftig i kommunerna genom åren. En ökande majoritet av ungdomar stödjer att föräldrar ingriper för att motverka ungas rökning. Resultaten talar mot uppfattningen att ungdomar ignorerar eller till och med ser negativt på föräldrars försök att motverka tobaksbruk. En gemensam och konsekvent norm mot tobak från både skola och föräldrar med ett stödjande förhållningssätt kan fungera tobaksförebyggande bland unga.

GLOSSARY

The glossary is mainly derived from:

Qualitative Methodology for International Public Health (Dahlgren et al., 2007)

Public Health Dictionary (Janlert, 2000)

A Dictionary of Public Health (Last, 2007)

A Dictionary of Epidemiology (Porta, 2008)

The Tobacco Atlas (Shafey et al., 2009)

Adolescence	The phase between child- and adulthood, characterized by physical growth and development of sexual maturity. A time of heightened vulnerability to many environmental and emotional hazards.
Chi-square test (X^2 test)	A statistical test for analysing association between categorical variables.
COP	Conference Of Parties. Countries who has ratified the Framework Convention on Tobacco Control meet regularly to develop recommendations within FCTC to guidelines and legally binding protocols.
Cotinine	Nicotine's major metabolite. Because cotinine has a significantly longer half-life than nicotine, cotinine measurement can be used to estimate tobacco exposure levels. Commonly measured in blood serum, urine and saliva.
Cross sectional study	A study that examines the relationship between diseases, other health-related characteristics or other variables of interest as they exist in a defined population at one particular time.
Focus group	A method to collect qualitative data through group discussions. The group interaction is used to explore ideas, attitudes and norms in relation to different phenomenon's.
Interaction	Interplay. Refers to the relation between two mutually observed variables producing an effect different than just the sum of the separate effects. If a variable decrease the effect of another it is called antagonistic. If it increase the effect it is called synergistic.
Meta-analysis	In biomedical sciences a systematic, organised and structured evaluation of a problem of interest, using information from a number of independent studies of the problem.
Nicotine	An addictive, poisonous alkaloid chemical found in tobacco. It increases heart rate and oxygen use by cardiac muscle.
Pandemic	An epidemic, that transcends national boundaries and extends over much or the entire world, attacking people in all affected regions.

Predictor	A variable telling something about future events.
Prevalence	A common measure of occurrence or disease frequency: the total number of individuals who have an attribute or disease at a particular time, divided by the population at risk of having the attribute or disease at that time or midway through the period.
Purposive sampling	A non random and non probability sampling mainly used in qualitative research. Informants are selected with the expectation that they represent the phenomena under study.
Random sampling	A method of drawing a sample from a universe population/population pool in a manner aimed at ensuring representativeness.
Snus	Swedish moist snuff.
Triangulation	A technique to enhance trustworthiness by the use of different data collection methods, informants, investigators or analytical approaches when studying a specific, joint problem.
Trustworthiness	The extent of which results extracted from empirical data is valid and reliable.

ABBREVIATIONS

CAN	Centralförbundet för Alkohol- och Narkotikaupplysning (The Swedish Council for Information on Alcohol and Other Drugs)
COP	Conference Of Parties
EU	European Union
FCTC	Framework Convention on Tobacco Control
HBSC	Health Behaviour in School aged Children
NGO	Non Governmental Organisation
NRT	Nicotine Replacement Therapy
SES	Socio Economic Status
TFD	Tobacco Free Duo
WHO	World Health Organisation

ORIGINAL PAPERS

This thesis is based on the following papers:

- I Nilsson M, Stenlund H, Bergström E, Weinehall L, Janlert U. It takes two: Reducing adolescent smoking uptake through sustainable adolescent-adult partnership. *Journal of Adolescent Health*, 2006;39:880-86.
- II Nilsson M, Stenlund H, Weinehall L, Bergström E, Janlert U. "I would do anything for my child, even quit tobacco" – Bonus effects from an intervention that targets adolescent tobacco use. *Scandinavian Journal of Psychology* (In press).
- III Nilsson M, Emmelin M. "You feel immortal but frightened" – smoking adolescents' perceptions on smoking uptake and prevention. (Submitted).
- IV Nilsson M, Weinehall L, Bergström E, Stenlund H, Janlert U. "Adolescent's perceptions and expectations of parental action on children's smoking and snus use; national cross sectional data from three decades". *BMC Public Health*, 2009, 9:74.

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THESIS AT A GLANCE

PROMOTING HEALTH IN ADOLESCENTS - PREVENTING THE USE OF TOBACCO

Paper	Reference	Methods and data
I	Nilsson M et al. J Adolesc Health 2006;39:880-86.	Repeated cross-sectional surveys over seven years, 1994-99 and 2001. Cases were ranged from 1300 to 1650/year in intervention area and approximated 4500 annually in the reference area.
II	Nilsson M et al. Scand J of Psychology (In press)	Repeated cross-sectional surveys in schools in 2001, 2003 and 2005 among grades 7-9 (aged 13-15 yr). 4055 cases.
III	Nilsson M et al. (Submitted)	A qualitative research design using focus group discussions aimed at content analysis. Eight focus groups with a total of 44 informants, 21 girls and 23 boys.
IV 	Nilsson M et al. BMC Public Health 2009, 9:74	Repeated cross-sectional surveys, reporting national data from 1987, 1994 and 2003 by 13500 questionnaires mailed to homes. The annual samples which were random and nationally representative, consisted of 4500 young people aged 13, 15 and 17 yr, 1500 individuals per age group.

Aim	Main findings
To assess the effects of a long-term intervention for tobacco use prevention that targeted adolescents (Tobacco Free Duo).	There was a significant decrease of nearly 50% in smoking prevalence in the intervention area, while the prevalence in the national reference area remained stable. The decrease was evident in grades 8 and 9 among both boys and girls.
To assess the effects from a long term intervention for tobacco use prevention that targeted adolescents (Tobacco Free Duo) on prevalence of adult smoking and snus use.	Almost 25% of the adult partners were reported to have stopped using tobacco in order to take part in the intervention. Out of these, 13% were daily tobacco users, 7% of whom were daily smokers.
To explore the role of smoking for young smokers with a focus on the mechanisms that facilitates smoking uptake as well as what could have prevented them from starting.	Three themes related to aspects of youth smoking behaviour emerged and reflect young smokers' views on what makes young people become smokers, what facilitates youth to start smoking, and what can be done to prevent them from starting: 1) gaining control; 2) becoming a part of the self and; 3) significant adults make a difference.
To explore adolescent perceptions and expectations of parental action regarding children's smoking and snus use, and whether they have changed over time.	Adolescents became more positive toward parental action on children's smoking over time. Young people strongly supported the idea of parental action, regardless of whether or not they smoked themselves. The adolescents preferred parental actions of dissuading their children from smoking, not smoking themselves, and not allowing their children to smoke at home.

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PROLOGUE

During my professional career I have had the privilege to work with young people. After graduating from university my focus has been social work and prevention targeting youth. I have always found it hopeful to work closely with young people. I have learned through experience that often little things can lead to big, positive changes. Even small and limited efforts can contribute to large changes in a young person's life and to his or her future choices.

Youth is a special time in life. In my experience it is a time when many of us, looking over our life span, describe lower self esteem and self confidence than in any other times of our lives. When you are in the early teens in a country like ours, there are so many things to feel insecure about: your looks, your behaviours, clothes, relations and the future...the list could be continued. On the other hand, it is also a time when you are developing an adult identity. I have heard many young people describe great insecurity and at the same time immense demands to "be and do right". This can make a young person both vulnerable to influences and easily led. Who or what is there to guide the young person in this process?

As I have worked in schools and social service, I am constantly affirmed of the importance of building structures for prevention and health promotion. Such good work will reach everyone but be especially important to young people who are in more vulnerable positions in society.

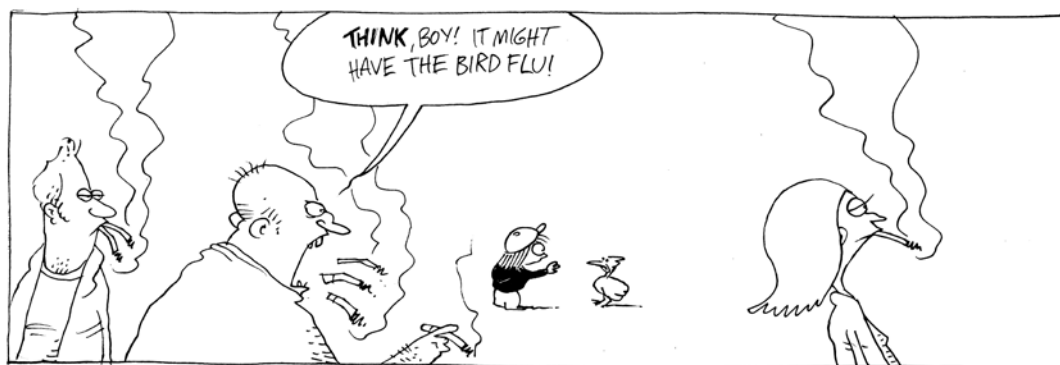
I hope that in a couple of generations, tobacco will be looked upon as a dying out phenomenon. As the "dinosaur" it really is. Until then, as adults "in power" we have a possibility to listen, understand and act to improve young people's lives and living conditions.

Maria Nilsson

"Knowing is not enough; we must apply.

Willing is not enough; we must do."

Johann Wolfgang von Goethe (1749-1832)



INTRODUCTION

“500 million people alive today -- many of them still children -- will eventually die of tobacco-related diseases, if present trends persist. Modest action by governments could prevent millions and millions of deaths, without harming economies”.

The World Bank

THE TOBACCO PANDEMIC

Tobacco is a global disaster. Every six seconds somebody dies a tobacco related death. Worldwide, one of ten deaths is caused by tobacco (Mathers et al., 2006). During the last century the number of people dying from tobacco was approximately 100 million and is expected to rise to one billion deaths during the 21st century. Globally, tobacco use is rising. As the negative health consequences can take decades to develop, the epidemic of tobacco-caused deaths is in its infancy. The smoking transition from the western world to developing countries is a development that justifies calling tobacco a public health disaster. By the year of 2030, the annual

deaths caused by tobacco are estimated at 8 million and 80% of those deaths to occur in low and middle income countries (WHO, 2008 b). The need to curb the pandemic is indisputable.

Evidence for the negative health effects from smoking is robust. Smoking is linked to severe morbidity and to mortality. Tobacco kills up to half of its regular users. The main smoking-related causes of mortality are cardiovascular disease, chronic pulmonary diseases and lung cancer, but up to 35 different diseases are reported to be associated with smoking (US Department of Health and Humans Services, 2004). The use of other tobacco products has also been shown to cause disease and death, but the

bulk of research on health effects from tobacco has focused on smoking. The younger a person is when starting to smoke, the greater the risk is of developing tobacco related diseases and to become a heavy smoker (Taioli et al., 1991; Everett et al., 1999).

Apart from causing illness and premature death, tobacco use and production results in other negative consequences such as economic loss for countries, poverty for individuals, child labour, deforestation, and other environmental problems in countries growing tobacco (WHO, 2004). Tobacco fortifies the inequalities between people within nations but also between low, middle and high income countries all over the world when human health and environmental and economical conditions are considered.

THE ROLE OF THE TOBACCO INDUSTRY

The driving force behind the tobacco epidemic is the trans-national tobacco industry. The market is dominated by three of the world's largest multinational tobacco companies—Altria/Philip Morris, Japan Tobacco International and British American Tobacco (Shafey et al., 2009). One sixth of the global cigarette market in 2004 was captured by Philip Morris which operates in 160 countries and sells \$57 billion of cigarettes (Mackay et al., 2006).

During the last century, the industry has worked to build its brands with marketing that directly attracts different target groups: men, women and young people. The marketing has worked through direct channels such as media ads but also through indirect product placement and sponsorship. The epidemic pattern in smoking is moving from men to women and from high income individuals to those with low incomes. Current tobacco industry marketing targets low income countries and this will accelerate the transition to higher smoking rates

and massive negative health effects in these countries. In many low income countries, mass marketing is directed to women. This will speed up the epidemic when reaching different target groups simultaneously.

The tobacco industry has worked strategically to defeat tobacco control efforts. Documents have revealed that the tobacco industry have been involved in or responsible for cigarette smuggling in large scale over the world undermining public health efforts (Shafey et al., 2009). International cross-company tobacco industry coalitions have been created to challenge international, national and regional tobacco control measures (McDaniel et al., 2008). The industry has used disinformation and cover ups to influence both public and political opinions. For example, scientific consultants were used to undermine early evidence on second hand smoke as a cause of sudden infant death syndrome and cardiovascular disease because the industry feared the impact of these findings (Tong et al., 2005; Tong et al., 2007). The industry has built networks and used sociologists, political scientists, economists, etc. to develop and disseminate “friendly research through credible channels” (Landman et al., 2008). The purpose has been twofold: targeting both individuals and nations to keep the individual smoker from quitting and to delay national restrictions and legislation against tobacco. During the last decade, their communication strategy has been to legitimize themselves as companies by taking social responsibility stressing that smoking are only for adults and that they do not want young people to smoke.

SWEDISH ADOLESCENT'S TOBACCO USE

Smoking has been decreasing among Swedish youth since CAN (The Swedish Council for Information on Alcohol and

Other Drugs) started reporting on young people's (aged 15) tobacco use in Sweden in the 1970s. The decrease continued into the early 21st century but has now abated. In 2007 prevalence data, the positive trend ended and an increase was noted in boys. In 2008, the smoking prevalence was 28% in girls, of whom 8% were daily smokers and 22% in boys, of whom 5% were daily smokers (CAN, 2009). In total tobacco use prevalence, the gender difference changes as more boys are snus users. Among fifteen year olds, 4% of the girls and 16% of the boys reported using snus.

Swedish youth aged 15 were found to smoke the least in a comparison of European countries (HBSC, 2005/2006). Among the Swedish 15-year olds, 9% of girls and 8% of boys smoked. The HBSC average prevalence was 19% for girls and 18% for boys. Swedish youth were also below average age at time of first smoking. Smoking at age 13 or younger was reported by 28% of the 15-year old girls and 31% of the 15-year old boys. Among the corresponding Swedish youth, the figure was 25% for girls and 23% for boys.



TOBACCO CONTROL AND PREVENTION

CONTROL AND PREVENTION STRATEGIES

Tobacco is not only a major cause of death, but according to the World Health Organisation (WHO, 2008 b) it is the leading preventable cause of death in the world. A combination of comprehensive interventions at different levels is needed to curb the tobacco epidemic. During recent decades activities in the western world have been carried out at macro, meso and micro levels.

At the macro level

Tobacco control is suggested to be the single most cost-effective intervention for adult health in the world (Laxminarayan et al., 2006). There are several instruments at different levels, from global to national, setting targets and/or prioritizing activities that effectively work with tobacco control.

The need for a global instrument for tobacco control was raised in the mid 1990s

as a response to the tobacco pandemic. It took until 1999 for concrete work on an international treaty (Framework convention on Tobacco Control - FCTC) was started. This was led by WHO and is the first treaty under the protectorate of WHO. It is also the first ever international treaty on health. Up till March 2009 the FCTC has been ratified by 164 WHO member states. When a country has ratified the convention it means that the country will implement the required instruments laid out in the convention within its own legislation. The convention was entered into force on February 27, 2005, just 90 days after being ratified by 40 countries. The overall aim is to acknowledge all peoples' right to good health (WHO, 2008 a). The core of the convention strategies are six of the most effective tobacco control policy interventions. See Figure one on the next page.

Figure 1. Tobacco control and prevention matrix (based on WHO:s MPOWER package, 2008).

