Feasibility Study of a Cognitive Behavioral Smoking Cessation Intervention for Adolescent Males in Residential Treatment

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A FEASIBILITY STUDY OF A COGNITIVE BEHAVIORAL SMOKING
CESSATION INTERVENTION FOR ADOLESCENT MALES IN RESIDENTIAL
TREATMENT

By Flora Casallas

Submitted in partial fulfillment of the
Requirements for the degree of
Doctor of Psychology
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Appendix H

PHILADELPHIA COLLEGE OF OSTEOPATHIC MEDICINE
DEPARTMENT OF PSYCHOLOGY

Dissertation Approval

This is to certify that the thesis presented to us by Flora Casallas on the 27th day of May, 2004, in partial fulfillment of the requirements for the degree of Doctor of Psychology, has been examined and is acceptable in both scholarship and literary quality.

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ABSTRACT

The current study examined the effectiveness of a modified, empirically-based smoking cessation intervention, originally designed for teenagers in public school settings, but applied to actively smoking adolescents in residential treatment. The cognitive-behavioral intervention, developed by the American Lung Association (ALA, 2001) and researchers at West Virginia University, called Not-On-Tobacco (N-O-T), provides a total-health approach to helping teenagers quit smoking or to reducing the number of cigarettes smoked. The 10-session intervention was delivered over five consecutive weeks to eight adolescent males ranging in age 13 to 16 and in grades 8 to 10, living in a residential treatment community (RTC) located within the Northeast region of New York State. At the time of the study, the average length of stay at the RTC was 7 months. The intervention curriculum was followed as written, with some changes made to suit the needs of the RTC. The intervention’s curriculum pre- and post-assessment questionnaires on “Smoking History / Usage / Motivation / Intent to Quit” and “Attitude Toward Tobacco Use” were used to determine effectiveness of the intervention in helping reduce or decrease the number of cigarettes smoked. The study’s findings indicated a reduction in the number of cigarettes smoked during a typical week for all participants. A noticeable reduction in the number of cigarettes occurred at session 9, when the focus of the previous session was on assertive skills training. Based on these results, and the fact that the current study was based on a small sample (n=8), a definitive conclusion that the intervention was effective cannot be made without validation of the data with a larger sample group. Discussion includes implications for future studies.
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CHAPTER 1: INTRODUCTION

Tobacco use has been the single largest preventable cause of premature death in the United States (U.S. Surgeon General, 1989; McGinnis & Foege, 1993, US Department of Health and Human Services [USDHHS], 2000). From 1995 to 1999, smoking has killed over 440,000 people in the United States each year (Morbidity and Mortality Weekly Report [MMWR], 2002).

Anyone with a smoking habit, including adolescents and teenagers, puts themselves at risk of developing health complications related to cigarette use, such as lung, cervical, and other types of cancer; respiratory and cardiovascular disease; and atherosclerosis (Center for Disease Control [CDC], 1989, 1994). Studies have shown that early signs of these diseases have been found in adolescents who smoke (CDC, 1996), and teenage smokers trained in competitive sports report experiencing a decrease in physical fitness and performance (National Center for Health Statistics [NCHS], 2001; CDC, 1996).

Since 1987, The Diagnostic and Statistical Manual (DSM)(American Psychiatric Association [APA], 1987) has listed nicotine dependence as a form of drug dependence characterized by (1) the inability to control cigarette use, (2) distress at not being able to quit, and (3) the experience of unpleasant physiological sensations (withdrawal symptoms) upon quitting. Withdrawal symptoms include cravings, depressed mood, irritability, anger and difficulty concentrating (Hughes & Hatsukani, 1986; USDHHS, 1988; Bower, 2001). Interestingly, nicotine is only one of more than 4,000 chemicals of
carcinogens released during the use of tobacco products (USDHHS, 1988; DiFranza, Rigotti, McNeill, Ockene, Savageau et al., 2000).

In 1989, the U.S. Surgeon General issued a report that concluded that cigarette use is addicting, and that nicotine is the drug in tobacco that causes addiction; long-term nicotine dependence results primarily from the long-term use of tobacco, which is often initiated in adolescence. The earlier the onset of smoking, the more severe nicotine addiction is likely to be, and the harder it will be to quit smoking. Researchers confirm that individuals who initiate tobacco use during early adolescence are more liable to become dependent, have difficulty quitting, and smoke heavily (Chassin, Presson, Sherman & Edwards, 1990; Jackson, 1998; Lamkin & Houston, 1998; Chassin, Presson, Breslau & Peterson, 1996; Moolchan, Giannas, Robinson, & Pickworth, 2000). Flay, Hu and Richards (1998) described three important clinical phases that precede tobacco dependence: trial, occasional use, and daily use. Researchers (Lynch & Bonnie, 1994; Sussman, Dent, Burton, Stacy & Fay, 1995) found that if smoking is not started in adolescence it is unlikely to progress to regular use. In fact, research suggests that there is very little new smoking initiation after age 21 (Chen & Kandel, 1995; Koppstein, 2001).

According to the American Lung Association (ALA, 2001) 4.5 million youths, under the age of 18, are current smokers; each day 6,000 children under the age of 18 start smoking (National Household Survey on Drug Abuse [NHSDSA], 2001). Johnston, O’Malley, Bachman & Schulenberg, 2002) report that 24.4 percent of children are current smokers by the time they leave high school; the average age of first cigarette use is between 11 to 15, and the average age of daily use is 18.
Demographic Correlates of Adolescent Smoking

Demographic correlates of smoking suggest possible influences on smoking development. Greater parental education is associated with less likelihood of smoking in offspring (Giovino, 1999). Girls appear to be more influenced by peer smoking than are boys (Flay et al., 1998, Mermelstein, 1999). There are large differences in smoking as a function of race/ethnicity. The highest smoking rates are among American Indian/Alaska Native adolescents, followed by whites and then Hispanics; the lowest rates are among Asians and African Americans. These race/ethnicity differences are seen in both school-based and household surveys, so they are not due to differential school attendance (USDHHS, 2000), and they are not eliminated when a bioassay is used to validate self-reported smoking (Giovino, 1999).

Statement of the Problem

National epidemiological data on adolescent tobacco use have been collected, using school-based surveys such as Monitoring the Future (MTF) and household surveys such as the National Household Survey on Drug Abuse (NHSDA). MTF surveys the same segment of the population (8th, 10th, and 12th graders; college students; and young adults) with the same set of questions over a period of years to see how answers change over time. The MTF surveys have been carried out each year since 1975 by the University of Michigan’s Survey Research Center (Johnston et al., 2002). Since national surveillance began, there have been significant shifts over time in the prevalence of adolescent smoking. According to MFT, adolescent smoking increased in the late 1960s (especially among females), peaked in the mid-1970s, and then declined in the late 1970s and 1980s (especially for African Americans (Giovino, 1999; Johnston et al., 2002). New
smoking increases began in the early 1990s (for both African American and white adolescents) until the mid-1990s, and since then, there has been a downturn (Johnston et al., 2002). These cyclic shifts in smoking prevalence are likely driven by economic forces including changes in the social images of smoking, changes in the price of cigarettes and difficulty of easy access in obtaining cigarettes by adolescents (Giovion, 1999; Johnston et al., 2002).