TOBACCO CONTROL AND PREVENTION STRATEGIES	INTERNATIONAL LEVEL
1) M onitoring tobacco use and prevention policies	Development of a global surveillance system within WHO. Support for countries to build national monitoring systems.
2) P rotect people from tobacco smoke	Guidelines have been developed within FCTC on total protection from tobacco smoke for all citizens in all environments. WHO support for countries to prepare and develop strong legislation on smoke free environments. Counter tobacco industry opposition.
3) O ffer help to quit tobacco use	Development of guidelines is under preparation within FCTC to be adopted by the latest in 2012, to increase knowledge on evidence based methods to promote tobacco cessation and adequate treatment against tobacco dependence.
4) W arn about the dangers from tobacco	Development of guidelines within FCTC on education and information is under preparation to be adopted at COP 4 in 2010. Includes counter tobacco industry opposition. WHO support for member countries to develop systems to create awareness on the dangers from tobacco.
5) E nforce bans on tobacco advertising	Development of guidelines within FCTC was adopted in 2008 on bans on tobacco advertising, marketing and sponsorship including international cooperation to ban or restrict Internet sales and promotion of tobacco.
6) R aise taxes on tobacco	Support for member countries in developing tax policies, to fulfil public health goals incl. the goals set out in the FCTC. Further work within FCTC for cooperation on restrictions for duty free goods crossing borders.

NATIONAL LEVEL	REGIONAL / LOCAL LEVEL
Research on tobacco and national monitoring of tobacco use prevalence and consumption levels; by age, sex, income, education level, etc in adults and young people. National register on tobacco cessation. National action plan against tobacco.	Regional and local surveys on the same issues as at the national level. Surveys to evaluate regional and local interventions against tobacco.
Preparatory campaigns for legislation on smoke free environments and smoke free/ tobacco free working hours. Implement and enforce legislation for workplaces, public places, age limits, etc. No designated smoking areas. Counter tobacco industry opposition. Build opinion. Research.	Regional and local supervision and enforcement of smoke free environments. Regional and local authority tobacco policies incl. smoke free / tobacco free working hours. Regional and local interventions to decrease tobacco use.
National guidelines for cessation to support regional and local development of cessation. Low-cost pharmacologic therapy. National information and cessation systems via telephone quit lines and the Internet. Quit line telephone numbers on tobacco packs. Raise prices and tobacco taxes. Research.	Regional incorporation of tobacco cessation into basic health care services. Well-staffed and well educated. Repeated quitting advice as part of regular care. Employers offer cessation during working hours and contribute towards pharmacologic treatment.
Anti-tobacco counter-advertising campaigns in all forms of media, not sponsored by tobacco industry. Comprehensive, large, clear pack warnings, including pictures, on all tobacco products. Production and dissemination of information materials. Education and research.	Regional and local anti-tobacco health communication as part of interventions, targeting different ages and populations. Health communication through local media, Internet and other channels.
Full enforcement of a comprehensive advertising ban. National efforts to restrict internet tobacco promotion or sales from servers abroad. No point-of-sale marketing. Licensed shops. Under-counter tobacco sales. No vending machines. Plain packaging.	Regional and local supervision and enforcement reporting violations of tobacco advertising bans. Include awareness on the power of marketing into interventions targeting youth.
Regular increases in tobacco taxation. Allocated tobacco tax revenues to be used for national tobacco control and prevention.	Allocated tobacco tax revenues to regional and local tobacco control and prevention.

Although many countries have ratified the convention today less than 5% of the world's population lives in countries that have fully adopted the policies laid out in the FCTC and its guidelines (World Health Statistics, 2008). Much work lies ahead.

The six tobacco control policies identified as effective by WHO have been called the MPOWER strategies. The strategies will have to be implemented by governments, authorities and organisations from international to local levels in order to have an impact. The tobacco control prevention matrix in figure one is based on the MPOWER strategies and provides examples of actions on the different levels.

In Europe, the European Union (EU) is a party of FCTC. Legislation, tobacco control projects under the Public Health Programme, and information campaigns are the core of the EU tobacco control activities. The EU also uses community policies, for example there are taxation and agricultural policies (European Commission, 2008).

Tobacco control strategies at a national level in the western world have often included components of information/education, taxation, legislative measures and influencing public opinions. Research has shown that strategies at societal level are successful. For example, the World Bank claims that using a price instrument is the most effective way to decrease tobacco use, and is most important for price sensitive groups such as those with low incomes and young people. Increasing tobacco taxes by 10% generally decreases tobacco consumption by 4% in high income countries and by about 8% in low and middle income countries. For young people, the effect of price increases is projected to be two to three times higher than that seen in adults (World Bank, 1999; Ding A, 2005).

As part of a Swedish national public

health policy, one domain focuses on the use of addictive substances including tobacco. The target is to reduce tobacco use. Four intermediate aims are set: 1) a tobacco free life start, from 2014; 2) halving the number of young people under age 18 who start to smoke or use snus until 2014; 3) halving the number of smokers among the groups who smoke the most until 2014; 4) no one should be involuntarily exposed to environmental smoke (SOU, 2000).

At the meso and micro levels

Leaving the macro level where international and national treaties, legislations and policies are vital instruments for control and prevention, the next levels are the meso and micro levels. At the meso level (communities, organisations and groups) and the micro level (individuals) two approaches have long dominated: cessation support for tobacco users and prevention activities to support young people refraining from tobacco use.

There is robust scientific evidence for successful cessation methods that show increased quitting rates in adults. These researched methods involve both behavioural and pharmacologic treatments. They include behavioural perspectives, psychological reliance on nicotine effects, as well as physical addiction. Effective counselling includes working with the motivation to quit, problem solving and skills training, and provides social support as part of the treatment (Fiore et al., 2008). A recent Cochrane systematic review concludes that all kinds of nicotine replacement therapy (NRT) can be helpful to people quitting smoking, regardless of the setting. The review reports an increase of 50 to 70% in the chance of successful quitting while using NRT. (Stead et al., 2008). A systematic review by Wu et al. showed that NRT and other pharmacological treatment (bupro-

pion and varenicline) all provide therapeutic effects in smoking cessation (2006).

Youth cessation programs have long reported modest success rates. In a review, programs reporting the highest quit rates used motivational enhancement and contingency based reinforcement delivered in the classroom, at the school clinic or by computer (Sussman, 2002). A recent meta-analysis found more positive support for effects from teen smoking cessation programs that used cognitive-behavioural techniques and social influence approaches. Evidence is growing on the benefits of youth cessation programs although more research is needed (Sussman, 2006; Sussman and Sun, 2009).

There is no magic bullet in primary prevention that keeps young people from using tobacco. Smoking uptake is a complex process that includes factors at the societal level as well as social and individual characteristics. Interventions that target adolescents have evolved from a focus on knowledge of tobacco's health effects to interventions based on broader psychosocial concepts (US Department of Health and Human Services, 1994).

Knowledge about the negative effects from tobacco does not seem to keep young people from becoming smokers. In a Swedish study, high levels of knowledge on the risks did not predict future non-use. The researchers concluded that attitudes and expectations may determine knowledge rather than the other way around (Rosendahl et al., 2005). The school is an important arena for prevention because of the ability to access almost all children. Studies on school-based educational programs, predominately performed in the US, have shown mixed results (Coleman, 2004; Flay, 2007). There are some tobacco prevention curricula that have shown short term

effects but fewer have reported long term results (Flay et al., 1989; Ellickson et al., 1993; Klepp et al., 1994; Flay, 2007). The Hutchinson Smoking Prevention Project, a multiyear program that used a teacher-led tobacco use prevention curriculum, found no evidence that their school-based social influences approach had long term effects of smoking among youth (Peterson et al., 2000). This program had a strong evaluation design, but some program components that are argued to be important for a prevention effect in a social-influence approach were not included. Examples of such missing components were listening and communication skills, decision making, and making a commitment (Sussman et al., 2001).

Comprehensive strategies that use several components have generally been found more effective than information-based interventions that have shown limited or no effect (Bruvold, 1993; Backinger et al., 2003). An understanding has evolved that knowledge is not enough but should be combined with training of individual practical achievements, awareness and shaping of social norms. The comprehensive social influence model has been frequently used in youth tobacco prevention programs. The core of the model is to change attitudes, knowledge and behavior of the adolescent within the context of a social environment. The model is recognized as one of the most successful to use as a basis for tobacco use interventions that address youth (Perry et al., 1996). A review of 25 intervention programs that used a social influence approach concluded that there was evidence for preventing adolescent smoking as 18 out of 25 programs showed significant short-term effects and intervention effects lasted longer than 24 months in half of the programs when booster sessions were given (Skara et al., 2003).

Conclusive evidence was reported in

a meta-analysis that psychosocial smoking prevention programs successfully reduce adolescent smoking in the long term. Programs that use cognitive behavior and life skill modalities and/or comprehensive school-community settings find the best effects (Hwang et al., 2004). Another meta-analysis of 207 school-based drug prevention programs, including 74 programs against smoking, found that programs addressing several drugs were as effective at reducing smoking as the ones targeting tobacco alone (Tobler et al., 2000). Program size was taken into account in the analysis and the most successful programs were small and interactive programs. According to Flay findings from several reviews and meta-analyses has suggested that school-based smoking prevention programs can have significant long-term effects if they are interactive social influence or social skills programs, if they involve at least 15 sessions including grade 9 and if they show substantial short-term effects (2007, 2009).

An increased understanding of the combined effects of social, environmental and cultural factors on adolescents tobacco use has resulted in increased interest in community-based interventions. These interventions normally work to influence both individual behavior as well as community norms on adolescent tobacco use. The long term goal is to create a supportive non-smoking environment. Community-based interventions involve several community resources such as schools, youth clubs, churches, NGOs, shop owners, health care, social service, media, etc. To date, few studies have evaluated the effects of community interventions, but a Cochrane review found some support for effectiveness in preventing long-term smoking uptake in adolescents (Sowden et al., 2003).

Recent research has been interested in using the school as an environment with a potential impact not only on a student's school achievements but also on health outcomes. Interventions that focus on the school as a context rather than on the single person have been successful in preventing different problem behaviors (Wilson et al., 2001). Some researchers have studied school effects on pupils' public health behaviors such as smoking. The overall aim is to determine whether school differences and characteristics in addition to ones explained by differences in socioeconomic status, neighbourhoods, peer groups, etc. can be found.

Some examples of potential school effects include institutional features such as school environment, perceived quality of student-teacher relationships, involvement and engagement, inclusiveness and caring. The contextual features of these different variables are often characterized as school ethos or school culture. One review found a school effect on smoking was that schools without health and antismoking policies reported higher smoking prevalence among their students. The school norms and values influenced both student smoking and alcohol use (Sellström et al., 2006). British researchers found school effects on smoking for young people aged 15-16 and even stronger effects for younger age groups within the same schools. Other associations that might explain the school effect were ruled out but the cause of the effect was not analyzed (Aveyard et al., 2004 a; Aveyard et al., 2005). The researchers concluded that school culture is an independent risk factor for smoking (Aveyard et al., 2004 b). Another British study found similar patterns but with greater school effects on children earlier in secondary school. The school effects were strongest on smoking but also seen for alcohol and other drug use

in 13 to 15 year olds. The researchers concluded that schools engaging and involving students with education and having better teacher-student relations also had lower school smoking prevalence and were more health effective (West et al., 2004). The first study exploring school effects on smoking by gender reported that school level characteristics such as the quality of teacher-student relationships, student attitudes to school and the school's focus on caring and inclusiveness could have an impact on smoking for both boys and girls aged 15-16. The reported effect was greater for male than for female students (Henderson et al., 2008). To sum up, the findings suggest that looking at the school context, working with school policies, values and norms, and school ethos variables can influence public health behaviors such as smoking.

BECOMING A SMOKER

When developing interventions against tobacco it is vital to know the predictors and associated factors for tobacco use and to understand nicotine addiction in young people.

Predictors and factors associated with adolescent smoking

The young smoker becomes a smoker in a social context, not in a vacuum. The factors influencing the process from initiation to maintenance of regular smoking are individual, contextual, and in complex interaction. The interrelationships between adolescent smoking and social and personal influences are similar across countries as made part of adolescent developmental processes (Piko et al., 2005). The young person is an agent in his/her own life with individual differences in predictors for smoking. Family, peers and schools are agents influencing the individual and social normative processes. There is also the community that sets

norms from a broader cultural and environmental perspective. The impact of influence differs depending on the young person's age and location in the smoking trajectory (initiation, escalation or regular smoking). An understanding of the interaction inside and between levels is a prerequisite for successful intervention. The presented overview is based on research reviews of predictors and factors associated with adolescent smoking that were carried out by Canadian and American researchers (Tyas et al., 1998; Turner et al., 2004). When other references are taken into account, they are cited. The predictors and associated factors are presented as three levels starting, at the macro level.

At the macro level there is a broad societal influence that goes beyond individual and family influence. On a societal level, the processes become normative. A substantial influence on adolescent smoking uptake and progression is carried out through media and marketing. The most heavily advertised cigarette brands are the ones most often smoked by adolescents. Tobacco industry advertising and promotion at the point of purchase has a significant impact on adolescent smoking decisions (Wakefield et al., 2003). Exposure to tobacco promotion has a causal, dose response relationship; the greater exposure, the higher risk for initiation. The increased risk is robust and seen in different cultures (DiFranza et al., 2006).

The taxation and pricing of tobacco is associated to adolescent smoking. High prices decrease adolescent smoking uptake and cigarette consumption while it at the same time stimulates interest in cessation. The price effect works directly on the price sensitive adolescent but probably also indirectly through decreased smoking by parents and peers. This in turn leads to less

access to tobacco and more tobacco free role models. Other tobacco control policies probably work in a similar way with both direct effects on the adolescents but also through indirect effects of influencing parents, peers and parts of the community. One example is the legislation on smoke free environments. This has been reported to decrease smoking in adults and reducing exposure to second hand smoke. An association has been found for adolescents, but whether the effect is direct or indirect is unclear (Liang et al., 2003).

At the meso-level, the associated factors and predictors are family, peer and school related. The social context shapes both attitudes and expectations and some relations are reciprocal. Parents have substantial influence on their children; parents' own tobacco use, attitudes, norms and parenting style, as well as attachment, support and the quality of the parent-child relationship matters in adolescent tobacco use behaviour. Other family related factors are family structure, socioeconomic status (SES), sibling smoking, family environment and attachment to family. Adolescent smoking and its relation to SES is probably best explained by the higher rates of parental smoking in lower SES families.