A number of researchers have suggested that occasional drug use among adolescents may be best understood as a manifestation of developmentally appropriate experimentation (Miller, Cisin, Gardner-Keaton, Harrel, Wirtz, Belson & Fishburne, 1983; National Institute on Drug Abuse [NIDA], 1986). One defining feature of adolescence is a process of testing attitudes, establishing independence and autonomy. This process and behavior may include drug and tobacco use, and may be considered a normative behavior among United States teenagers in terms of prevalence as well as from a developmental task perspective (Newcomb & Bentler, 1988).

Shedler and Block (1990) argue that to the extent that drug experimentation may represent normative behavior during adolescence, it may be wrong to pathologize adolescents who experiment with drugs by assuming that they fall between nonusers and drug users on a continuum of psychosocial adjustment. Nonetheless, the emergence health risks associated with tobacco use, the addictive nature of nicotine, and the fact that though smoking prevalence has declined, 30% of twelfth graders still smoke (Johnston et al., 2002; Koppstein, 2001), together provide a rationale for a study focusing on adolescent smokers.
Adolescent Smoking Cessation Programs

A review of the literature suggests that smoking cessation interventions may hold promise for reducing or preventing continued tobacco use into adulthood if done in adolescence (Sussman, Dent, Burton, Stacy & Flay, 1995; Chen & Kandel, 1995; Kopstein, 2001). Sussman (2002) analyzed 66 tobacco cessation intervention studies from both published and unpublished literature conducted predominantly in the USA along with studies conducted in nine other countries. These studies dated from 1975 to January 2001 and reported a mean quit rate of 12% at 3–12 months follow-up.

The mean quit rate for the control groups was 7%. Length of follow-up varied from 2 weeks to 64 months (CDC, 1994; Sargent, Mott & Stevens, 1998; Kviz, Clark, Crittenden, Freels & Warnecke, 1994). Ershler, Leventhal, Fleming, and Glynn (1989) found that factors correlating with successful cessation in adolescent smokers are occasional smoking, age at cessation, and nonsmoking friends. These findings imply that smoking cessation programs are effective, and if applied to adolescent smokers, who are beginning to smoke, may render the behavior easier to extinguish due to the short history with smoking, thus targeting adolescent smokers with cessation programs may be promising.

Colby, Barnett, Monti and Rohsenow (1998) conducted a study of brief interventions with 40 adolescents who were not seeking smoking cessation treatment. At a 3-month follow-up, they discovered that motivational interviewing and length of time smoking were keys to reduction in the number of cigarettes smoked. Colby and colleagues (1998) suggested that their findings and motivational interviewing could transfer to other settings with adolescent smokers.
Despite these findings, relatively little research has been conducted in the area of adolescent smoking cessation programs (McFee, Boykan, Lasner & Mazure, 2001; Johnston, Bachman, & O'Malley, 1992; USDHHS, 1997). Without data to guide the implementation and development of programs specific to adolescent smokers, established adult smoking cessation programs have been modified for use with adolescents (Sussman et al., 1995; Fiore, Novotny, & Pierce, 1990). Researchers confirm that these adult programs, as modified for adolescents, are flawed in design, written in mature language and do not address the social roles of smoking in the lives and self-image of adolescents (Sussman, Lichtman, Ritt, & Pallonen, 1999; Fiore, Jorenby, Baker, 1997; Fiore, Novotny, Pierce, 1990, Sussman, 2002). A possible explanation for the lack of adolescent smoking cessation programs may be related to the challenges presented when working with adolescents, such as parental consent, and parental involvement and support. These issues, combined with challenges seen with other populations in cessation programs, such as attendance, recruitment, and retention in formal cessation programs, make smoking cessation interventions with adolescents particularly challenging (Carpenter, 2001; Cinciripini & McClure, 1998; Emmons, 1995; McCormic, Crawford, Anderson, Gittelsohn, Kingsley & Upson, 1999).

One possible way to address the challenges posed when working with adolescents is to provide smoking cessation programs in residential settings where adolescents are already in treatment, and where their parents or caretakers may also be involved in their treatment. Residential treatment offers an extended inpatient admission which, when compared with outpatient treatment, can provide opportunities to deliver consecutive smoking cessation programs without concern of recruitment or retention issues.
Overview of Residential Treatment Communities

Residential treatment communities (RTCs) provide intensive services over an extended period of time; these usually last from 12 to 18 months (Spenser, Shelton, & Frank, 1997). RTCs are often geographically removed from the community and provide comprehensive services which include food, shelter, school and medical services. The philosophy of most RTCs is that the residential program offers treatment possibilities, allowing adolescent’s behavior and functioning deficits to emerge and be addressed consistently across multiple contexts. Therefore, the length of stay must be sufficient to allow adolescents to receive the full benefit of this milieu (Spenser et al., 1997).

The National Association of Psychiatric Treatment Centers for Children (NAPTCC, 1990) indicates that the presence of any combination of the following is necessary to qualify for admissions to an RTC: a moderate to severe mental health disorder; impairment of functioning in at least one of the areas of family, vocation / school, or community, an acute disturbance of affect, behavior, or thinking; the need for continuous, comprehensive, holistic treatment. This admission standard implies that a large percentage of adolescents admitted to residential treatment have a psychiatric disorder (Bailey, 1989; Bonaguro, Rhonehouse & Bonaguro, 1988; Newcomb, 1995). There is some evidence that suggests that nicotine dependence is associated with psychiatric comorbidity. Moolchan, Giannas, Robinson and Pickworth (2000) found that in both adults and adolescents, having a psychiatric disorder was one of several factors associated with cigarette smoking. Breslau (1995) and Sussman (2001) contend that since most of the tobacco research is on smoking only, there is relatively less known about the comorbidity of psychiatric disorders and tobacco use.
Profile of Adolescents in Residential Treatment

Youth in residential facilities in New York State were surveyed in late 1988 (Morehouse & Kleinman, 1990) and were found to be more likely to use drugs (including tobacco) at a much earlier age than were youth surveyed in high schools nationwide (Johnston, O’Malley & Bachman, 1989). Rounds-Bryant, Kristianse, & Hubbard (1999), conducted a comparison of adolescent characteristics and pretreatment behaviors in three treatment modalities: inpatient, outpatient, and long-term residential. The sample totaled 3,382 adolescent subjects (age range 12-18) who presented for treatment from 1993 to 1995 in 37 programs in Pittsburgh, Pennsylvania; Miami, Florida; Minneapolis, Minnesota; Chicago, Illinois; Portland, Maine; and New York, New York. The study’s findings on long-term residential programs included the following: the juvenile or criminal justice system referred almost half of all residential clients to treatment; these clients had the highest proportion of criminal justice status at admission, a history of a past arrest, and were in juvenile detention prior to their admission to treatment.

I was unable to find studies in the literature that investigated the prevalence of tobacco use by high-risk adolescents in residential treatment, or indicating that smoking cessation interventions are part of the treatment milieu of adolescent residential facilities. Nothing was found that acknowledges tobacco use by adolescents in treatment facilities, yet the literature points out that a large percentage of adolescents admitted to residential treatment report active and regular tobacco use at the time of admission (Bailey, 1989; Bonaguro et. al., 1988; Newcomb, 1995; Spencer, Shelton & Frank, 1997; Morehouse & Kleinman, 1990). In response, a study with adolescent smokers in residential treatment seems warranted.

Purpose of the Study

The purpose of the current study is to examine the effectiveness of an empirically based smoking cessation intervention that was originally designed for teenagers in public school settings to eight active smoking adolescents in residential treatment.
Related Research

**Nicotine Dependence**

Nicotine, the toxic substance that is exclusively absorbed from smoking, produces a wide array of behaviors which can collectively propel drug-seeking behaviors when abused (Bahk, Li, Park & Kim, 2002). Nicotine induces the release of dopamine, which produces a feeling of euphoria. Some smokers report that smoking gives them energy and stimulates their mental activity, other smokers report that smoking relieves anxiety and relaxes them (Chassin, Presson, Rose, Sherman & Prost, 2002; Johnson, Cohen, Pine, Klein, Kasen & Brook, 2000). The association of smoking with euphoric feelings may contribute to a self-reinforcing smoking behavior, and serve as a reward rather than a deterrent to smoking (Boughton, 2001).

Evidence exists indicating that repeated exposure to nicotine creates dopamine receptors in the brain. With more receptors, there is a need for more of the drug to occupy those receptors (DiFranza et al., 2000). Most studies have been conducted using animals which can be predictive of clinical effects but not always (DiFranza et al., 2000), and animal research studies does provide biological plausibility for a model of genetically determined differences in individual susceptibility to nicotine dependence (Lerman, Caporaso, & Audrain, 1999; Pomerleau, 1995). Although there is also such evidence in humans, the data were obtained from postmortem brain tissue and, therefore this linkage (increased levels of dopamine cause an increase of receptors) is not a 100% established psychopharmacological fact, DiFranza et al. (2000) also state that the up-regulation of nicotinic receptors has not been established as the mechanism causing nicotine
dependence, but the speed with which these changes in brain structure appears makes it plausible that the first symptoms of dependence might also appear rapidly.

Several researchers have described the progression of nicotine dependence as starting from occasional use, increasing to heavier daily use, and finally resulting in dependence (Jackson, 1998; Lamkin & Houston, 1998; Chassin et al., 1990; Evans, Gilpin, Pierce, 1992; Hennrikus, Jeffery & Lando, 1996; Leventhal & Cleary, 1980). However, it has not been established that daily use of nicotine is necessary for dependence to begin (DiFranza, et al., 2000).

The assumption that heavy use (one half pack per day) is necessary for the development of dependence is derived from observations of “chippers”, adult smokers who have not developed dependence despite smoking up to five times per day over many years (Shiffman, 1991; Shiffman, Fischer, Zettler-Segal & Benowitz, 1990; Brauer, Hatsukami, Hanson & Shiffman, 1996). Chippers do not differ from other smokers in their absorption and metabolism of nicotine, causing some investigators to suggest that this level of consumption may be too low to cause nicotine dependence (Shiffman, 1991; Shiffman et al., 1990; Brauer et al., 1996). The assumption that prolonged daily use is a pre-requisite for dependence conflicts with the observation that symptoms of nicotine dependence appear to develop in some youths before the onset of daily smoking (McNeil, West, Jarvis, Jackson & Bryant, 1986; Baker, 1993; Dappen, Schwartz & O’Donnell, 1996; Henningfield, Clayton & Pollin, 1990; McNeil, Jarvis, Stapleton, West & Bryant, 1989). Recent studies confirm similar findings that the first symptoms of nicotine dependence can appear within days to weeks of the onset of occasional use, often before the onset of daily smoking (DiFranza et al., 2000).
Although scientists do not understand fully why “chippers” do not develop a dependency to nicotine, they do know that being a chipper runs in families, and being an addicted smoker also runs in families (Brauer et al., 1996). Adolescents with this genetic disposition may feel that they are immune to developing nicotine dependency, and smokers who come from families of addicted smokers may look like occasional users when they start, but if they persist in using tobacco, they are liable to become addicted (Novak & Clayton, 2001; Chassin et al., 2002). While this concept may support a link that prolonged tobacco use may develop into dependency, not enough is known about “chippers” and a genetic disposition may prolong nicotine dependence but not protect against it.

Because there may be evidence that even chippers may become addicted, adolescents who think they are chippers and are not going to ever get addicted, or who think they can smoke and quit when they are older may be at risk.

Adolescent Developmental Stage

In the United States, chronic tobacco use typically has pediatric origins. This raises the possibility that adolescence is a time period when the individual has a heightened vulnerability to tobacco dependence or reward. Such a conjecture is supported by recent animal research showing that adolescent rats acquire nicotine self-administration behaviors much more readily than adult rats (Belluzzi, Young, Manzardo & Leslie, 2001; Levin, Rezvani, Montoya, Rose & Swartzwelder, 2003). These findings suggest that processes involved in the central nervous system development and maturation may play a critical role in the etiology of tobacco use and dependence.
Adolescents may not perceive the health consequences related to smoking as immediate or harmful (NHSDA, 2002; CDC, 1996). A possible explanation may be related to the concept of invulnerability, which is the adolescent belief that they face little risk or harm, that they are never going to die, and that health warnings are meant for other people (Quadrel, Fischhoff & Davis, 1993). But even if adolescents hold strong beliefs about the negative outcomes of smoking, the influences of these beliefs on behavior may be outweighed by the perceived benefits of smoking (Millestine & Halpern-Felsher, 2002). One perceived benefit is that smoking communicates a societal image of precocity and adult-like status (Jessor & Jessor, 1977). Others report that since acceptance by peers during preadolescence and adolescence is highly valued, adolescents with peers who smoke may be adopting the perceived beliefs and behaviors practiced by members of their peer groups (Epstein, Botvin & Diaz, 1999; Paxton, Schutz, Wertheim, & Muir, 1999; Sieving, Perry, Williams, 2000; West, Sweeting, & Ecob, 1999).

Reasons why adolescents begin smoking include peer pressure, rebelliousness, wanting to look and act adult, taking a risk, creating a certain image, fitting in and satisfying curiosity (Moolchan et. al., 2000). Adolescents may continue to smoke in order to manage uncomfortable feelings, reduce stress and boredom, and control weight (O’Malley, Johnston, Bachman & Schulenbert, 2000). Thus, adolescents may be using tobacco in specific situations because of social cues or social values (Pomerleau, Pomerleau, Majchrzak, Kloska, & Malakuti, 1990).

Psychological Antecedents to Drug Use by Adolescents

The findings of a longitudinal study that followed a group of children from nursery school to early adolescence suggest that psychological factors may be central to
understanding drug use (Block & Block, 1980). Similar findings were reported by Kellan, Brown, Rubin and Ensminger (1983) in a longitudinal study that assessed characteristics of children at childhood and again at adolescence. Kellam et al. (1983) found that the psychological characteristics at ages 6 to 7 foretold drug use at ages 16 to 17. These studies suggest psychological antecedents predating drug use. These findings are significant because they provide insight into the study subjects (adolescents) and highlight the uniqueness and possible special needs of this population.