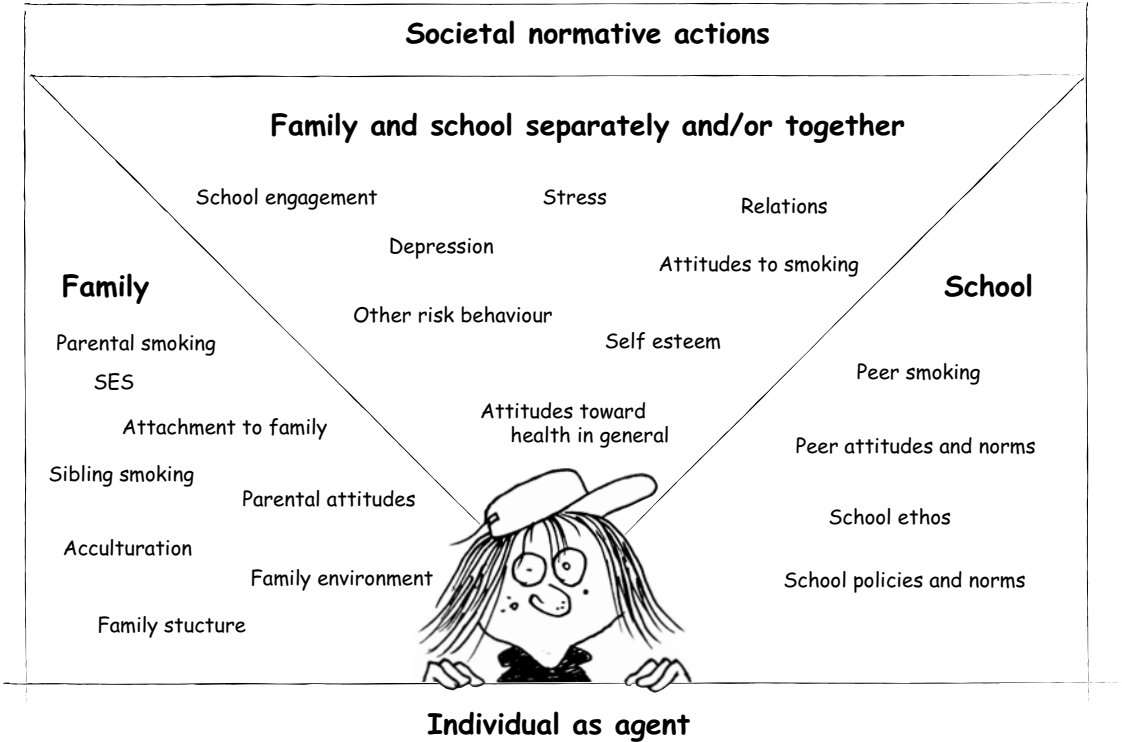
The evolving autonomy from parents that characterizes adolescence, where peers are suggested as becoming more important, is seen as a natural phase in the developmental process. Peers have been suggested as being the most important predictor for smoking in some studies (Conrad et al., 1992), while others suggest parents are the most influential or equally influential to peers (Baumann et al., 2001). Smoking in young people is a social behaviour related to class mate, friend, boyfriend, and girlfriend smoking. Adolescents are more often smokers if their best friends smoke,

and this is more likely for group outsiders. Adolescent smokers often overestimate smoking prevalence among their peers. Perceived smoking among friends is reported to be a stronger predictor for smoking than their friends' actual smoking habits. Peer and parental attachment is reported to raise the risk of becoming a smoker if the peer or parent is a smoker.

To conclude, there is a strong and robust link between peers and adolescent smoking. Some recent research is widening the scope of peer influence. A bidirectional relationship is suggested between peer factors, with at-risk teenagers selecting specific peer groups that reinforce substance use and deviance (Buttross et al., 2003). A selection paradigm in smoking uptake is suggested among adolescents. The paradigm implies that adolescents choose friends with similar smoking behaviours (De Vries et al., 2006). It is proposed that peers within the same school influence each other, but it is more the school's influence on its pupils than a peer-to-peer influence (Aveyard et al., 2004 a). School policies, values and norms, the so called "school ethos variables" have the potential to be influential factors in adolescent smoking (West et al., 2004; Aveyard et al., 2004 a; Aveyard et al., 2004 b; Aveyard et al 2005; Sellström et al., 2006; Henderson et al., 2008).

At the micro level individual or person-level predictors are reported to be genetic and biological influence, and demographic variables like gender, age and ethnicity. In Sweden more girls than boys smoke and this follows the same gender pattern seen in the adult population (CAN, 2009; Statistics Sweden, 2008). In many other countries, the opposite pattern is the prevalent one. However, the gender pattern seen in the adult population generally reflects among adolescents. A Swedish study found

Figure 2 Predictors and factors associated with young peoples smoking that can be influenced by family and school.



that tobacco uptake differed between genders with an earlier initiation among boys and a more rapid transition to regular smoking in girls. The same study also found snus experimentation among boys marked a transition to cigarette smoking (Galanti et al., 2001). A recent American study has found smokeless tobacco use to be a strong predictor for adolescent smoking (Forrester et al., 2007). Body image is a predictor of smoking in adolescent girls (Stice et al., 2003) while studies on boys report aggression and conduct disorders to be related to smoking (McMahon, 1999).

Age of initiation is important for health reasons but also because adolescents who start smoking early more often become regular smokers, are more nicotine dependent and less likely to quit as adults. Examples of other individual level characteristics are other risk behaviours, school performance and engagement, personal income or spend-

ing money, stress, depression, self-esteem, attitudes to smoking specifically, and health and lifestyle in general. Associations with other variables such as behavioural problems, co-morbidity, a propensity toward rebelliousness, and risk taking are also predictors for adolescent smoking (Burt et al., 2000).

When designing interventions to reduce adolescent smoking, it is important to be clear about what associated factors that can be influenced and by whom. The young person is his/her own agent, but this ignores the factors that can be influenced by others such as family and school. The predictors and associated factors previously presented are illustrated in figure two.

Getting hooked

Every day approximately 80-100 000 young people become addicted to tobacco (World

Bank, 1999). Worldwide, 9.5% of 13-15 year olds smoke cigarettes. The highest rates are found in Europe at 19.1%. Almost all first tobacco use occurs before high school graduation (Turner et al., 2004). The critical time of initiation, escalation and onset of daily smoking is between early adolescence and early adulthood (US Department of Health and Human Services, 1994; Lantz, 2003; Gilpin et al., 2005; Edvardsson et al., 2009). The initiation processes may differ from the ones affecting escalation and maintenance of regular smoking (Turner et al., 2004). Adolescent experimentation with tobacco is clearly related to an increased risk of tobacco addiction in adulthood (Menezes et al., 2006).

The smoking trajectory has been described as a process progressing through stages. The first stage is a preparation phase where the young non-smoker first meets tobacco and is influenced by family, friends, the media, etc, in shaping attitudes and setting expectations. During the next phase, the young person tries smoking, often in secret and with friends. Many more young people try smoking than the number that actually proceeds to the next phase which is characterized by irregular use. During this phase, the young person smokes intermittently; not on a regular basis but more often in connection to specific activities. This stage is followed by regular use. Regular use begins with regular, but not daily, smoking and ends with nicotine dependent smoking. At that point the smoking becomes daily, the number of smoked cigarettes increases, and the young person finds it difficult not to smoke (US Department of Health and Human Services, 1994; Mayhew et al., 2000).

Daily smoking is thought to be a prerequisite for nicotine dependence and the experience of withdrawal symptoms (Benowitz et al., 1994). Research in the

1970s suggested that 3 or 4 years of intermittent smoking were required to develop dependence of a regular, adult type (Russell, 1971). This view has persisted although recent studies challenge these descriptions and suggest that symptoms of nicotine dependence occur much earlier in the smoking onset process (DiFranza et al., 2002; Wellman et al., 2004; Gervais et al., 2006). DiFranza et al. conclude that the most susceptible youth risk losing their autonomy over tobacco within a day or two of first inhaling tobacco smoke (2007).

SWEDISH LEGISLATION AND COMMISSIONS

Tobacco legislation

The Swedish tobacco act, SFS 1993:581, was adopted in 1993 and has had several amendments (Government offices Sweden, Ministry of Health and Social Affairs, 2009). The act included 1) restrictions on smoking in some premises and spaces and in some outdoor areas, 2) a smoke-free working environment, 3) health warnings and declaration of content on the packaging of tobacco products, 4) restrictions on trade and the right to import tobacco products, 5) marketing of tobacco products and use of certain trademarks in marketing of other products or services, and 6) product control, etc of tobacco products.

Through this act, smoking is prohibited at schools, youth clubs and day care centres both indoors and out doors. In 1997, an age limit was introduced that prohibited selling tobacco to those below 18 years of age. In 2005, smoking was prohibited in restaurants and in other establishments that serve food or beverages.

Commission of the Swedish schools

The Swedish compulsory school comprises children aged seven to sixteen, with a pre-

school year offered to children aged six. The Swedish Education Act, along with the Swedish Curriculum for the Compulsory School System, provides directions with consequences for how schools work with tobacco prevention. In the second chapter, paragraph eight of the Education Act, it stipulates that municipalities must have a school plan, adopted by their council, that states the action the municipality intends to take to achieve the national objectives set for schools. It also states that the aim of school health care shall be to monitor pupil development, protect and improve student mental and physical health, to instil healthy living habits, and that school health care shall be primarily preventive (Government Offices of Sweden, Ministry of Education and Research, 2009). The Swedish Curriculum for the Compulsory School System stipulates that a compulsory school goal is that every student have fundamental knowledge about what is necessary to maintain good health, and to understand the importance of lifestyle for health and the environment. The school heads are responsible for ensuring that interdisciplinary knowledge areas are integrated into the teaching of different subjects. Such areas cover the environment, traffic, equality, consumer issues, sex and human relationships, as well as the risks posed by tobacco, alcohol and other drugs (The Swedish National Agency for Education, 2009).

TOBACCO FREE DUO

A program called Tobacco Free Duo (TFD) started in 1993 as a small-scale pilot project in Västerbotten County in the north of Sweden. The long-term aim was to prevent cancer by the short term prevention of adolescent tobacco use in ages 12-15 years. Though smoking is the major risk factor for cancer, the decision was made to include all tobacco use. The tobacco use transition

in young people was not fully known and it was feared that snus use might lead to smoking.

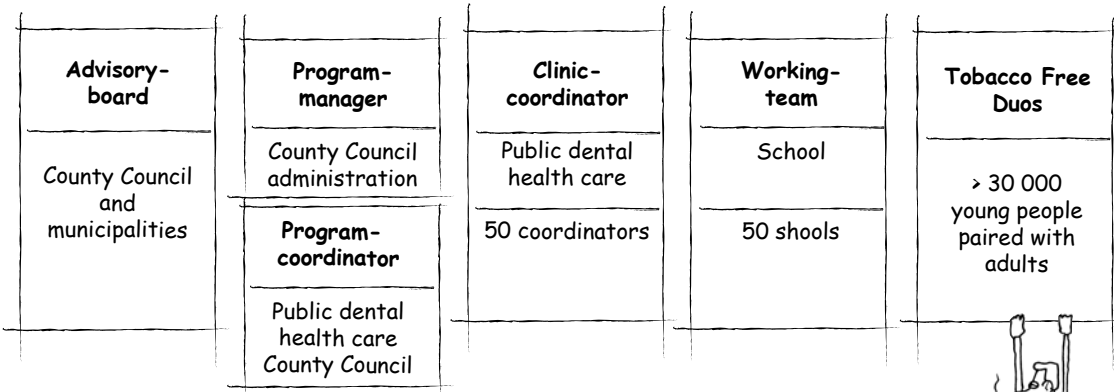
The developed program focused on adolescents but also involved school staff, parents and significant others. Some factors were prioritized when building the intervention: cooperation over sector borders; integration of the intervention into daily work; and local ownership and participation. The people involved, both young and old, were invited to take active parts and influence the intervention model. It was believed that by doing so the local interest and engagement would increase.

Comprehensive strategies were used, including building policies, increasing knowledge on tobacco related issues, positive reinforcement, and methods of social influence and support. The different activities in the program focused on increasing individual knowledge and affecting attitudes and behaviours regarding tobacco.

A number of objectives were expressed when designing the intervention. It was considered important to let the adolescents listen, discuss and make their own decisions and take public stands about tobacco. An effort was made to create a positive, non-smoking influence from friends as well as providing a supportive adult in the decision to be tobacco free. Adults were involved and encouraged to express messages against tobacco. Parents were informed about the harms of tobacco and information was given about the importance of them taking a clear stance against the use of tobacco by their children and children's friends. Education in tobacco-related issues and methods was offered annually for students, school staff and others.

The Department of Community Health at Västerbotten County Council further developed the program during

Figure 3. Tobacco Free Duo - Organisation



the pilot years. The department hosted the management and worked in close cooperation with four county municipalities. Each year new schools joined, and in 1997 the program was offered to all county municipalities. This was possible due to public dental health care that was involved in building a professional basic program organisation that covered the whole county, shown in figure three.

TFD was introduced to the students before they left for summer holiday in grade 6 (age 12). It ran for the next three years, until the students finished grade 9. Each subsequent year the new 6th graders were invited to participate. In this way the intervention gradually expanded. After three years, all 6-9th grades at the school were involved.

During the sixth school year, students and school staff were encouraged to discuss issues involving tobacco as part of the program. The classes were visited by their clinic coordinator from the public dental health care that gave information and used exercises to stimulate a dialogue on tobacco related issues. At that age almost none of the adolescents used tobacco. Before the end of the school year, students were given the opportunity to team up with a tobacco

free adult to form a tobacco free pair, or "Duo".

The name Tobacco Free Duo originated from the idea that the pairs signed a contract to stay tobacco free together for the coming three years. The adult involved was thereby making a commitment to provide a good example as a tobacco free model and to actively support the young person to stay tobacco free. Informational meetings were held for the involved adults to provide knowledge and encouragement. The pairs were invited to a meeting at the end of grade 6 and contracts were signed at that time. The participating students were given a membership card and local sponsors provided rewards of discounts and small prizes. Each school was encouraged to appoint a working team composed of 7-9th grade students and adults. This group had the local responsibility for activities within the framework of TFD. Schools were encouraged to work closely with the local community, including youth clubs, organizations, and shop owners. The County Council representative was responsible for supporting the schools' work: to offer lectures, education, materials, supervision and booster sessions.

THEORIES FOR PREVENTION

There are several theories related to understanding the attitudes, behaviours and behavioural changes during adolescence that can be used when developing and evaluating prevention models. The theories chosen for the framework of this thesis are theories of socialisation and social learning theory.

Theories of socialisation

Human beings live in groups and have to co-exist in harmony while at the same time supporting individual well-being. In its widest meaning, socialization refers to how individuals are assisted in becoming members of one or several social groups (Grusec and Hastings, 2007). As part of a socialisation process there is a reciprocal influence between new and old members of the social groups with ongoing responses to endless behaviour changes, but also according to changes in culture. For example, culture can change due to development of new technology, acts of war, methods for contraception, climate change etc.

Socialisation is a process where individuals are taught skills, accept standards, and capture competencies. Part of the process is to understand and acquire group values and customs, roles and rules from cognitive, emotional and social perspectives. Socialisation can be described as a normative concept (Maccoby E, 2007). Some outcomes are striven for and others may be unintentional, sometimes undesired, effects of socialization practices. The focus of socialisation often happens in the first years of life but it is a lifelong process involving many influences, such as parents, siblings, grandparents, friends, teachers, partners, family, media, the internet, etc. To understand the socialisation process one has to consider that it is a process where biological factors and socio cultural aspects interact. Socialisation cannot be fully understood

outside the context in which it occurs. Much of the meaning is found in the context and it is to a great extent a cultural phenomenon. Gender self-concepts develop early in childhood in relation to families, friends, schools, media, etc. Gender development is embedded in the large societal context and children form a social identity as being part of a specific gender group. Children value being part of an “in-group” and consequently they are sensitive to how they are viewed by others (Leaper and Friedman, 2007). As a consequence, same-gender friend groups tend to promote group assimilation.

Grusec and Hastings stress that primary caregivers have a central and undeniable position in socialisation, but they acknowledge agents other than parents (2007). Parents and their children are in close proximity, first as part of a biosocial system with the purpose to protect offspring and to assure that children can handle the demands of social life (Grusec and Davidov, 2007). Human beings have a strong need for interrelatedness, and this plays an important part in socialisation. Strong feelings of interrelatedness abound in the child-parent relationship as parents show affection, protect and nurture their children. There is a link between protection and positive outcomes from socialisation that involve trust that the parent will act fair and do what is best for the child. Children with parents who are normally available and supporting when needed more often perceive their rules and prohibitions as a sign of caring and not as coercion (Grusec and Goodnow, 1994). The result is that they comply and cooperate with their parents more often. Children need to feel that their behaviour is generated by themselves and that they are in control with a certain amount of autonomy. In this setting, reasoning parents are less threatening than ones who use power

demonstrations (Grusec and Davidov, 2007). Socialisation starts in the home and relations with parents and family continues to be important for development and cultural transmission throughout life. However, to some extent socialisation is constructed by each new generation. From childhood on, one interacts with other agents of socialisation apart from parents and family. Their influence grows the older the child gets. Individuals become part of new social settings and where new patterns of social behaviour may be needed.