**Adolescent Frequent Drug Abusers**

Shedler and Block (1990) followed subjects from preschool through age 18 and compared adolescents who had abstained, experimented and abused drugs (primarily marijuana). They found that when compared with experimenters, frequent drug users were visibly deviant from their peers, emotionally labile, inattentive and unable to concentrate, uninvolved in what they do, stubborn, unhelpful and uncooperative, pushing and stretching limits, not eager to please, liable to give up easily, liable to withdraw under stress, lack of high performance standards, suspicious and distrustful and over reactive to minor frustrations. In short, the frequent drug users appeared to be relatively maladjusted as children. Shedler and Block (1990) suggest that given the poor ability of users to regulate impulse, the urge toward drug use would meet with little inner resistance; however, there was no mention of the possibility of these adolescents smoking as a way to self-medicate.

**Not-On-Tobacco (N-O-T) Program**

*Cognitive Behavioral Theoretical Background of N-O-T*

Because the focus of the current study was on adolescent smokers, special attention was given to adolescent developmental issues, which were evident in the
study’s intervention’s age appropriate group activities. The importance of peers is highlighted in Bandura’s (1977) Social Learning Theory (Bandura, 1977) which conceptualizes social behavior as acquired through the imitation and the modeling of others’ behavior. The study’s intervention incorporates two clinical-theoretical approaches: The Stages of Change model (Prochaska & DiClemente, 1984) and Motivational Interviewing (Miller & Rollnick, 1991).

*Stages of Change and the Transtheoretical Model*

The Stages of Change model can be thought of as a way of conceptualizing and operationalizing general coping activities in order to make specific behavioral changes, and can easily be applied to whatever stage of change an individual may be in (DiClemente & Prochaska, 1985). Understanding how change occurs and tailoring programs to meet the developmental stage of the participants will facilitate movement across the stages (Prochaska & DiClemente, 1984).

The stage of change construct is applied to a number of health behaviors (Prochaska, DiClemente, & Norcross, 1992). It is the central and organizing concept in the transtheoretical model (TTM), and refers to the temporal dimension of behavior change. There are three organizing constructs of the model: the stages of change, the processes of change, and the levels of change (Miller & Heather, 1998). Within the TTM, forward movement through these stages is related to perceptions of the advantages and disadvantages of smoking, the strength of the temptation to smoke or perceived ability to refrain from smoking.
Stages of Change

The stages of change represent the dynamic and motivational aspects of the process of change over time. They are a way of segmenting the process into meaningful steps consisting of specific tasks required to achieve successful, sustained behavior change (Miller & Heather, 1998; Prochaska & DiClemente, 1984). The model distinguishes five stages: (a) the Pre-Contemplation stage, in which smokers are not motivated to change because they do not see smoking as a problem; (b) the Contemplation stage, in which smokers start to consider quitting; (c) the Preparation stage, in which smokers plan to actually quit in the short-term; (d) the Action stage, in which smokers refrain from smoking but are potentially in danger of relapse; and (e) the Maintenance stage, in which ex-smokers have internalized the new nonsmoking behavior.

The Stages of Change model (Prochaska & DiClemente, 1984) shows that, for most persons, behavior change occurs gradually with the person moving from being uninterested, unaware, or unwilling to make a change (Pre-Contemplation) to considering a change (Contemplation). When the balance of pros and cons begins to tip in the direction of change, there ensues a period in which change options are explored (Preparation) before moving on to deciding to make a change (Action). Genuine, determined action is then taken (Change) and, over time, attempts to maintain the new behavior (Maintenance) occur (Prochaska & DiClemente, 1984).

The Processes of Change

The processes of change are the engines that facilitate movement through the stages of change. Ten processes have been identified: five experiential and five behavioral processes which refer to overt and covert activities people engage in while
changing their behaviors (Prochaska et al., 1992). According to the model, these processes employed at particular stages are responsible for movement through the stages of change (Miller & Heather, 1998).

Levels of Change

In addition to the stages and processes of change, the TTM model recognizes that changing any one problem behavior is usually complicated by other problems that interfere with or facilitate the process of change. The concept of levels of change incorporates the realization that individuals are in different stages with respect to problem areas. There are five levels of change: (1) symptom / situational, (2) maladaptive cognitions, (3) interpersonal problems, (4) systems / family and (5) interpersonal (Prochaska & DiClemente, 1984). This concept has been the least studied of the three basic constructs of the TTM; however, multiple complicating problems occur with substance abusing populations, and the levels of change concept can guide interventions with the problems at the levels of change (Miller & Heather, 1998). When substance abusers are given services to address the multiple problems that they are facing, the treatment outcome is often better (DiClemente & Scott, 1997; McLellan, Arndt, Metzger, Wooky & O’Brien, 1993).

Motivational Interviewing

Miller (1985) and Miller and Rollnick (1991) have argued that the use of constructs such as denial and resistance has not advanced the knowledge of addictive behavior or its treatment. As an alternative, they have focused on motivation (Prochaska & DiClemente, 1992).
Motivational interviewing (MI) (Miller & Rollnick, 1991) is a counseling approach with good empirical support in the treatment of a wide range of addictive behaviors (Miller, 1985; Yahne & Miller, 1999). Although MI is not overtly based in the TTM, the two models are compatible. While MI is particularly applicable to patients in pre-contemplation and contemplation, elements of the process can be used across all stages of change.

MI is a directive, client-centered and focused approach aimed at eliciting behavior change by helping individuals explore and resolve ambivalence about continuing drug use. It was developed specifically to enhance intrinsic motivation for change (Miller & Rollnick, 1991; Roffman, Klepsch, Wertz, Simpson & Stephens, 1993). MI seeks to understand the person's frame of reference, elicits the person's own self motivational statements, monitors the person's degree of readiness to change, ensures that resistance is not generated by jumping ahead of the client, and affirms the person's freedom of choice and self-direction (Miller, 1985).

According to the literature, many persons seeking treatment for drug problems often present under some form of external threat or coercion and are likely to be in the Pre-Contemplation (uninterested or unwilling to make a change), or the Contemplation stage (considering a change), and motivational ambivalence appear to be a key factor in early treatment drop out (Gerstein & Harwood, 1990; Prochaska, 1999).

The Stages of Change Theory and the N-O-T Protocol

The goal of the current study's intervention is to facilitate the subjects' progress across the five Stages of Change (Prochaska & DiClemente, 1984). The first four sessions of the intervention have group exercises that focus on addressing Contemplation,
and Pre-Contemplation (unwilling and considering change) and explore alternatives to smoking as a way of Preparation or getting ready for change (Action; is to quit or reduce smoking). The actual quitting or smoking reduction occurs at the end of session five, which is designated as “quitting day.” Smoking increase or decrease is documented starting in session 6 until the end of the study. Sessions six through nine provide tips for remaining smoke-free (Maintenance). Session ten, the final session, is a celebration of accomplishment with a pizza party and is an opportunity to administer the post-intervention questionnaire. The study’s intervention group discussion and exercises are delivered using Motivational Interviewing (Miller & Rollnick, 1991), which includes non-judgmental questions, activities that seek to understand the participant’s point of view, and affirmation of the participant’s freedom of choice to quit or reduce smoking (Miller, 1985). The following discussion and Table 1 further show how the study's 10-sessions parallels Prochaska and DiClemente's (1984) Stages of Change.