Most Swedish school age children spend about 190 days a year in school. Their relationships with teachers are important but not as intimate as the ones with parents. Children must be more independent at school and rely more at friends for social support (Wentzel and Looney, 2007). When part of the school environment, children must have the ability to be with other children in large groups and coordinate personal wishes and competencies with others. School climate (students' sense of school community and belonging) has been positively related to social behaviours (Anderman, 2002). Pupil beliefs about their schools being responsive and caring predict a decrease in young adolescent drug use (Battistich and Hom, 1997).

Social learning theory

The new born child has a biological inheritance that may influence his or her behaviour. Genetics and hormones have the potential to affect behaviour over the long term as they affect individual development from the beginning. According to social learning theory the new born child does not inherit behaviour in any other way. It postulates that children adopt and develop behaviours through observation and imitation (Bandura, 1977; 1986). Children observe others' behaviour and the

consequences from the observed behaviour. Learning through observation is considered essential for human development, survival and transmission of cultural patterns. Part of this observational learning is the act of modelling. Through observing others, one shapes an idea on how to perform new behaviours that can serve as guides for future action. Family and friends are important models for children. The basic modelling process is similar no matter if it is conveyed by actions or words, films or pictures, but the efficiency may vary with the medium. According to social learning theory, seeing models engage in risky and prohibited activities without negative consequences can reduce inhibitions in the observer, weaken defensive behaviour, reduce fears, and contribute to attitude changes.

Bandura explained social learning as a combination of psychological, social and environmental factors that influence the development of behaviour. In social learning theory there are four demands when people learn, model and adopt behaviour. They are attention, retention, reproduction and motivation. They can be explained as the fact that a person must observe, remember what he or she observed, be able to reproduce the behaviour, and have a reason to adopt behaviour in order to actually do so. Motivation to engage in behaviour is explained by the effects obtained from the behaviour. With an expectation of a valued outcome, it is more likely that a person will engage in the behaviour and for it to be reinforced. The behaviours that seem effective for others are preferred over ones that seem to have negative consequences. Through observation, comparisons and evaluation of reactions, the person comes to understand the social world in which they live and accordingly make conclusions of requirements for success. Bandura states that there is a mutual interaction between a

person's environment, physical, emotional and cognitive personal characterization and the behaviour. Social learning theory has often been used as a theoretical basis for development of interventions against adolescent smoking worldwide.

AIMS

OVERALL AIM

- to gain knowledge of tobacco preventive mechanisms and components

SPECIFIC AIMS

- to study the relation between Tobacco Free Duo and tobacco use prevalence
- to explore the role adults can play in supporting young people to refrain from tobacco



STUDY POPULATIONS, MATERIAL AND METHODS

The results in this thesis are comprised of data from three separate sets of data, two quantitative and one qualitative. One was collected through school-questionnaires, one through questionnaires sent home by post and one through focus group discussions. This chapter describes the populations, materials and methods used. Methodological and ethical considerations for the study as a whole are discussed at the end of the chapter.

QUANTITATIVE DATA - VÄSTERBOTTEN COUNTY (PAPERS I AND II)

Västerbotten is a wide county in a tall country, ranging from coast to mountains. The county holds close to 260 000 inhabitants in 15 municipalities. There are more than 50 municipality high schools with students aged 13-15 years. Most municipalities have

more than one high school and connected to every high school there are several schools for the younger ages that together form the school district.

From the very start of the TFD intervention, there was an interest on the part of the County Council and the municipalities to follow tobacco use trends of young people. Information about young people's tobacco habits and related issues was therefore collected through surveys every spring starting in 1994. Schools that took part in the survey agreed to perform it annually and in return were offered presentation of their school data with a county comparison from the County Council. The County Council was responsible for data collection, analysis, report preparation, etc. No data were collected in 2000 because of time and financial restrictions. From 2001 onward,

data were collected every second year. This was due to a combination of lack of resources and a wish from the schools. They expressed “questionnaire exhaustion” over being asked to perform many questionnaires for many good causes and needed to reduce the burden.

The repeated questionnaire surveys were performed at the same schools, grades 6-9 (ages 12-15), in six school districts. Districts were chosen at random before the first survey. Schools on the coast and inland were represented and included both rural and urban settings.

The overall aim of the first study, reported in Paper I, was to assess the effects of TFD on young people’s tobacco use. It had a repeated cross-sectional design using data from 1994 to 1999 and from 2001. The lowest annual number of study participants was 1637 and the highest number 2177 with a total of 13 597 (see table one).

The reference data were from The Swedish Council for Information on Alcohol and other Drugs (CAN, 2000). There was no overlap of students surveyed across the two samples and the same reasons for non-participation (< 15% per year) were reported in the national sample as in the intervention study. The survey methodology, questions and methods used for questionnaire completion were comparable across the intervention and reference groups over time. For Paper I the analysis of changes over time within the intervention area sample was performed using logistic regression where clustering due to school was taken into account. Analysis of trends between the intervention and reference area was performed using year by region interaction. Data were analyzed using soft ware programs SPSS (SPSS Inc., Chicago, IL) and Stata 9.0 (Stata Corporation, College Station TX).

In 2001 questions were added to the

Table 1. Number of students surveyed each year in the intervention area during 1994-99 and 2001, grades 6-9.

	1994		1995		1996		1997		1998		1999		2001	
	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)
GRADE														
Six	526	(24.3)	504	(26.4)	426	(23.2)	428	(24.8)	574	(26.4)	461	(21.6)	337	(20.6)
Seven	572	(26.4)	494	(25.9)	487	(26.5)	388	(22.4)	559	(25.7)	591	(27.6)	489	(29.9)
Eight	543	(25.1)	525	(27.5)	466	(25.4)	482	(27.9)	498	(22.9)	584	(27.3)	417	(25.5)
Nine	526	(24.3)	388	(20.3)	458	(24.9)	431	(24.9)	546	(25.1)	503	(23.5)	394	(24.0)
Total	2167	(100.0)	1911	(100.0)	1837	(100.0)	1729	(100.0)	2177	(100.0)	2139	(100.0)	1637	(100.0)

All schools with surveyed students participated in TFD, but they started during different years. Four of these schools started the intervention in grade 6 during 1994. They introduced it to an additional grade each year, so that in 1997 they included 6-9th grades. The remaining two schools in the study started TFD in 1995, with all grades 6-9 participating in 1998.

National reference data were used to compare smoking prevalence and trends.

questionnaire described above about adult partner tobacco use. This was done because field workers continuously reported that they met parents and other adult partners in TFD who said they had quit tobacco use to be able to participate. It was thought this might be a bonus effect and therefore important to ascertain. The aim of the study reported in Paper II was to assess TFD effects on adult smoking and snus use prevalence. A question was added to the

questionnaire asking if the TFD adult partner had ever used tobacco, stopped before TFD for other reasons, or if he or she quit because of the intervention. This study collected data during the spring of 2001, 2003 and 2005. In the analysis, only replies from members of TFD were included for a total of 4120 (see table two).



Table 2. Total number of students surveyed, and those who were members of TFD in the intervention area in pooled data from 2001, 2003 and 2005, by sex.

School year	Girls		Boys		Total	
	All surveyed TFD members		All surveyed TFD members		All surveyed TFD members	
7th grade	1166	989	1258	953	2460*	1954*
8th grade	1153	924	1233	901	2401*	1837*
9th grade	234	177	237	152	471	329
Total	2553	2090	2728	2006	5332 (100.0%)	4120 (77.4%)

* In grade 7 there were 48 students not answering the question if they were a girl or a boy and in grade 8 they were 27.

The study population was comprised of students in grades 7-9. Students were offered membership in TFD at the end of 6th grade after the questionnaire survey was conducted. Each student's answers were captured only once over the included study years. This was accomplished by removing answers from the 9th grade in surveys from 2003 and 2005. No reference data were necessary as an effect would be an effect in itself. P-values were calculated using X² tests. Data were analyzed using SPSS (SPSS Inc., Chicago, IL) and Epi Info (CDC, Atlanta) computer software.

QUALITATIVE DATA - VÄSTERBOTTEN COUNTY (PAPER III)

Paper III data were obtained through a qualitative study carried out in Västerbotten County. The overall aim of the study was to explore the role of smoking for young smokers by focussing on mechanisms that facilitate young people to start smoking as well as what could have prevented them from starting. In Paper III young smokers

reflected retrospectively on what happened, what they felt when starting to smoke, how those around them behaved and influenced them, and what could have made a difference.

The target group of the study was purposively selected. They were young smokers in 9th grade, ages 15 and 16. A smoker was defined as a person who smoked tobacco on a regular basis at least once a week. Eight focus group discussions were carried out: two at each school, one group was for girls and another for boys. The reason behind having single-sex groups was to give a chance to explore gender differences on the issue. There were five to six participants in each group. The total number of participants was 44, 21 girls and 23 boys.

The young people were all residents in Västerbotten County. A demographic scattering was achieved through the selection of four schools from three different county districts. Two group discussions were held at each school, with a total of eight focus groups. Schools were con-

sidered the best source for recruitment since a well-functioning network would allow reaching young people who were interested and thus achieve the desired selection. Recruitment was mainly carried out by written information distributed by student social welfare staff, school nurses, teachers and youth club leaders. Of course this influenced the selection so that the groups were primarily made up of relatively well-known adolescent smokers. In some cases, recruitment was made through the snowball approach: the young people themselves recruited peers (Lindlof, 1995). The focus groups turned out to be friendship groups, although this was not the intention. Participants explained that at school, smokers know each other because they regularly spend time together smoking during school hours. An unexpected difficulty in the recruitment procedure was finding schools that had a sufficient number of acknowledged adolescent smokers. Many interested schools were forced to decline study participation because of this.

Focus group discussions were held in discussion rooms at the schools during the school day. They were conducted without the presence of school staff. Tape recordings were made to document all discussions. Session length varied between 55 to 90 minutes. A thematic discussion guide covering selected key issues was used during the focus group discussions. This was a means of repeatedly considering the young people's experience, attitudes, desires, thoughts, etc., throughout the research project. There was a pilot session to test the discussion guide before the first focus group discussion.

The focus groups were moderated and transcribed by this thesis' author. The design was emergent, giving the possibility to include additional issues relevant to the aim of the study. The first group discussion was

transcribed, a preliminary analysis done, and discussed in a group of researchers who provided feedback before the second focus group was conducted. The next three focus group discussions were carried out, transcribed and preliminary analysis done before the last four focus groups were conducted. This made the research process flexible and open to emerging issues with a basis on the common thematic discussion guide. The focus group discussions were transcribed verbatim and coded closely to the data. Open Code software was used in the open coding of the interviews (Umdac, 2001). The program was designed to facilitate coding and sorting of qualitative data, and was developed by teachers/researchers at the Department of Public Health and Clinical Medicine, Epidemiology and Public Health Sciences, Umeå University and Umdac. A person other than the moderator reviewed the transcriptions, gave feedback and took part in the emergent design.

A descriptive content analysis was employed. Different meaning units were identified, condensed and coded to create categories and themes.

QUANTITATIVE DATA - SWEDEN (PAPER IV)

In 1987, a national survey was conducted on young people's use of tobacco, their knowledge, attitudes, and beliefs by the Swedish National Board for Health and Welfare. The target group was adolescents aged 13, 15 and 17. A follow up study were carried out by The Swedish National Institute of Public Health in 1994, and in 2003 they commissioned Umeå University to do a second follow up. The same methodology and the same three age groups were chosen for all three surveys in order to follow trends over time.

In the three surveys, a postal questionnaire was sent to homes each year for a

sample of 4 500 young people. In total there were 13500 individuals. The annual sample presented in table three consisted of 1 500 per age group, 13, 15 and 17 years of age (see table three).

This was a national representative random sample drawn by Statistics Sweden.

should try and influence their children's smoking, and if their own parents had acted to prevent them from using tobacco. Differences in distributions were calculated using X^2 tests. Data were analyzed using SPSS (SPSS Inc., Chicago, IL) and Epi Info (CDC, Atlanta, GA).

Table 3. Study participants in 1987, 1994 and 2003, reported by age and sex.

Age		n	%	Boys	%	Girls	%
13 yr	1987	931	62	480	64	451	60
	1994	1284	86	617	82	667	89
	2003	1026	68	488	65	538	72
15 yr	1987	844	56	440	59	404	54
	1994	1267	84	606	81	661	88
	2003	968	65	456	61	512	68
17 yr	1987	1258	84	654	87	604	81
	1994	1186	79	575	77	611	81
	2003	980	65	454	61	526	70
Total	1987	3033	67	1574	70	1459	65
	1994	3737	83	1798	80	1939	86
	2003	2974	66	1398	62	1576	70

For each survey, the sampling procedure was carried out in the same way and the questionnaire was sent out at the same time of the year. An analysis of the non-respondents was carried out by Statistics Sweden in 2003 using a calibration technique. The full questionnaire was validated by focus group discussions with boys and girls in the same ages as in the study prior to data collection. Through the focus group discussions some potential validity problems were identified and the questionnaire was modified accordingly.

Data from these three surveys were used in Paper IV to study adolescent perceptions and expectations of parental action regarding children's smoking and snus use, and whether they changed over time. Adolescent tobacco use was described to put the findings on perceptions and expectations of parental action in a context. Data from the three questionnaire surveys were used to assess the young peoples' personal tobacco use, if they thought that parents

METHODOLOGICAL CONSIDERATIONS

In this thesis, both quantitative and qualitative research methodologies were used to fulfill the aims. When describing the different methodologies used in relation to each other it is often easier to explain what they are by telling what one is and the other is not. One way to distinguish qualitative research from quantitative research is in relation to hypotheses. This may be especially relevant when mentioning the intention to combine the two methodologies. Qualitative research is essentially explorative and generates hypotheses while quantitative research measures and more generally has the purpose of testing hypotheses. In this thesis, three papers are based on data collected using quantitative methodology and one has used qualitative methods.

The aims of the quantitative studies were to assess tobacco use prevalence and other related variables, to describe trends, and to evaluate the primary preventive program TFD.

The data used in Papers I and II were originally collected as school surveys to give schools feedback on tobacco use trends. Thus, the data were not primarily collected for research purposes, but proved to hold quality research data. The surveys were cross-sectional and this limits the ability to draw causal conclusions or generalize findings. The fact that the studies were repeated over several years and conducted at the same time of year and in the same way adds strength to the study. In Paper I there was a reference group with comparable data that allowed discussion and suggestions on the effects from the TFD intervention program.

The quantitative national data used in Paper IV were collected on three different occasions over 15 years. This study was also cross-sectional, but the repetition allowed analyses of changes over time in young peoples' tobacco use, knowledge and attitudes on tobacco related issues. The individual sampling procedure, validation of the questionnaire prior to implementation of the survey, and the analysis of non-respondents carried out by Statistics Sweden were undertaken to improve statistical power and validity.

In the qualitative study, the aim was to explore and understand young smoker's views on smoking uptake and smoking prevention. Focus group discussions were chosen for collecting data. The methodology was assumed to have certain advantages when capturing data to answer the research questions as they were explorative in nature. A focus group discussion is a discussion-based interview using group interaction to explore a specific set of issues. Focused data are gathered through multiple respondents. Using discussions, you get close to and explore the participants' discourse, their experiences, wishes, concerns, opinions, attitudes, beliefs and values

regarding the research issue. This methodology is valuable when exploring how points of view are constructed and described. The assumption is that these data are valid in their own right (Kitzinger et al., 1999). The research interest of this study was to generate hypotheses, not to achieve generalizability.

An example of an advantage of the methodology used is that a discussion in a group of young people can bring up perspectives and terminology on the issue that the researcher would not be aware of or have thought about. A focus group allows the participants to talk directly to each other. It is assumed that the psychological distance is less between the young participants than between the participants and the moderator. This could result in a more open and free climate for discussion and fewer reasons to behave defensively.

The sampling procedures were carried out to encompass demographic diversity with groups of young people from both rural and urban areas. Guided by the research questions, the groups consisted of smokers and were homogeneous with respect to gender. Whether the young person is a smoker or a non-smoker is most likely to influence their perspectives on the topics. Given the research question, smokers were chosen. A group of non-smokers could only talk about the smoking behaviour of others and would not have the personal experiences necessary to fulfil the study aim. Gender homogenous groups were chosen to make interpretations and analysis of gender differences possible. Though unintended, the focus groups turned out to be friendship groups. Participants knew each other and during the focus group interviews this was perceived to be a factor that facilitated creation of a good discussion atmosphere.

No observer assisted the moderator during focus group discussions. This was

not considered necessary because of group size but because the moderator had extensive experience in performing group discussions with young people. After the sessions, important nonverbal behaviours or communications that were noticed and considered potentially important for interpretation were written down. In order to perform group discussions that gave rich material, the moderator needs to be equipped with some necessary skills. The most important skills are probably being a good listener and probing well. The focus group study was preceded by training for the moderator/main researcher in qualitative methodology.

In order to increase the trustworthiness of the qualitative study, we actively used triangulation in professional expertise during data collection, coding, and the analytical phase. Peer-debriefing was used to help evaluate the researcher's own role (author of the thesis) in the process as well as to broaden perspectives and discuss interpretations as part of the analysis. A presentation of preliminary results at a national conference brought debriefing from experienced colleagues.

The results in the qualitative paper (Paper III) generated hypotheses that were partly studied in one of the quantitative papers (Paper IV).

ETHICAL CONSIDERATIONS

As a basis for this thesis, all participation was voluntarily. The subject for the studies is not particularly sensitive, but rather is a part of most teenagers' lives. The study participants were aged 13 to 17, an age where they were assumed to be mature enough to decide whether or not to participate. The young people received written or verbal information on confidentiality, voluntariness, etc. before deciding on participation. The parents or guardians received information about data collection for the Papers

I-III through the schools, and through letters to their homes for the survey for Paper IV. The information dealt with the aim of the study, its methodology, practical details, terms for volunteering, dealing with results, and the names and addresses of responsible persons. The ethical considerations for research primarily dealt with protection afforded for the participant's integrity. The results were treated confidentially and no individuals could be identified in the compilations or presentations. The cooperating and participating schools received written reports of the results.

All necessary approvals for the separate studies in this thesis were given by the Research Ethic Committee at Umeå University. Because of the impact of tobacco as a public health problem and the well documented challenges of trying to influence young people's behaviour by tobacco prevention programs, it is easy to defend this kind of research. Further knowledge and understanding of what influences young peoples' lifestyles and what methods work to prevent risks and promote health are needed to be able to offer high quality interventions. Ineffective methods not only risk decreasing the credibility of tobacco prevention activities but also other public health interventions in general. An on-going process to acquire knowledge to continuously develop prevention methods is vital. When evaluating the relation between potential risks and benefits, the potential benefits of these studies were considered great and the risks controllable.

MY PERSPECTIVES ON AND ROLE IN THE RESEARCH PROCESS

Before becoming interested and involved in research I had a career working as a social worker with teenagers in different community settings. I brought experiences built during previous professional train-

ing and years of practical work with young people to what I do today. Now I share my professional life between two offices at two working sites. One is at the Västerbotten County Council where I work at the Unit for Research, Development, Education and Public Health. The other is at the Umeå University Unit of Epidemiology and Public Health Sciences. Thus, I have two offices with one foot in practical prevention and the other in prevention research. They are connected through an interest in one issue – primary prevention in young people. During my research training I have had no direct involvement in the schools working with TFD. From the beginning I felt a strong need to do all I could to distance myself from all aspects of the practical prevention work. I was concerned that my experience could blur my judgements or could be questioned as biased. I have come to realize that it can also to be considered biased not to use one's experience. Therefore I have found a way to use my background professional experience in research. I have participated in all aspects and stages of the studies, from design to data collection, analysis and writing the papers. Today I have come to understand the benefits of being part of both practical, applied public health work and research, with the privilege and possibility of making both richer.



RESULTS

The results from the studies are presented under the headings: *Tobacco Free Duo and relation to the use of tobacco* and *Adults' role in supporting young people to refrain from tobacco*. Some additional results that have not previously been reported will also be described. When this is the case, it is stated.

TOBACCO FREE DUO AND RELATION TO THE USE OF TOBACCO (PAPERS I AND II)

Points of departure

When Västerbotten County Council started the TFD intervention, they wished to develop a model to prevent adolescent tobacco use. An initial requirement was to think long term and try to create an intervention that could last years and reach as many county youth as possible.

TFD started on a small scale 15 years ago and has spread across the county. It is

still ongoing and currently is a method used in all 15 Västerbotten County municipalities. Ninety six percent of the 7-9th grade schools were working with the program at the time the data in Paper I were presented. Therefore, the requirement to develop a long lasting and widespread program has been fulfilled. There were more than 8 000 members between grades 6-9 each year. More than 30 000 young people in the county, paired with adults, have been members of TFD since the program start. The percentage of youth forming duos in the different school areas during each study year are shown in table four (see next page).

There was a greater difference between school districts than within a district during the study. The lowest proportion of signed contracts was 61% in 2001, in a district with low figures in general, and the highest proportion was 98% in 1995 in a district with a generally high proportion of signed contracts.

Table 4 Students signing contracts in intervention area, 1994-99 and 2001, in percent, grades 6-9.

	1994	1995	1996	1997	1998	1999	2001
School area 1	94	96	94	93	94	95	93
School area 2	86	85	81	83	83	79	80
School area 3	82	85	78	80	80	78	71
School area 4	91	90	87	88	87	89	91
School area 5	-	98	96	94	94	92	94
School area 6	-	77	82	83	84	74	61

In total, 13 597 students in grades 6-9 responded to a questionnaire during 1994-99 and 2001 and were part of the repeated cross sectional studies used in the TFD and adolescent tobacco use research described in this thesis. The response rates varied between 80% and 95%. The non-participants consisted mainly of students absent from school, but sometimes of whole school classes who were away on school trips, etc. Almost all students present in school at the time of the survey answered the questionnaire. A few questionnaires had to be excluded every year as they contained obviously erroneous data throughout the questionnaire (e.g., 304 siblings, started smoking at one year old, smoke 1000 cigarettes a day) or because they were not readable. The proportion of excluded questionnaires never exceeded 2%.

Tobacco use trends in adolescents

The primary interest of the study presented in Paper I was to assess tobacco prevalence trends, gather information on the intervention, and better understand if the intervention had an influence on the tobacco use among young people. First the county trend

was assessed. This is presented in table five. There were few tobacco users in 6th grade so the results are confined to replies from students in grades 7-9.

Smoking decreased in the intervention area during the study period. When looking at the study groups, total smoking (includes all frequencies of smoking from occasionally on weekends to regular daily smoking) decreased significantly by almost 50% ($p < .001$).

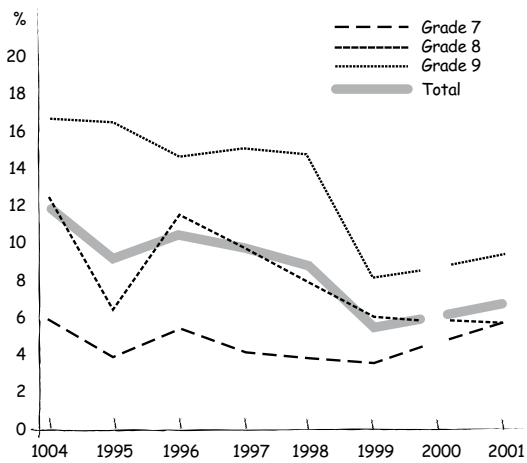
There were differences in time trends between the different grades. In figure four, smoking and snus use prevalence by grades are shown for the different survey years.

In 7th grade, no significant decrease was found in smoking. In 8th grade, a smoking decrease occurred both in overall smoking (from 12.2% to 6.8%) and in regular smoking (from 9.4% to 3.9%). Regular smoking was defined as daily or almost daily smoking. In the years 1995, 1998, 1999, and 2001, overall smoking was significantly lower than in 1994 (p -values ranging from 0.038 to $p < 0.001$). Regular smoking was also significantly lower in the same years, with

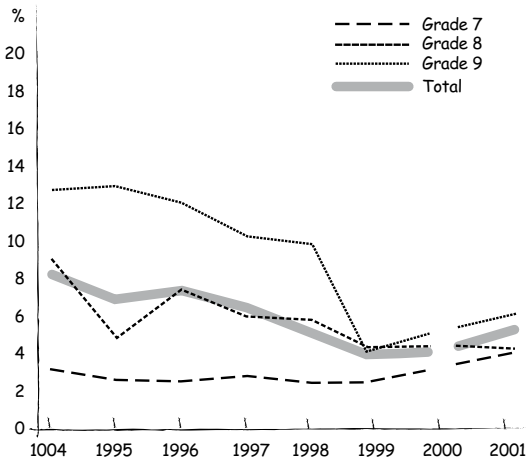
Table 5. Prevalence of tobacco use in intervention area, 1994-99 and 2001, grades 6-9.

	1994		1995		1996		1997		1998		1999		2001	
	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)
GRADE														
Six	4	0.8	10	2.1	6	1.5	10	2.4	16	3.0	11	2.5	13	3.9
Seven	37	6.9	20	4.2	36	8.0	28	7.7	25	4.5	25	4.2	32	6.5
Eight	81	15.4	60	12.0	63	14.4	69	15.0	56	11.4	46	7.9	37	8.9
Nine	119	23.3	90	23.8	91	20.9	81	19.7	105	19.4	56	11.2	52	13.2
Total	241	11.6	180	9.8	196	11.3	188	11.4	202	9.5	138	6.6	134	8.2

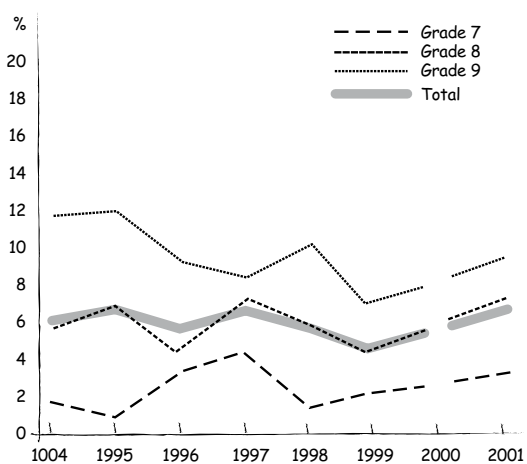
Figure 4.



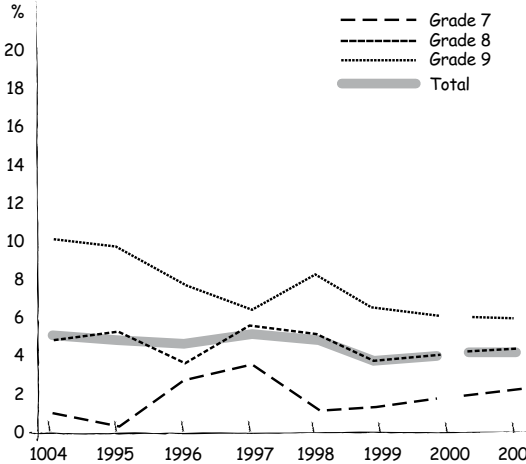
(a) Prevalence of overall smoking in the intervention area, grades 7-9, 1994-1999 and 2001.



(b) Prevalence of regular smoking in the intervention area, grades 7-9, 1994-1999 and 2001.



(c) Prevalence of overall snus use in the intervention area, grades 7-9, 1994-1999 and 2001.



(d) Prevalence of regular snus use in the intervention area, grades 7-9, 1994-1999 and 2001.

p-values from 0.05 to 0.001. In 9th grade, a decrease in overall smoking from 16.1% to 9.0% was noted. This decrease was statistically significant during 1999 and 2001 compared with 1994, p-value < 0.001. Regular smoking decreased from 12.3% to 6.0% in 9th grade and was significantly lower in 1999 (p < 0.001) and 2001 (p < 0.021). The decreases were significant for both girls and boys with p < 0.01 for both.

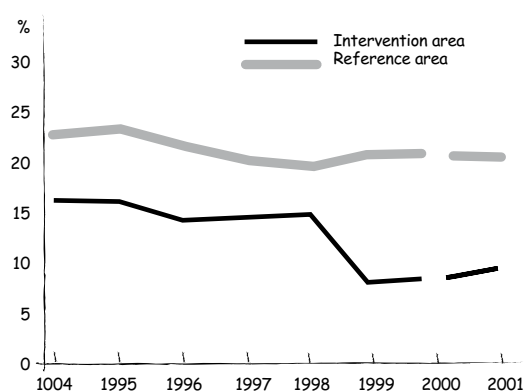
No significant decrease was found for snus use.

To be able to discuss effects from the

intervention, smoking prevalence's in the intervention and reference areas are presented. A significant difference was found between the two areas in 9th grade smoking prevalence (significant year by region interaction, p < 0.001). The intervention area had a lower prevalence and a greater decrease than the reference area, presented in figure five. Smoking decreased in the intervention area during the study period while it was stable in the reference area (see figure five on the next page).

The smoking decrease was most pronounced in 1998, in the intervention area. At the first study point in 1994 the difference between the intervention and reference areas on overall smoking was 6.9 percentage units. In 2001 the difference had almost doubled to 12.5. For daily smoking the trend was the same, but less pronounced. After Paper I was published an analysis has been carried out on data collected in 2003 and 2005. The increase seen in 2001 has stabilized with a non significant decrease noted in 2003 and 2005, being comparable to the level in 1999.

Figure 5. Grade 9, 1994 -1999 and 2001.



Prevalence of overall smoking in the intervention and reference areas.

Considering snus the changes were smaller and less stable. The pattern seen was a higher snus prevalence found in the intervention area in the beginning of the study period, but there was a shift in 1999 and thereafter the reference area had the higher snus prevalence.

The young people participating in TFD were asked if they perceived that the contract they had signed with an adult had helped them in staying tobacco free; 53% said that the contract had helped them. One out of five said that the contract had helped them a lot in refraining from tobacco and there were no gender differences noted. The most important reason for adolescents to

become a TFD member was that they decided for themselves that it was the right thing to do. This was reported by 75% of girls and 60% of boys.

Adult partners' tobacco use and quitting

The young people at the schools were the target group for the intervention and their tobacco use prevalence was therefore assessed. They were asked if their parents used tobacco and TFD members were also asked if their adult partner was a tobacco user who had to quit tobacco to be able to take part in the intervention duo. The questions on adult partners were added to the 2001 questionnaires after field workers reported their perception that many adult partners were quitting tobacco.

In this section the presented results are confined to data from the years 2001, 2003 and 2005. The study base consisted of 5332 students surveyed during 2001, 2003 and 2005. The response rate and the reasons for non-response were the same as previously described.

In an unpublished analysis, parents' tobacco use was assessed using the study base mentioned above. A pattern was found where mothers were more often smokers and fathers were more often snus users. How much and often parents used tobacco was not assessed. Of the mothers, 17.8% were smokers and 9.5% were snus users. Of the fathers, 10.4% smoked while 26.9% used snus. Overall, fathers were more often tobacco users.

To assess the proportion of adult TFD partners who quit tobacco, the study group had to consist only of TFD members. Of the 5332 students who answered the questionnaire, 4120 (77.3%) said that they were TFD members.

On the question about their adult partner's tobacco experience, and if the adult had stopped using tobacco to be able to be-

Table 6. Adult partners' tobacco use and quitting status when becoming an adult partner in Tobacco Free Duo, 2001, 2003 and 2005 for grades 7-9, by sex.