Stage One: Pre-Contemplation

Individuals at Pre-Contemplation (lacking or perceiving a need for change) are not amenable to following directions and subscribing to behavioral schedules (Prochaska & DiClemente, 1984). According to Prochaska and DiClemente (1992), interventions should focus on motivating individuals to consider change (Contemplation) through exercises eliciting individuals to think about the benefits and costs of continued drug use. The study’s intervention that parallels this approach occurs in sessions one and two. The goal of these sessions is to increase arousal by getting the facts on cigarette smoking, and explore personal excuses for not quitting.
Stage Two: Contemplation

Individuals in the Contemplation stage may have an awareness of their problems yet lack the action or commitment necessary for change (Prochaska & DiClemente, 1984). These individuals may benefit from an exploration of personal goals and desired changes, recognition of necessary actions for desired changes, identification of reasons for desired changes, exploration of used or unused strategies for making changes and motivational interviewing (Prochaska & DiClemente, 1992; Miller & Rollnick, 1991; Groth-Marnat, 1997). The study’s intervention that parallels this approach occurs in session three in which the goal is to have individuals weigh the benefits of being smoke-free.

Stage Three: Preparation

Individuals at the Preparation stage have taken small behavioral and mental actions necessary for change (Prochaska & DiClemente, 1984). These actions indicate potential commitment and may be enhanced through exploration of reasons for and against changing, as well as an inventory of strengths and weaknesses that may serve to promote or inhibit particular strategies (Prochaska & DiClemente, 1984; Prochaska, DiClemente & Norcross, 1992; Groth-Marnat, 1997). The study’s intervention that parallels this approach occurs in sessions four and five in which the participants experiment with small changes, for example, hold a group discussion of physical and psychological effects of smoking, and explore alternatives to smoking.

Stage Four: Action

Individuals in the Action stage have demonstrated their efforts and commitments to change through overt behaviors (Prochaska & DiClemente, 1984). These individuals
may benefit from behavioral strategies, as well as from exploring the complexity of problems, levels of change, re-evaluation of self-statements, exploration of concrete necessary actions, and recording of thoughts and behaviors (Prochaska, DiClemente, & Norcross, 1992; Groth-Marnat, 1997). The study's intervention group exercises and discussion in sessions six through ten focus on activities that facilitate group discussions and reminders of reasons for wanting to quit, re-affirming statements, and relaxation exercises to address urges to smoke.

**Stage Five: Maintenance**

Subsequent to the Action stage, individuals in the Maintenance stage have demonstrated their willingness to actively continue the actions necessary for sustained change (Prochaska & DiClemente, 1984). Individuals may benefit from education about the relapse dynamic and encouragement for continued actions necessary to prevent relapse (Prochaska, DiClemente & Norcross, 1992; Gorski & Miller, 1982). The study participants received reinforcement during the quitting process by being allowed to use the phone at designated times for support calls to other study peers or to family members (sessions six through nine). In preparation for the RTCs scheduled monthly home leave, and ultimate discharge from the residential community, the study participants were also allowed to call their parents or caretakers to report on their smoking progress, and ask for continued support from them.
Table 1: The Stages of Change and Corresponding Chapters in the N-O-T Intervention

<table>
<thead>
<tr>
<th>Stage of Change</th>
<th>Stage Goal</th>
<th>Corresponding N-O-T Chapter</th>
<th>N-O-T Chapter Goals</th>
</tr>
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<tbody>
<tr>
<td>Pre-Contemplation</td>
<td>Get the individual to think about change</td>
<td>1 &amp; 2</td>
<td>Getting the facts</td>
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<td></td>
<td></td>
<td></td>
<td>Looking at excuses for not quitting</td>
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<tr>
<td>Contemplation</td>
<td>Weigh the benefits of proposed change</td>
<td>3</td>
<td>Exploring the benefits of quitting</td>
</tr>
<tr>
<td>Preparation</td>
<td>Experimenting with small changes</td>
<td>4 &amp; 5</td>
<td>Exploring alternatives to smoking</td>
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<td></td>
<td></td>
<td></td>
<td>Making a smoke-free space</td>
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<td></td>
<td></td>
<td></td>
<td>Setting a quit date</td>
</tr>
<tr>
<td>Action</td>
<td>Taking a definitive action to change</td>
<td>6, 7 &amp; 8</td>
<td>Gaining support and avoiding slips</td>
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<td></td>
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<td>Making a reward list</td>
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<td>Assertive skills for risky situations</td>
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<td></td>
<td></td>
<td></td>
<td>Understanding the physical changes</td>
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<tr>
<td>Maintenance</td>
<td>Maintain new behavior over time</td>
<td>9 &amp; 10</td>
<td>Coping skills</td>
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<td></td>
<td></td>
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<td>Rewards and continued support</td>
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</tbody>
</table>

**Development and Research in Support of N-O-T**

The American Lung Association [ALA](2001), worked closely with West Virginia University (WVU) in developing the intervention module, and in conducting an ongoing multi-phased evaluation plan. In the 1997-98 school year, WVU conducted an initial feasibility study of the module with 163 teens through the Departments of
Education in West Virginia and Florida. At the end of the program, smoking, as confirmed by chemical validation (saliva and breathalyzers), the quit rates for those study participants who provided data (71%) were significantly higher for teens who received the intervention module (20.8%) than for a similar group who received brief advice on quitting and self-help materials (4.4%). Of those who received the intervention and continued to smoke, 76% reported reducing their smoking on weekdays and 71% reported reducing their smoking on weekends. In addition, findings regarding program acceptability were consistently positive. Field-based evaluations in 10 Lung Associations nationwide were conducted during the 1998-99 school year, producing positive results with overall end-of-program quit rates between 20% -40%.

In 1998-99, WVU conducted a statewide demonstration study of the intervention module with high school students ages 14 to 19. This collaborative study involved an academic research team, the ALA of Florida and high schools in local ALA of Florida regions. Under a contract awarded by the Florida Tobacco Pilot Program, the intervention module was provided in 67 schools with more than 1,200 students and 180 facilitators. Of these 67 schools, ten were selected to become part of a researched study to evaluate the efficacy of the intervention module. A total of 320 teens participated in the study from schools that reflected heterogeneous and multicultural student bodies. About half of the participants were available for follow-up almost six months after the program ended. Some of the results from those participants included an overall self-reported quit rate of 22%, and chemically validated results of nearly 30%. For those participants who did not quit, 65% reduced their smoking on weekdays and 75% reduced their smoking on
weekends (ALA, 2001). Thus, about 90% of participants either quit or reduced their cigarette use.

The intervention module participants reported that the program helped them in areas of their lives beyond smoking. For example, 55% reported feeling better about themselves and dealing with stress better, 30% said they were eating better, 43% reported exercising more, and 21% reported attending school more often, with 14% reporting better grades. Overall, participants felt very positive about the module intervention, with 84.6% believing that the program helped them alter their smoking behavior. According to the ALA (2001), the findings from the ALA study suggest that teens can quit and reduce cigarette use as a result of their participation in the module intervention, and can maintain or improve their efforts over time. The study also found that the module intervention curriculum was effective for a diverse heterogeneous sample of Florida youth.