	2001	Girls 2003	2005	Total	%	2001	Boys 2003	2005	Total	%	Total	%
TOBACCO USERS WHO QUIT												25%
Quit smoking:												
Daily smoker	49	50	32	131	6.3	39	57	55	151	7.6	285	7.0
Smoked less than twice a week	47	17	27	91	4.4	62	27	29	118	6.0	211	5.2
Smoked less than twice a month	24	20	26	70	3.4	16	27	26	69	3.5	131	3.2
Quit snus use:												
Daily snus user	15	26	56	97	4.7	32	49	70	151	7.6	250	6.2
Used snus less than twice a week	4	6	16	26	1.3	4	15	28	47	2.4	74	1.8
Used snus less than twice a month	6	7	14	27	1.3	17	7	6	30	1.5	57	1.4
NON TOBACCO USERS												75%
Never smoked or used snus	311	387	541	1239	60.0	242	359	495	1096	55.5	2348	57.9
Stopped smoking or using snus for other reasons before Tobacco Free Duo	99	130	154	383	18.6	70	126	119	315	15.9	699	17.3
Total	555	643	866	2064	100.0	482	667	828	1977	100.0	4055	100.0

come a partner, 65 students (1.5%) did not reply. Among the remaining 4055 students, 2348 (57.9%) reported that their adult partner had never used tobacco, 699 (17.3%) previously used tobacco but stopped for some other reason before the start of TFD. The remaining 1008 (24.8%) reported that their adult partner had stopped using tobacco to be able to take part in the intervention. Out of these, 13.2% used tobacco daily with 7% smoking and 6.2% using snus. Among the rest who quit tobacco, 8.4% smoked less than twice a week and 3.2% used snus less than twice a week. In table six, the adult partners' tobacco experiences and quitting status are shown.

The adult partners who quit comprised 62.2% of those who stopped smoking and 37.8% who stopped using snus.

When comparing differences between girls' and boys' adult partners, a significant difference in quit rates was found. Among the adult partners of girls, 21.4% quit smok-

ing or snus use to participate. Among partners of boys, 28.6% quit ($p<0.001$).The biggest gender difference was found in those who quit daily snus use, and this group was dominated by fathers of boys.

ADULTS' ROLE IN SUPPORTING YOUNG PEOPLE TO REFRAIN FROM TOBACCO (PAPERS II, III AND IV)

In the qualitative study, 15-years old smokers discussed smoking in relation to peers, adults at home and in school, etc. in focus groups. During the data analysis three themes emerged that all relate to different aspects of youth smoking behaviour that are relevant to prevention (see figure six on next page). The themes were 1) "gaining control" reflecting what makes young people become smokers, 2) "becoming a part of the self" focused on what facilitates youth to start smoking, while 3) "concerned adults make a difference" indicated what may prevent them from starting.

The young smokers reflected on the

process of becoming a smoker and they described feelings that were both complex and contradictory: uncertainty about some aspects of life was combined with great certainty about others; feelings of curiosity and a wish to challenge existing norms were accompanied by feelings of fear, vulnerability, and a need to comply with peer conceptions about attitude and image. Smoking was described as a short cut to handling this vulnerability and reaching social and adult status, making them feel more confident in gaining control. Different views on adult roles, engagement and mission in connection to young peoples' tobacco use was repeatedly brought up.

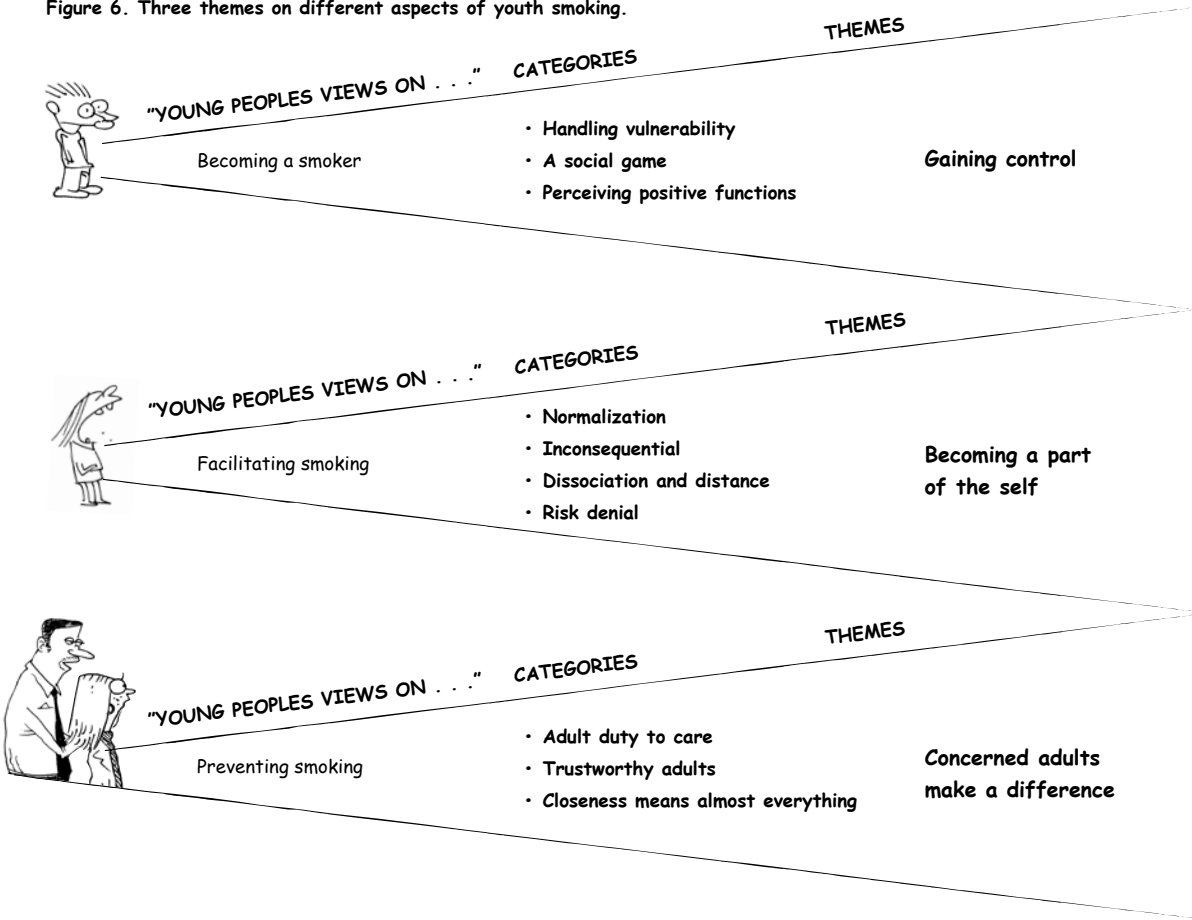
In relation to school

In school the young smokers spent a lot of

time with other smokers in what could be described as a smoking community. The girls talked about smoking and sharing cigarettes as social putty while boys described it as nice having friends to smoke with. The description of themselves belonging to a smoking community with good friendships was common for girls and boys.

The young smokers stated that when parents allowed their children to smoke, the school lost its potential power to intervene against their smoking. The informants expected adults to act against smoking but often described the adults as passive, doing nothing or more or less resigned. The majority of the young thought that significant adults like teachers should intervene *"It's what they should do. It's part of the pack-*

Figure 6. Three themes on different aspects of youth smoking.



age of being an adult". When adults did not act, it was regarded as an acceptance that facilitated smoking.

All young informants smoked during school hours, and most of them did so at the school yard. They knew that smoking was not allowed within the school premises and shared the view that they expected teachers to intervene. They perceived it as a teacher's responsibility and expressed feelings like *"Good teachers care and then you respect them"*. Many expressed sympathetic feelings for those teachers having to intervene all the time. They thought it prevented smoking, especially early in the smoking path when you were not an established smoker and still were smoking on the sly. When the teacher's obligation to act was not there, it was perceived as if they didn't care about the young smokers.

The young smokers knew that smoking was not allowed by anyone at the school yard but they described regularly seeing school staff smoking on the premises and not following regulations themselves. Some gave examples of the smoking school staff gossiping about what teachers were doing when no students were present. Both were examples of adults at school undermining trust and respect for rules. The young tended to lose respect when their expectations of adults were disappointed. An example given was *"Adult smoking on the sly sucks. It's pathetic"*.

The results from the qualitative study were studied using data from the national quantitative study. The data were collected in 13, 15 and 17 year olds in 2003. These results have not been previously scientifically reviewed and published. Students were asked: "Are there students smoking at your school yard?" The results are presented in table seven on the next page.

In total, 83% of the respondents answered

that students were smoking at their school yard. Of those, 38% meant that "many" students smoked at the school yard. The young smokers were asked if they smoked during school hours and if so, if they smoked at the school yard. Of the young smokers, 13% said that they did not smoke at the school yard while 39% said that they did so sometimes and 48% said that they often smoked at the schoolyard.

The students were asked if school staff intervened when they saw young people smoking at school. In total, 29% answered that all or most of the school staff did, 25% that one or two took action about student smoking at the school yard, and 22% responded that nobody intervened (see table eight on the next page).

The lowest proportion of adults in school intervening was in the secondary high school with 40% of the 17 year old respondents answering that adults did not act against smoking at the school yard.

Another aspect of interest was if adults smoked at the school yard, which is presented in table nine. Fifty three percent of all surveyed students answered that adults were smoking at their school yard and out of them nine percent that many adults smoked there (see table nine on the next page).

In grade seven when the students were 13 years old, 40% answered that adults smoked on the school premises; in grade nine, 56% stated the same. In the second year of secondary high school when the students were 17 years of age, 62% answered that adults smoked at the school yard.

In relation to parents

Almost 30 000 adults have teamed up with young people to support them in saying no to tobacco since TFD started. The most frequently chosen adult partner was a parent (77%) and no differences were seen between

Table 7. "Are there students smoking in your school yard?", 2003; by age; in percent.

		Many	Some	One or two	No one	Don't know	Total
13 yr	(n=1007)	22	42	9	13	14	100
15 yr	(n=956)	30	46	6	12	6	100
17 yr	(n=966)	63	27	3	4	3	100
Total	(n=2929)	38	39	6	9	8	100

Table 8. "Does the school staff act against student smoking at the school yard", 2003; by age; in percent.

		All	Most	Some	One or two	Nobody	Don't know	Total
13 yr	(n=1008)	16	18	13	7	11	35	100
15 yr	(n=957)	11	23	22	9	16	19	100
17 yr	(n=965)	5	13	16	9	40	17	100
Total	(n=2930)	11	18	17	8	22	24	100

Table 9. "Is school staff or other adults smoking at the school yard?" 2003; by age; in percent.

		Many	Some	One or two	Nobody	Don't know	Total
13 yr	(n=1011)	5	22	13	24	36	100
15 yr	(n=955)	9	32	15	20	24	100
17 yr	(n=965)	12	36	14	13	25	100
Total	(n=2931)	9	30	14	19	28	100

the proportion of whom the girls and boys chose. The remaining 23% of chosen adult partners were grandparents, the mother's or father's new partner, an older sibling, a friend's adult partner in TFD, a neighbour, a member from the school staff or an older sibling's girlfriend or boyfriend. To be able to take part in TFD and to be a tobacco free role model, 25% of the adult partners quit their own tobacco use.

The focus group discussions presented in Paper III emphasize several aspects of parental responsibility in preventing young people from starting to smoke.

When reflecting on what facilitated the process of becoming a smoker, the young smokers described a normalization of smoking that started for many when they were very young. Almost all the informants' parents were smokers and/or snus users. They described many positive memories from early childhood that were connected to smoking parents and these influenced them and contributed to an internalization and identi-

fication as a smoker-to-be. They described parents smoking, observed them relaxing and feeling good, and more or less perceived smoking as a natural part of their parents.

The fact that parents smoked gave access to cigarettes. Parents' cigarettes were available at home and this was perceived as an inconsistency that facilitated smoking. Many felt it strange when parents said you shouldn't smoke and then had no control over the cigarettes at home. *"They deny and supply at the same time"*. For many, the first cigarette smoked was picked up secretly at home. Cigarettes from parents continue to be one of the main sources for many young people and are either given or secretly taken. The provision of cigarettes at home was perceived as an open or hidden permission to smoke and contributed to the normalization of smoking. Many described smoking more when parents gave permission, and even more if parents smoked with their children. The young informants' shared the view that smoking parents weakened

their position in making their child smoke free. When their mothers and fathers gave different messages and set different rules about smoking, they lost their chance to intervene. The young smokers described inconsistent and untrue role models to be dangerous.

The informants said that today's young people decide for themselves and their own will and choice has to be accepted. They also had opinions on how parents should intervene. They stated that when they (children) did wrong, if the parents scolded them loudly and started big conflicts about the young people smoking, or when they nagged or punished the children, there was a risk of encouraging obstinacy and persistent smoking. Many experienced their parents as having given up on their child's smoking. When teachers telephoned the home, many young people described their parents as being irritated and perceiving the phone calls rather than the smoking as the problem. They described their parents having "*zero check*" of what was going on, being disengaged, and not having the ability to exercise any influence. Thus, on one hand most of them said that their parents could not do much about their smoking. At the same time, they stressed that it is the adult's duty to care. The young people used forceful words when they discussed adults who did not care. The young smokers said that parents had an obligation to do all they could to support their children from starting to smoke: "*It's a parental duty*". They found it tiresome if and when their parents "bothered" about their smoking. But it was generally expressed that the other opposite would be worse, and that was the feeling of being abandoned and unimportant to their parents.

The national quantitative data presented in Paper IV was used to study the focus group perspective of how the children per-

ceive parental responsibility to influence not smoking on a group level. Data were gathered in 1987, 1994 and 2003. A majority of the adolescents answered that parents should try to influence their children's smoking habits. Over the three study years, adolescents in all age groups became more positive toward parental actions to prevent their children from smoking ($p < 0.001$). See table 10 on the next page.

The alternatives "persuade", "not allow them to smoke at home," and "not smoke themselves" received the strongest adolescent support. More than 86% approved of all three alternatives.

Support for the alternative "forbid their children to smoke" more than doubled, increasing from 26% in 1987 to 59% in 2003 ($p < 0.001$). A weaker but increasing support was given to the alternative "reduce pocket money." This alternative was not in the questionnaire in 1987, but from 1994 to 2003, the support grew from 26% to 42% ($p < 0.001$).

The support for parental action against children's smoking was similar for both non-smokers and smokers. In 1987, 87% of the non-smokers supported the idea that parents should try to persuade their children not to smoke. The support grew to 93% in 1994 and 95% in 2003 ($p < 0.001$). The alternative was supported by 67% of the smokers in 1987 and it grew to 81% in 1994 and to 84% in 2003 ($p < 0.001$). Much weaker support was given from smokers for the alternatives "forbid children to smoke" and "reduce children's pocket money," then from non-smokers.

Statistically significant age differences were found for the alternatives "persuade," "forbid," and "reducing pocket money," with the strongest support from the youngest age group ($p < 0.001$). No age differences were found for the alternatives "not allowing

Table 10. Adolescent's perceptions on parental practices on children's smoking. In percent, by age, survey year and order of precedence.

		13 yr	15 yr	17 yr	Total
By trying to persuade their children not to smoke	1987	92	86	79	86
	1994	94	90	89	91
	2003	96	93	92	94
By not smoking themselves	1987	86	86	86	86
	1994	86	86	89	87
	2003	88	86	88	87
By not allowing the children to smoke at home	1987	63	64	59	62
	1994	84	82	76	81
	2003	87	87	84	86
By forbidding their children to smoke	1987	45	22	12	26
	1994	54	33	23	37
	2003	76	58	44	59
By reducing their children's pocket money*	1987	-	-	-	-
	1994	37	23	17	26
	2003	53	39	32	42

All changes over time are significant $p < 0.001$, with the exception of the alternative "By not smoking themselves" with a $p = 0.038$. * The alternative was not in the 1987 questionnaire.

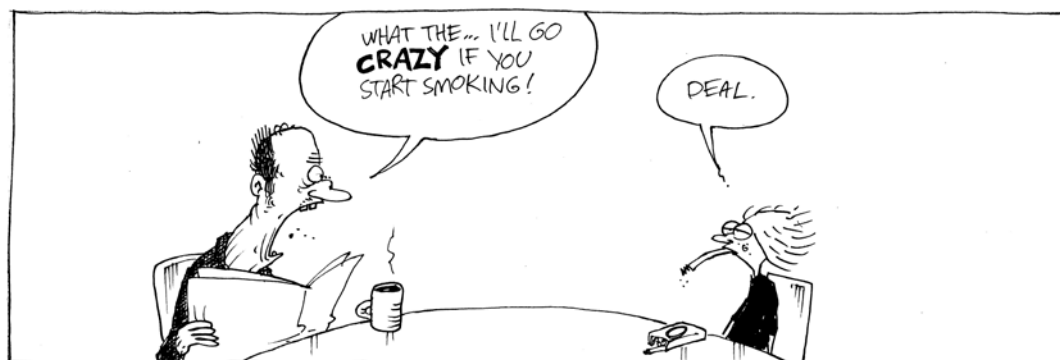
the children to smoke at home" and "by parents not smoking themselves". Boys were more positive than girls toward the more punitive measures of "forbid" and "reducing pocket money" ($p < 0.001$).

A majority of the adolescents said that their parents would try to make them stop if they started smoking or using snus, and non users reported this to a greater extent than the users. Eighty-nine percent said that their parents would try to make them stop smoking. The non-smokers were more convinced of parental action than the smokers. Among the smokers, 71% reported that their parents would try to persuade them to stop and 4% said that their parents would not care about their smoking. Sixty-seven percent of the smokers said that they would be influenced by their parents not wanting them to smoke, and out of those, 30% said that it would influence them a lot.

Considering snus use, 85% expected their parents to act. The non-snus users expected this to a greater extent than the snus users. But while 71% of the smokers' parents tried to persuade them to quit, only 36% of the snus users had experienced this

parental action. Twenty-two percent of snus users said that their parents did not care about their snus use.

In the qualitative study, young people perceived parents as being far too gullible and not wanting to believe that their child was a smoker. A new analysis using the Västerbotten data assessed the proportion of parents' who knew about their children's tobacco use. Data from 2001, 2003 and 2005 on the 15 year olds were used since these were the same ages as the participants in the focus groups. The question was "Does your parents know about your smoking/snus use?" Among the smoking youth in 9th grade, 46% said that their parents were aware and 54% that they were not aware or that they did not know if their parents knew. For snus, a greater proportion of the parents knew about their children's snus use. Among the snus using youth, 62% said that their parents knew and 38% that parents did not know or that they did not know if their parents knew. Parents more often knew that their child used snus compared to smoking. The difference was statistically significant ($p < 0.001$).



DISCUSSION

There is a lack of scientific studies on primary prevention programs targeting youth in Sweden. Knowledge development on underlying mechanisms and methods in primary prevention for the youth age group in general is needed in order to be able to conduct high quality programs. Ineffective methods may risk reducing the general credibility of prevention programs.

This thesis contributes to the evidence base by focusing on how to prevent young people from starting to use tobacco. It is likely that some results and conclusions from the studies in this thesis are more general in nature and can be used for broad preventive work that targets youth. When reflecting over the lessons learned during the start, development and more than 15 years of intervention, some factors can be identified as challenges as well as contributing to success.

TOBACCO FREE DUO AND RELATION TO THE USE OF TOBACCO

Points of departure and basis of intervention

The starting point of the TFD intervention was to create a lasting intervention with a long term perspective. A prerequisite believed important was to make the intervention context sensitive by building a supportive non-smoking infrastructure for health in cooperation with the community (Nilsson et al., 2007). To be able to prevent tobacco use in youth, one must conquer each group of children as they come of age and require the intervention to be long lasting for it to have a chance of making a difference. The general nature of public health interventions is that they are characterised by being low intensive, have a long term perspective, and have a population based target group. This thinking was applied when developing the TFD model.

International evidence along with the experience from local cooperating partners was used when modelling the intervention and deciding on intervention components. Comprehensive strategies with several components were used as previously studied, successful interventions targeting youth smoking had previously included such strategies.

The theoretical basis often used in youth tobacco prevention during the last thirty years derives from social learning theory (US Department of Health and Human Services, 1994). Social learning theory describes observation and imitation as important when children adopt and develop behaviours and that self-efficacy and outcome expectancies are predictors of behaviour (Bandura, 1986). When adapting the theory to tobacco prevention, it was concluded that children use tobacco due to a complex mix of psychosocial factors and as a result of psychosocial influence. The prevention programs often aimed at making the society-group-individual interplay visible; creating awareness; developing skills to resist direct pressure and indirect social influence; and support non-smokers to refrain from doing as smoking friends do. Information, discussions, role playing, behaviour mobilisation, and public commitment to be tobacco free are some examples of components that were used. When modelling TFD, there was an influence by social learning theory and all the mentioned components were made part of the intervention. TFD aimed at creating normative changes in tobacco at group and individual levels. The public commitment for being tobacco free was visualised by the signed contracts of young people and their adult partners. According to social learning theory, part of the observational learning is through modelling. An aim of TFD was to inspire and motivate for a tobacco free life and there-

fore tobacco free models were considered important.

Role models change over time, but among adolescents, smoking behaviours of parents and older siblings are known to be potent influences (Avenevoli et al., 2003; Rajan et al., 2003). Apart from the family influence, peer influence is also evident (Tyas et al., 1998; Pinilla et al., 2002). In theories of socialisation, the influence of parents and family are considered central but as children gets older, other actors such as peers are part of the socialisation process.

The school was considered an important area and cooperating partner for the intervention as the school is an environment where all children and adolescents can be targeted. It was decided to develop an intervention that cooperated with schools and involved family and peers. TFD considered it important to develop the intervention by involving parents, peers and the school as they all are important agents in socialisation and needed to create a tobacco free norm. The scientific literature was combined with discussions with school staff, parents and young people on how to form a relevant intervention that could be managed long term. According to socialisation theories, adolescents who feel that their behaviour is self-generated and that they have a certain amount of autonomy are more often positive and less defensive. It was thought important to see the young person in a social context of friends, adults and their community. As young people's daily lives integrate both risk and protective factors, the belief was that the intervention had to be both sensitive to and depend on their own context to have an effect. The local community of friends, parents and other significant adults was regarded as a major asset for supporting young people to choose a tobacco free lifestyle. Interest in community based interventions in the

literature focuses on influencing individual behavior and community norms. We found that there may be combined effects from social, environmental and cultural factors on adolescent tobacco use. Few studies have evaluated the effects, but there is some evidence for effectiveness in the long term prevention of adolescent smoking uptake (Sowden et al., 2003).

Tobacco use trends in adolescents

While smoking and snus use in young people aged 15 was stable in the national reference data, smoking decreased in the intervention area in both boys and girls. This suggests that the TFD program contributed to a reduction in adolescent smoking.

The effect was evident by 1998 after just a few years of intervention. There are probably several explanations. One is the way the intervention evolved. When a new school joined, it was introduced in 6th grade the first year of intervention and then included a new grade at the start of every school year. In this way it took three more years until all 6th-9th grades were involved. All schools with surveyed pupils participated in TFD, but they started during different years: 1994 and 1995. By 1998 all grades at all surveyed schools were part of the intervention. The impact from the intervention probably depended on the time and whether a majority of pupils participated. In 1997 the program organisation evolved to include the Dental Public Health Care and this had several implications. Previously, a program manager at the County Council worked with a few schools to pilot the intervention. But involving the Dental Public Health Care meant that the County Council organisation grew to almost 40 people with local representation in all municipalities. It also meant that TFD was offered to all county schools and contact people at every school joined. With so many schools engaging in tobacco

prevention, the process was given extensive media coverage. In summary, time, the impact of a majority of pupils and schools taking part, local contact people from the County Council, having the schools in all municipalities participate, and high public attention might explain the effect seen after a few years of intervention.

The significant decrease was found in 8th and 9th grades. One could have expected a decrease in 7th grade as well. In county data as well as the national data, smoking uptake shows a stepwise pattern with the lowest prevalence in 7th grade gradually increasing in 8th and 9th grades (Nilsson, 2005). The pattern seen in our studies might reflect increased activity against smoking in grades 8-9 in the intervention area. When asked, school staff said that before the intervention activities against tobacco were most prevalent in 7th grade and more or less replaced by alcohol and other drug prevention activities in the higher grades.

No significant changes were seen in snus use. This might be due to focus in the first years on smoking as the intervention was focused on cancer prevention.

Two other tobacco prevention studies in Sweden and Norway, which used personal contracts, have also reported decreased tobacco use in young people. In the two intervention programs, youth signed personal contracts but without the component of adult partners used in TFD. The Swedish study reported reduced smoking and snus use by more than 50% in grades 7-9, with the biggest effect found in grade 9 (Persson, 2003). In the Norwegian study, an 80% lower rate of daily smoking was found in grades 7-9 (Svoen and Schei, 1999). Due to the studies small sample sizes, one should be careful about drawing definitive conclusions. Verbal testimonies from young people and their adult TFD partners have been

positive about the contract as an intervention component. In the county survey, 53% answered that the contract helped them and 20% said that it had “helped a lot” to refrain from tobacco.

Adult partners’ tobacco use and quitting

A TFD intervention component was that young people were given the opportunity to team up with a tobacco free adult of their choice to form a tobacco free pair or “duo”. They signed a mutual agreement to stay tobacco free together for the next three years. The involved adult thereby made a commitment to provide a good example and actively support the pupil to stay tobacco free. Although the adult’s own tobacco use and quitting was not addressed as part of the intervention, and they were not the target group, the intervention seems to have started many processes. One of four adult partners was reported by the surveyed youth to have been tobacco users but quit to be able to take part in the intervention.

Field workers reported many verbal testimonies on reasons for becoming an adult partner were connected to their own tobacco use. Most of the reports were about parents who quit and their reasons, feelings and determination about their decision. Many parents who used tobacco occasionally started to ask “What’s the point?” Other reports gave information about the value of the long-term success of the program. Many parents told field workers that they were not prepared or motivated to quit when their first child wanted to become a member. But when their second child was at the age for TFD membership, they were both prepared and motivated. Many also reported that it just was not possible to relapse because they felt an obligation towards their child. One of four adult partners was reported to have quit tobacco to be able to be a partner (Paper II). These data

were cross sectional and we do not know if the effect is sustainable and if the adult has quit tobacco permanently. The perceptions of school staff and field workers are that the majority of adults take the signed contracts seriously. Few have reported children having to sign new contracts with a new adult due to the original adult partner relapsing in tobacco use.

Summarizing reflections on intervention effects

Using a multi-faceted intervention that includes adolescent-adult partnerships can contribute to a reduction of adolescent smoking uptake. This intervention is proven to be sustainable within communities. Apart from main rules that were common to all schools, there were variations in the program implementation that are not assessed in the analyses for this thesis.

Therefore it is not currently possible to specify which intervention components are responsible for the outcomes. But some reflections based on our experiences and the literature is relevant to enhance our understanding of the outcomes.

At the start of the program the most appropriate age to target was discussed. There were reports that the majority of young people test tobacco during the first half of their teens (CAN, 1993). Therefore it was decided to start the intervention in 6th grade and to let the intervention have a developmental approach involving tobacco free peers and adults as positive influences. Identification with a peer group can provide a positive psychosocial effect that, in turn, can prevent the use of tobacco as was later established by Dutch researchers (Crone et al., 2003). In TFD, it was considered essential to show that the majority of the young decided to stay tobacco free. Doing it as part of tobacco free pairs gave an imaginary audience and this could have increased the

adolescent's identification with a healthy peer group. Research from New Zealand confirmed that the decisions are made early and concluded that effective programs need to be embedded in a developmental approach that reduces both early smoking experimentation and the effects of peer pressure on the development of cigarette smoking. They also suggested that children who engage in early smoking experimentation tend to affiliate with adolescent peer groups whose members smoke (Fergusson et al., 1995).

Based on experience as well as the literature, we believe that it was crucial to find ways to involve family, friends and the surrounding society in a school based intervention. According to Tyas et al, and Turner et al, (1998; 2004) both attitudes and expectancies are formed in the young people's social context and some relations are mutual. Parents have a substantial influence on their children through their own tobacco use, attitudes, norms and parenting style, attachment and support, and the quality of the parent-child relationship. An effect of taking part in TFD was that many parents stopped using tobacco themselves. Parents were informed about how important it is that parents give clear messages against their children using tobacco. In some research, peers are suggested as the most important predictor for smoking (Conrad et al., 1992) while in other studies parents are suggested as the most influential or at least as influential as the peers (Baumann et al., 2001).

Adolescent smokers often overestimate smoking among peers and perceived smoking is reported to be a stronger predictor for smoking than their friends' actual smoking habits (Turner et al., 2004). Therefore the intervention program included components that made public that a majority of the young had decided to be tobacco free.

For example, the TFD contracts were often signed at meetings at school, attended by both the young people and the adult partners.

The intervention ends in 9th grade and it is not known if the adolescents stay tobacco free thereafter. But as age of initiation is important for health reasons, levels of nicotine dependence, and likeliness to quit as adults, a great deal is achieved even if age of initiation is only delayed for a few years.

Specific TFD intervention components were important for to sustain it long term. One is the county organization described in Figure 3 with shared engagement to prevent adolescent tobacco use. The organization builds an intervention structure with an agreement of responsibilities between identified people at the County Council and in the municipalities or schools. All roles are important to the structure but some are more critical for the long term functioning of the program. These are the management positions of the program manager and coordinator who have the mission to develop, educate, supervise and maintain an overview of critical points, as well as set good examples and make sure that the core of the intervention is maintained and delivered with good quality.

Another component was the education and training within the program. This extended to school staff, students and the clinic coordinators within the Public Dental Health Care. American researchers evaluated the maintenance of school-based health education programs and concluded that staff training is an important factor in institutionalization of the program. To make it work long term, you must invest and one investment is in staff training (Hoelscher et al., 2004). Norwegian researchers evaluated a school-based smoking

prevention program and found that teacher training and education were a requirement for reduced smoking among pupils. They perceived teacher training and education as important to motivate teachers to administer the program as intended to assure their approaches were in accordance with the program (Joesendal et al., 2005). TFD training was vital as a motivating factor and to offer a good quality intervention, both being necessary elements for a long term model. Booster sessions are necessary and have to be periodically repeated. Without boosters, long term effects are not realistic. The Norwegian study evaluated an adolescent intervention program called "Be Smokefree". In addition to emphasizing the importance of teacher training, involvement of parents was stressed (Joesendal et al., 2005).

The collection of data on tobacco use was important. Especially during the initial years of the intervention, schools asked for feedback to understand if their contributions had any effect.

The intervention was context sensitive and from the start it was considered a prerequisite to have a joint core of intervention components. Participants must give ideas and local resources be used to strengthen the intervention. To keep the intervention modern, we had to be open to adjustments over time. Being able to conduct an intervention within a health care and school system that are often perceived be overwhelmed with different important tasks and financial restrictions required the openness to make changes.

One difficulty in the intervention was the different organizational memberships of the cooperating partners. From the start there was a need to overcome potential problems by clear identification and agreement on responsibilities. County Council

staff managing the intervention perceived a responsibility for the intervention but did not have a mandate in the schools. The quality of the work was dependent on engagement within the schools. The mandate of the County Council was only within its own organisation. Ultimately, there was an understanding of what they could do to develop the quality of their own work by offering the schools engaged in TFD a supportive partnership with skilled, well educated staff who used high quality materials and methods. Another difficulty in the relation of the county staff with partnering schools was that schools do not have an overall county organisation. This was overcome by contacts with the management at every school and by building an organisation with contact people at the schools that joined the intervention. Establishing these contacts was time consuming considered a worthwhile investment.

Differences in the number of signed contracts between school districts were found over time. The differences could not be explained by different socioeconomic settings or tobacco prevalence levels. The explanation was in the local administration of the contracts and communication around contracts between the different 6th and 7th grade schools.