*Rationale for Using N-O-T with High-Risk Adolescents*

The Shedler and Block (1990) study relates to the current study’s population since the study’s population have been diagnosed with psychiatric disorders (P. O’Gorman, personal communication, November 14, 2001 and May 22, 2002). Shedler and Block (1990) suggest that abusers would be better addressed through efforts aimed at encouraging sensitive and empathic parenting, at building childhood self-esteem, at fostering sound interpersonal relationships, and promoting involvement and commitment to meaningful goals. The Shedler and Block (1990) suggestions are also the key ingredients found in the current study’s interventions, including activities to improve life management skills, decision-making, communication and interpersonal skills, assertive
skills and peer and family relationships. Taken together, the understanding of psychological factors of adolescents, a cognitive behavioral smoking cessation intervention, and the current study’s structured environment, may combine to form an effective intervention.

Research Hypotheses

There are three major research hypotheses for this study:

1) There will be a reduction in the number of cigarettes smoked

2) There will be a shift of all study subjects across the stages of change into the Action stage of change

3) There will be an increased knowledge in attitude toward tobacco use

Significance of the Study

This study hopes to contribute to the field of psychology, in substance abuse and behavioral medicine by attempting to determine the effectiveness of an adolescent smoking cessation intervention with an underserved population. The results could provide useful information and direction to augment the existing body of knowledge on adolescent smoking and contribute to helping reduce the number of adolescents who smoke, thus providing useful information and direction for working with an underserved population.
CHAPTER 2: METHODS

IRB Approval

This study received approval as exempt from informed consent requirements under 45 CFR.101 (b)(4) by the Internal Review Board (IRB) of the Philadelphia College of Osteopathic Medicine. The study data was archival and the information was recorded so that the human subjects could not be identified, directly or through identifiers liked to the subjects.

See Appendix B for a copy of the approval letter.

Description of the Study Site

The study site was a Residential Treatment Community (RTC) located in the Northeast region of New York State. The study’s RTC is a self-contained community that has a junior and senior high school, a dinning hall, a nondenominational church, recreational facilities and a health and counseling department with clinical and medical staff available for consultation after hours if needed. The high school is a public charter school, and as such is open to enrollment to the community, and anyone from the community enrolled in the school must abide by the school rules, including wearing a school uniform. The school principal and school superintendent are always on site during school hours, and the school abides by the State’s rules and regulations on education.

The RTC is surrounded by 200 acres of land and a lake, providing opportunities to engage in horticultural activities, horseback riding, swimming, rock climbing, hiking, swimming, and picnics. The executive director lives within walking distance and department heads reside in housing proved by the RTC. Housing is provided for other
staff members who may need to work double shifts during inclement weather; a total of 12 vehicles are available for staff use in what is known as the transportation department.

Adolescents live in one of 11 bungalow-style residences called cottages, staffed and supervised 24 hours a day, each with an occupancy capacity of 22 people; a typical total census numbers about 250 adolescent residents. In addition to residential treatment, every 6 weeks all the adolescent residents go home to visit with their families for a weekend.

Adolescents are referred to the study’s site RTC from several entities across the state of New York and include the juvenile and criminal justice system, the New York State Child Welfare System, and family court. The minimum average length of stay is one year.

Physical and Anecdotal Evidence of Tobacco Use in the RTC

Clinical observation suggests that tobacco use occurs at the study’s RTC (i.e., cigarette butts are often scattered behind the youths living quarters and throughout the facility). Some of these cigarette butts could have been from the staff; however, self-reports by the study participants indicate that they have either engaged in or have witnessed their peers smoking cigarettes. Self-report measures of drug use are the most commonly used measures in general population drug surveys; although there is always the concern that self-report without independent corroboration may underestimate drug use, the consensus is that such reports are reasonably valid (Harrison, 1997; Johnston et al., 1998a, 1998b). Conversations with experienced RTC workers confirmed that adolescents use tobacco while in residential treatment (residential treatment employees, personal communication, October, November, 2001; May 22, 2002); the RTC’s clinical
director confirmed that smoking is a problem in residential treatment and is documented in incident reports kept in clinical files.

RTCs have limited resources to address the many challenges associated with a high-risk population of adolescents who may be acting out. Some challenges may take priority over others; dealing with a medical emergency, searching for an adolescent who did not return from dinner, or dealing with a negative reaction to medication will all take priority over dealing with an adolescent smoker. Of note is the fact that while there are programs in the RTC’s treatment milieu that address substance abuse, there were no programs that addressed tobacco use. The RTC’s clinical director hypothesized that the reason was related to managed care: Smoking cessation is not a service that is reimbursable through third party billing (P. O’Gorman, personal communication, November 14, 2001 and May 22, 2002).

**Participant Demographics**

Eight participants completed the 10-session study. The mean age was 14.6 years (SD = 1.2); 2 (25%) were in the 8th grade, 4 (50%) were in the 9th grade and 2 (25%) were in the 10th grade. The ethnic distribution was 6 (75%) Non-Hispanic White, 1 (12.5%) Non-Hispanic African American and 1 (12.5%) Hispanic. The average length of continuous tobacco use was 3.9 years, and the average age of smoking initiation was 12.1 years. Five subjects (62.5%) reported having tried to quit smoking on their own, prior to this study; the average number of quitting smoking attempts was 3 (37.5%). On a Likert scaled response from 1 (lowest) to 10 (highest), the average stress level experienced in residential treatment, at the start of the study, was 4 and the average length of stay at the residential treatment facility, at the start of the study, was 7 months. The participant’s
medical histories indicated good health. Diagnosis was not included in this study for the following reasons: (1) protection of participant anonymity, (b) diagnosis was not included or collected in the retrospective data. However, the study's site clinical director reports that diagnoses of the adolescents in residential treatment include conduct disorders.

**Participant Selection**

A meeting with school officials, including the superintendent of the school, the school principal, the clinical director and the RTCs executive director, was held to explain the study, obtain support for the study, and discuss issues of confidentiality.

Because this was a chart review, data was gathered from the files of students who had volunteered for the intervention or who had been referred to the intervention by staff because they had been caught smoking. To protect the confidentiality of study subjects, they were assigned numbers as identifiers that were used in completing survey questionnaires.

Intervention participants reported an average rating of 6, using a Likert scale of 1 (low) to 10 (high), to describe motivation for participation in the intervention. All participants confirmed an active cigarette smoking status and no other drug use.

The intervention participants were interviewed individually for inclusion criteria and an in-depth explanation of the program was presented. They assented to being in the study; they acknowledged their understanding. Participants were also interviewed as a group and each received an outline of the program as well as the scheduled dates, times and location for the meetings. Participants were also interviewed individually for any follow-up questions. The intervention occurred over five consecutive weeks and was
offered immediately after school. The program’s last day included a pizza party as a reward for participation, and a certificate of completion.

Overview of the Study Design

A modified standardized 10-week smoking cessation curriculum developed by the American Lung Association (ALA, 2001) called Not-On-Tobacco (N-O-T) was used as the treatment intervention. The ALA provided a grant for facilitator training prior to delivery of the structured intervention. The ALAs pre- and post-intervention questionnaires were used for analysis of effectiveness of the intervention indicated by a decrease in the number of cigarettes smoked or complete abstinence.

To ensure consecutive delivery of the intervention and consecutive attendance by the study subjects, the study’s ten sessions were delivered over five weeks, April 22, 2002 to May 22, 2002. This time frame was between two scheduled home leaves; the next home leave was scheduled two days after the completion of the study.