An ongoing concern has been that the intervention could contribute an unintended consequence of stigmatization of young smokers. During staff training it has been emphasized that all measures should be taken to counteract such patterns. If this is not done, there is a risk that obstinacy may result in excessive smoking or other defiance reactions. By creating feelings of "us and them" nothing positive will be achieved and this would not be right for smoking youth. Primary smoking preventions cannot be expected to make smoking youth

quit tobacco, although such programs may make them reflect on their tobacco use. Combining the development of interventions to assist adolescents in refraining from smoking uptake with youth tobacco cessation programs might be a way forward.

ADULTS' ROLE IN SUPPORTING YOUNG PEOPLE TO REFRAIN FROM TOBACCO

In relation to school

As described earlier, school staff had a key role in the TFD intervention. They administered the intervention and its components at school. In TFD, attention was given to the school setting as a social system that could function as a supportive environment while interacting with other parts of the community. At many intervention schools, teachers and other staff worked hard to create a supportive environment for the intervention. Policies, values, norms, and so called "school ethos variables" have the potential to influence adolescent smoking (West et al., 2004; Aveyard et al., 2004 a; Aveyard et al., 2004 b; Aveyard et al., 2005; Sellström et al., 2006; Henderson et al., 2008). Such information is a part of TFD teacher training. If consistent messages against tobacco are given to pupils by school staff in a caring, inclusive and respectful manner, schools have the potential to be a place where tobacco free norms are confirmed.

Young smokers described school as "a really dangerous environment" for considering tobacco use during the focus group discussions. A process was illustrated whereby both behavioural and normative beliefs formed attitudes, norms, intentions and behaviour as described in the theory of planned behaviour developed by Ajzen and Fishbein (1980). Their descriptions of becoming smokers were full of words such as "vulnerability, feeling unsure, being scared,

afraid not to fit in, becoming lonely", etc. Smoking was a means of perceiving control of their feelings and of the situation. Implications for prevention in school are that programs should include components directed towards the individual but also an attitude of the school as an environment. There are positive results from US school programs addressing the individual using cognitive and life skill modalities (Hwang et al., 2004). Scottish researchers who studied effects on health behaviours related to the school environment-school ethos concluded that schools that engage and involve pupils in education, and describe good teacher-pupil relations have lower smoking prevalence's and can be regarded as more health effective (West et al., 2004). Other researchers have also reported on the importance of good quality teacher-pupil relationships and a school focus on caring and inclusiveness in reducing smoking prevalence (Henderson et al., 2008). One TFD aim was to make visible that all or almost all young people had decided to remain tobacco free. This gives the feeling that you belong to a tobacco free majority. To let the adolescents choose an adult whose mission is to be supportive may be especially important for youth with weak adult support in their daily lives.

The young smokers expected teachers to act against pupils smoking and intervene against smoking at the school yard. Teachers who did not act were interpreted as not caring. Teachers who smoked at the school yard were thought not to be trustworthy. In a European study that included Sweden, young smokers were more often truant from school, less likely to have positive feelings about school, had low academic achievement and more often took part in bullying other students (Flemish Institute for Health Promotion, 2002). Therefore, for young smokers a school environment with good trustworthy relationships between

pupils-teachers is of added importance. According to the smoking youngsters, teachers who do not care about pupil smoking and who smoke themselves risk undermining respect and trust, and also risk losing their potential to positively support and influence young smokers.

National quantitative data revealed a problematic picture about smoking at school. A majority of the surveyed pupils said that pupils smoked at their school yard. A minority said that school staff intervened, and more than half said that school staff smoked at the school yard. This is problematic from several points of view. The first is that by allowing pupils to smoke at the school yard, the school will be part of smoking initiation and allowing smoking to become an established part of young people's daily lives. By not intervening against smoking at the school yard, adults at school risk sending the message that they cannot be bothered about young people smoking in general, or that they do not care about these specific young people. The youth in the focus group discussions thought this was wrong. They said that if teachers "don't care about us smoking they probably don't care about us at all". When school staff smokes at the school yard, they are smoking role models for pupils. A positive association has been reported in literature between teachers smoking on the school grounds and adolescent smoking (Poulsen *et al.*, 2002). Watching adults break rules also may affect the young people's attitudes towards rules and regulations in general.

The young smokers described feelings of togetherness and belonging to a "smoking community". They regularly spent time together during the school day and had their best friends in that group. This should be considered when developing cessation models for young people. Interventions might be improved by offering the youth in-

involved in smoking cessation, activities during breaks and developing ideas for offering alternative friend and adult support.

In relation to parents

Most of the young TFD participants chose a parent as the adult partner. Even if that was a quick and easy choice, without reflection for many, nearly a fourth (23%) chose someone else. It was thought important to make the young people reflect on alternative adult partners as part of the intervention. For some children it was not possible to choose a parent because of their tobacco use. Others had different motives. Some wanted to demonstrate independence from parents, others wanted to deepen a relation with an alternative adult, and some chose other adults because they thought the adult needed to quit tobacco for health reasons.

Involving parents in interventions against tobacco is essential. In TFD, parents were informed about the harms of tobacco and their child's opportunity to become a member of TFD. Information about the importance of parents taking a clear stance against the use of tobacco by their children and their children's friends was provided. The way parents react to their children's smoking has a very important influence on adolescent smoking uptake. American researchers found adolescents to be almost half as likely to start smoking in the next two years if they expected their parents to be upset about it (Sargent and Dalton, 2001). The parenting style and quality of the parent-child relationship can affect adolescent smoking. Parental control (den Exter Blokland *et al.*, 2007), parent-child connectedness (Karcher and Finn, 2005) and parental concern (Kalesan *et al.*, 2006) are also important. If the parent is a non-smoker, high levels of parent-child connectedness have a protective influence on youth smoking (Fleming *et al.*, 2002, Tilson *et al.*, 2004).

Parents function as role models by being tobacco-free. But smoking parents can reduce the risk of their children's smoking uptake by having a negative attitude and reaction to adolescent smoking (McGee et al., 2006). If parents stop smoking themselves, there is a decreased risk of adolescent smoking (Farkas et al., 1999).

Reduced smoking in young people was an effect of TFD. But the influence of children on parents seems to be reciprocal. One of four adult partners, most of them parents, quit tobacco as a result of TFD.

In focus group discussions, parental smoking was part of the normalization process whereby smoking became a part of the young people's lives. It contributed to children's smoking through early positive identification with smoking parents and access to cigarettes. For many of the youth, parents' cigarettes were the main source of cigarettes. The provision of cigarettes from home was perceived as a blatant or hidden permission to smoke. Even though the young people were smokers, they thought that parents should intervene against their children's smoking with respect, as a sign of concern. When studied on a group level, this was confirmed in the national study. The results of the study show that a growing majority of adolescents supported strong parental intervention to help them refrain from tobacco. The youth prefer this not be in a punitive manner. The finding dismisses the notion that adolescents ignore or even disdain parental practices concerning tobacco. The results are in concordance with a North American study where adolescents were reported to express the expectation that parents should do what they could to influence children not to smoke (Jackson, 2002). The researcher of that study concluded that it is a myth that adolescents disregard parental values and rules regarding tobacco.

Norwegian researchers who focused on the interactions of influences at home and in school found that the impact of school smoking restrictions depends on home smoking norms (Wium and Wold, 2006). These results agree with focus group statements that concluded schools lost their ability to influence young people's smoking if smoking was accepted by the parents.

In terms of adolescent snus use, fewer parents intervened according to the children's reports. Parents knew more often that their child used snus compared to being a smoker. There is a slowly growing body of evidence of negative health effects from Swedish snus (Cnattingius et al., 2005; Norberg et al., 2006; European Commission, 2007; Hergens, 2007; Luo et al., 2007; Zendejdel et al., 2008). Frequently people compare the health effects of snus with smoking instead of evaluating the risks from snus use compared to no tobacco use at all. This way of reasoning might explain the more passive stand taken by parents of snus users. Recent research on the pharmacological aspects of nicotine addiction in relation to alcohol and some other drugs is a cause for alarm. If we want to reduce young people's use of alcohol we must also work to prevent their snus use (Wickholm et al., 2003).

LIMITATIONS AND STRENGTHS OF THE STUDIES

This thesis consists of four studies with limitations and strengths. Studies of Swedish primary prevention programs are rare, adding significance to the research undertaken.

A limitation of the study in Paper I was that the design did not allow us to specify which intervention components were responsible for the outcomes. The conclusion able to draw was that by using a multi faceted

intervention involving an adolescent-adult partnership an effect was seen in decreased adolescent smoking. The surveys used in Paper I were cross-sectional but the fact that the studies were repeated over several years, was conducted in the same way and at the same time of year added strengths to the study. In Paper I a national reference group with comparable data was used allowing discussion and conclusions on the effects from the TFD intervention program.

The data used in Paper II was also cross sectional. A limitation of the study was that we do not know if the effect found in adults quitting tobacco use is sustainable and if they have quit tobacco permanently. A suggestion for future research is to conduct a cohort study in the adolescents and the adult partners to be able to draw conclusions on long term effects.

The study in Paper II was limited to adolescents' reports about their adult partners' tobacco use. There were no reports from the adults themselves or any objective measures such as serum cotinine or exhaled carbon monoxide. But there is no indication found that asking the adolescents would give more false positive answers than one would get by asking the adults. Studies of the accuracy of adolescent reports on parental status characteristics have concluded that adolescents are acceptable informants (Ensminger *et al.*, 2000; Pueyo *et al.*, 2007). A study on 11 year olds and their parents even suggested that children sometimes give more valid reports than the parents themselves (West *et al.*, 2001).

In this thesis qualitative and quantitative methodology was combined, which is a strength.

Measures were undertaken to increase the trustworthiness of the qualitative study; triangulation in professional expertise was

actively used during data collection, coding, and the analytical phase. Peer-debriefing was also used to help evaluate the researcher's own role in the process as well as to broaden perspectives and discuss interpretations as part of the analysis. The results in the qualitative paper (Paper III) generated hypotheses that were partly studied in one of the quantitative papers (Paper IV).

The quantitative national data used in Paper IV were collected on three different occasions over 15 years. This study was also cross-sectional, but the repetition allowed analyses of changes over time in young people's tobacco use, knowledge and attitudes on tobacco related issues, studies which are rare. The study was methodologically strong. The individual sampling procedure, validation of the questionnaire prior to implementation of the survey, and the analysis of non-respondents carried out by Statistics Sweden undertaken to improve statistical power and validity all added strengths to the study.



CONCLUSIONS AND IMPLICATIONS

Calling tobacco a public health disaster sets demands for action. In this thesis knowledge on tobacco preventive mechanisms and components is gained and an intervention described that decreased tobacco use in adolescents and adults. A decrease of almost 50% in adolescent smoking prevalence was found in the intervention area while the smoking prevalence in the reference area remained stable. A bonus effect was reported in the adults that were engaged to support a child in the intervention to refrain from tobacco; almost 25% of the adult partners were tobacco users who quit tobacco in order to take part in the intervention. A study in this thesis showed that adolescents have become more positive towards and strongly support parental action on children's smoking, but preferably not in a punitive manner. Smoking adolescents stressed that adults had an important role to play both in facilitating and preventing young peoples smoking.

There are several implications for prevention. Long term interventions aimed at normative changes, with supportive and consistent messages from both parents and schools about the positive aspects of a tobacco free life, seem to be feasible approaches for preventing youth tobacco use. Adults need to understand their significant role in youth tobacco use. Adults are role models for youth and by using tobacco they are modelling tobacco use and will contribute to adolescent tobacco use. If they quit, they model a life without tobacco. Adults who are significant to young people should be aware of this fact and find ways to handle the situation thereby minimizing the risk of harming young people. Parents have a far-reaching responsibility but also vast opportunity to support their children in a tobacco free life. A tobacco using parent can have the same chance of a tobacco free child, but it requires clear messages and engagement against tobacco. Most

importantly to understand is that smoking adolescents expect adults to intervene against their smoking and if they do not do so they are considered unconcerned. Thus, involving close adults as parents and school staff in intervention programs can prevent or decrease adolescent tobacco use.

Concrete actions against smoking in school yards are essential to avoid schools as areas where smoking becomes established in young people's lives. Legislation prohibits smoking in the school yards. Schools are environments where adolescents spend a great deal of time and can be supportive environments for health. Actions to achieve smoke free school yards should be prioritized. Why not take the full step to make schools tobacco free environments? Who wants to be first? Interventions should also focus on limiting access to tobacco in general since it is clear that this signals an important normative message about the dangers of smoking. It is important to involve other parts of the community and peers in intervention programs to create a broader supportive environment for health.

Tobacco prevention has to be comprehensive in activities and policies, proceed from the global to the local level, from adults to children. Strong and clear policies on national and municipality level against tobacco constitutes a base for successful regional and local interventions. Policy and decision makers need to continue to be tough and brave when developing and implementing policy solutions and interventions, but also smart and sensitive for when the time is right.

Sometimes one can hear people expressing the feeling that the tobacco problem is solved. The perception can be understood as a view of the tremendous changes that

have happened in the Swedish society since the first tobacco legislation was introduced. But the view is a real danger if believed by policy makers as it risks diverting attention and limiting resources from ongoing tobacco uptake. From a Swedish perspective, progress has been made. Since the 1970s smoking has decreased by 50% among men and 30% among women. But there are still almost one million smokers and almost as many snus users in Sweden. More than 50 young people start to use tobacco every day of the year. The strategies in WHO's MPOWER package serve as a roadmap for the Swedish government when deciding on future legislation, policies and interventions. As exemplified in the matrix of this thesis, the strategies also have regional and local adaptations necessary to fulfil to get an impact.

FCTC, EU-directives and national legislation have restricted the tobacco promotion by the tobacco industry. Advertisements in the European periodic press and tobacco company sponsorship of sport events are reduced. The new area of promotion is the internet which allows marketing across national borders. This is a growing problem and difficult to restrict with current regulations. This is worrisome considering young people's internet habits which are often without adult control or guidance. An area that is nearly unregulated is a free market for promotion where brands are connected to the "right, attractive" attitudes and values. This is a dream for the tobacco industry. The basic idea of the internet sharing of free information contradicts the interest of countries that want to regulate content. Within FCTC and the EU there are crucial, ongoing discussions of ways to proceed in preventing such tobacco promotion.

Being involved in research, it might be ex-

pected to point out the need for increased research funding. There are two specific areas that have been under financed for many years. As snus is not allowed to be sold in other EU-countries and an extensive lobby works at the EU level for the ban to be lifted, it is easy to assert that Sweden has a specific responsibility to develop the evidence base about snus. The other field of research that is under financed is research on primary prevention. Since the prevention of adolescent smoking and drug use is a societal goal there must be resources to build a Swedish evidence base for primary prevention to assure that effective methods are used.

Work against tobacco and other drugs have to be integrated into our daily lives while meeting young people. Intervention models will have to be continuously developed and implemented. Long term programs seem to be a prerequisite for long term effects. An increased understanding of the school as a supportive environment for health and the value of good teacher-student relations is essential to a climate contributing to decreased adolescent use of tobacco and alcohol. Inclusion of training in counselling techniques, and group and conflict management is a necessary improvement in teacher education. Apart from interventions against tobacco in schools, the surrounding community should be involved, and understand the areas for social influence as a part of adolescent daily life. It is about socioeconomics, living and working conditions for young people and their families, school resources and teacher education, media influence ... the list can be continued.

No one should doubt that it is possible to prevent adolescent tobacco use. There are strategic measures based on WHO strategies to decrease the use of tobacco among

young people, including the following: 1) continued active taxation and pricing policies, 2) continued development of tobacco free environments and tobacco free work hours, 3) no exposure of tobacco products where tobacco is sold, 4) plain packaging and pictorial warnings on cigarette packages, 5) licences for those selling tobacco, 6) prohibition of tobacco peddling, 7) sanctions for illegal tobacco sales, 8) intensified supervision, 9) increased product control, and 10) increased access to tobacco cessation. With implementation of these strategies a societal context would upgrade the effects from evidence based interventions like Tobacco Free Duo.



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