Intervention Modules

The intervention curriculum is designed to provide a total health approach to helping adolescents quit smoking or reduce the number of cigarettes smoked. The modules help participants identify the reasons why they smoked, understand how their smoking behavior is influenced by others, develop skills to resist social pressures, and understand the consequences of continuing to smoke by utilizing the adolescent perspective of peer group members.

N-O-T Session Activity Schedules

All sessions were scheduled for one hour, from 3:30pm to 4:30pm. Fifteen minutes were allowed in the beginning for late arrivals and for distributing snacks, and
five minutes at the end were designated for any follow-up questions; the actual interventions lasted 40 minutes. Each session was divided into Getting Started (5 minutes), Group Discussion (15 minutes), Journal Activity (15 minutes), and Winding Down (5 minutes). All sessions ended with a positive affirmation statement, which all program participants repeated as they stood in a circle formation, which was called the Unity Circle.

*Modifications Made*

The N-O-T module curriculum was followed as written, with changes made only as required to meet the needs of an adolescent RTC. Changes included offering the program immediately after school to avoid scheduling conflicts and to comply with the school’s State regulations on core-class attendance. The modifications did not involve changes to the underlying curriculum.

**Session Content**

**Session One: Getting the Facts**

The goal of this session was to get the study participants excited about the program. The objectives for this session were to provide the study participants with an overall understanding of the program, and an opportunity to ask questions.

The pre-intervention questionnaire, which included demographic information, was administered. Overview of the study was provided, along with a schedule of the meeting times and dates, and the scheduled “quit date” (end of session five) was announced. The participants identified the group ground rules or touchstones. The group discussion focused on reasons why males smoke. The closing affirmation statement for this session was "I am ready to stop smoking!".
Session One Modifications

This session instructs participants that teacher’s permission slips will be collected at the start of the session. Because this study was offered immediately after school, teacher's permission slips were not necessary.

Session Two: Getting Pumped Up

The goal of this session was to excite the participants about the decision to quit smoking. The objectives for this session were to help the participants identify the reasons why adolescents start smoking and the reasons why they keep smoking, understand their own reasons for smoking and excuses for not quitting, and begin to get “pumped up” about quitting smoking.

Individual excuses for not quitting smoking were identified by each study participant and the group then challenged the excuse with a counter answer. Facts on smoking were handed out at the end of this discussion. The guidelines for the journal exercises were introduced with an emphasis on confidentiality. The study subjects were informed that the facilitator would not read the journals. The journals were collected and kept in a locked cabinet until the next scheduled session. The first journal entry was assigned; this entry instructed the study participants to write about their thoughts, feelings, and experiences with quitting smoking, as well as a personal fact they wanted other group members to know about them. The closing affirmation statement for this session was, "I made a huge awesome step today."
Session Two Modifications

All take-home assignments were done as group discussions to avoid the study participants from losing their papers, forgetting to bring or not completing their assignments.

A key point in this session was on the importance of exercise. This session calls for a group exercise chart review at each session. Because the study participants are required by the residential treatment program to participate in physical activities at least three times a week, the individual physical exercise documentation section was skipped; instead, the study participants were asked to report on their physical activity participation since the last scheduled study session. The facilitator reinforced the importance of exercise and its impact on helping to relieve stress.

Session Three: Me Without My Smokes

The theme of this session was on the role of smoking in smokers’ lives. The objectives for this session were to help the participants understand their own smoking history, to begin visualizing themselves as nonsmokers, to understand nicotine addiction, and to begin practicing positive self-talk.

The meaning of the word "trigger" was explained before the study group could participate in identifying their triggers for smoking. Nicotine addiction and its physical and psychological effects were discussed. The participants reviewed a handout, “The Anatomy of a Cigarette”, which highlights some of the chemicals found in cigarettes. Alternatives ways to relax were discussed, followed by a scripted meditation activity.

A key point in this session was on understanding the quitting process by exploring one’s history with cigarettes and smoking. To further facilitate this process, the
participants were provided with "Pack Tracks" for keeping track of their behaviors and moods when the urge to smoke occurred. Pack Tracks were credit card-sized cut-outs that could easily be placed in the packaging of cigarettes or fit in a wallet. The Pack Track included a grid numbered 1 through 20 (for each cigarette in a pack), and pictures of a smiling or frowning face. The participants were asked to place a check mark next to the picture of the face which indicated their moods at the time they experienced an urge to smoke, and another check mark next to the words Yes, No, or a question mark to indicate their need for having a cigarette. The outcomes of the “Pack Tracks” were to be discussed at the next scheduled session. The closing affirmation for this session was "I can do it."

Session Three Modifications

Because of the quantity of the handouts, and discussion of activities (for example, discussion of triggers, anatomy of a cigarette, meditation activity), the journal entry exercise which called for the study participants to draw themselves smoke-free, was skipped but it was incorporated into the group discussions.

Session Four: Mind and Body -Before

The theme of this session was on the physical and psychological affects of smoking. The objectives for this session were to help the participants understand how smoking affects their bodies, understand how smoking affects how they think and feel, become aware of how smoking affects their relationships with others, and recognize and identify supportive people.

The session started with a review of the outcome of the “Pack Tracks” (handed out in the prior session). The purpose of the review was to help the study participants
understand their moods and behaviors associated with their urges to smoke. The effects of smoking on the body and mind were also reviewed.

A key point in this session was to provide the study participants opportunities to practice asking for social support while quitting smoking. In anticipation of "quitting day" which was scheduled to occur at the end of session five, the participants were asked to identify supportive people in their lives; tips for making a smoke-free environment were discussed. The closing affirmation for this session was, "I am good to myself!"

**Session Four Modifications**

In anticipation for the possibility that some study participants may forget their "Pack Tracks", there were additional blank "Pack Tracks" available, and a review of the exercise was done as a group. Because of time constraints the "Acting Out Role-Play" activity, which called for the participants to role-play ways to gain support from others was skipped; however, the focus of this exercise was integrated into the group discussion activity entitled "Rocks That Don't Roll". This discussion provided an outline of the qualities of supportive people and suggestions about questions to ask when choosing a supportive person.

**Session Five: The Big Day**

The goal of session five was on getting the participants ready to quit smoking. The objectives for this session were to help the participants become aware of physical, psychological, and social benefits of quitting; to understand and deal with urges and cravings; and to make a social commitment to quitting. The end of this session was designated as the beginning of “quit day” which was the time when complete cessation or reduction of cigarette smoking begins.
The key focus of this session was to provide tools to help with cravings and triggers to smoke, such as deep breathing, positive self-talk, and meditations. Group discussion included the group’s expectations of the quitting process. A symbolic ritual ceremony occurred; this included each participant writing a good-bye letter to his cigarettes, throwing these letters in the trash can, and signing a personal commitment to quit smoking. The group facilitator also signed a personal commitment for continued support of the participants throughout the quitting process. The study participants were provided special permission to make phone calls to other study participants for additional support and encouragement throughout the rest of the study. Each participant provided a personal closing affirmation for this session.

Session Five Modifications

The clinical director gave special permission for the participants to be allowed to call a peer study participant for additional support and encouragement, from session five until the end of the intervention only.

To save time, the handout "Not Smoking Makes Cents" was completed ahead of time, and reviewed with the participants. This exercises called for a calculation of money spent per week, per month, and per year on cigarettes. The calculations were written on the blackboard using the current price of a pack of cigarettes, and copies of the calculations were handed out.

The exercise "Daily Check Sheet" was skipped due to time constraints and to avoid deviation from the focus of smoking cessation, because this exercise calls for the use of color in highlighting and keeping track of smoke-free days. According to the clinical director at the RTC, colors are associated with gang affiliation and it would be
easy for the study participants to deviate from smoking cessation into the topic of gang colors (P. O’Gorman, personal communications, May 1, 2002). As a result, participants were encouraged to use a calendar to keep track of their progress, and were provided opportunities for reporting to the group on their smoking cessation progress.

Session Six: Putting It Out and Keeping It Out

The theme of this session was gaining support and avoiding slips. The objectives for this session were to help the participants verbalize their experiences while trying to become smoke-free, and recognize and avoid slips and risky situations. Participants engaged in an open discussion about being smoke-free.

The key point of this discussion was to focus on the importance of support and rewarding oneself during the quitting process. Tips about slips were discussed, with an emphasis on having the participants identify the events that they associate with slips. Discussions focused on the importance of understanding these events in order to avoid future slips, as well as positive ways to handle slips. The affirmation for this session was, “The tough times are passing.”

Session Six Modifications Made

The exercise "My Rewards List for Males" included suggestions that could not be carried out in a residential community such as "hang out, watch a game, and go biking.” Although adolescents in residential treatment are allowed free and unstructured time, all activities are under the supervision of an adult staff member. According to the clinical director (P. O’Gorman, personal communications, November 14, 2001 and May 1, 2002), due to the therapeutic nature of residential treatment programs, adolescents in these settings are limited to making decisions about activities where the possibility of limited
adult supervision exists. For this exercise, the participants were asked to generate their own list of activities that could be done while in residential treatment and while on a home leave.

*Session Seven: Mind and Body - After*

The theme for this session was on how the mind and body react to change. The objectives for this session were to help the participants understand the physical and psychological changes that are associated with quitting smoking, and to learn healthy ways to respond to physical or psychological stress. The group discussion focused on the physical changes that occur after quitting smoking.

A key point was to understand one’s body and how it responds to change, and the importance of exercise and proper nutrition. Emphasis was placed on learning coping skills for stress reduction, such as doing an exercise on progressive muscle relaxation. The participants were given an opportunity to report to the study group on their smoking cessation and reduction efforts. Continued encouragement for effort was given to all group members. The affirmation for this session was: “I control my mind and body.”

*Session Seven Modifications*

A key point in this session was on the importance of proper nutrition and exercise. Because the study participants are required to participate in physical activities at least three times a week and meals and snacks are scheduled and predetermined, all handouts regarding exercise and food were reviewed with an emphasis on exercise as a way to reduce stress. The importance of healthy food alternatives as a way to combat possible high-sugar food cravings was emphasized.
Session Eight: Stand Up To Friends and Family

The theme of this session was being assertive with friends and family. The objectives for this session were to help the participants learn ways to assert their needs with friends and family, understand challenges that may emerge during the quitting process, and learn how to establish a plan for overcoming obstacles to quitting. This session addressed the issue of assertiveness.

The key point was to be direct when negotiating with family or friends for a smoke-free space. In anticipation of the next scheduled home leave, the program participants were given special permission to call their parents or caretakers, report on their smoke-free status, and to ask for continued support while on home leave. Strategies for dealing with difficult situations and the importance of planning ahead were discussed. The participants made personal strategy cards as helpful aids and reminders of what to do when in challenging situations, such as being in the presence of family members or friends who smoke. The strategy cards ask participants to list their reasons for quitting, list alternative behaviors to smoking, and remind them that the urge to smoke will pass whether they smoke or not. The affirmation statement for this session was; “I stand up for what I believe in!”

Session Eight Modifications

The clinical director gave special permission for the participants to call home; because the RTC limits personal calls to once a week unless there is a family emergency; the call was an opportunity for the study group members to ask their parents or caretakers for continued support in their smoking cessation efforts while on home leave. The next home leave was scheduled for two days after the completion of this study. Out of
consideration for the participants’ writing and spelling skills, during the activity entitled "Refusal Without Losing" which calls for a study participant to take notes, the facilitator took notes instead of soliciting a study participant for this role.

Session Nine: Tuning In / Tuning Out

The theme of this session was on countering the myths of advertising and other societal influences. The objectives for this session were to help the study participants understand how tobacco advertising affects thoughts, feelings, and behaviors, learn how to counter the false images portrayed by advertising. This session addressed the issue of how adolescents can make a difference by making contributions in their community and how tobacco advertising aims to control and manipulate behavior. The activities were intended to help the study participants affirm their decisions to stop smoking. The affirmation for this session was, “I am doing my part to create a healthier world.”

Session Nine Modifications

Because this intervention was designed for adolescents in the public school setting, the focus of the exercises asked the RTC participants to generate a list of activities that could be done while in residential treatment and while on a home leave. The Winding Down exercise called for the study subjects to "do something nice for at least one person" and all study participants were encouraged to show support to each other, as well as to other non-program study adolescents who may be struggling with the desire to quit smoking. As a supplement to the exercise on tobacco advertisements, current magazines were used and examined for examples of smoking advertisements.
Session Ten: Committed and Connected

The theme of this session was staying committed to the decision to quit smoking. The objectives for this session were to help the participants understand the importance of self-rewards for accomplishments, and establish ways to stay connected with the group.

The key point in this session was to celebrate accomplishments and life changes through rewards. The group discussed ways to stay committed to the decision not to smoke by revisiting the strategy cards and by having the program participants continue to see themselves as non-smokers. Success in the program was identified as complete cessation or a reduction in smoking. Regardless of the outcome of the participants’ smoking cessation efforts, all intervention participants were praised and encouraged to continue their efforts to being smoke-free through continued support from each other.

A post-intervention questionnaire was administered along with one feedback question. Pizza and soda were provided as tokens of appreciation for participating in the study, and each participant received two certificates of completion, an original copy for the participant, and a copy for their residential team supervisor. A third copy of the certificate of completion was filed in each participant’s clinical record. The affirmation for this session was: “I am a success”.

Session Ten Modifications

The feedback questionnaire consists of one question, which asked the study participants to make suggestions for improving the program.
Measures

Pre-Intervention Questionnaire

The pre-intervention questionnaire consisted of three parts: a section for individual and demographic information consisting of four questions; a section containing seven questions focusing on smoking history, usage, motivation and intent to quit; and a section consisting of 13 questions focusing on attitudes toward tobacco use in the format of a Likert scale ranging from strongly agree to strongly disagree.

Post-Intervention Questionnaire

The post-intervention questionnaire consisted of three parts: first, six questions on current smoking status, reduction, motivation, and intent to quit; second, the same pre-intervention 13-question Likert questionnaire on attitudes toward tobacco use; and the third section was one question asking participants for suggestions for improving the program.
CHAPTER 3: RESULTS

IRB Approval

This study received approval as exempt from informed consent by the Internal Review Board (IRB) of the Philadelphia College of Osteopathic Medicine. The study data was archival and the information was recorded in such a manner that the human subjects could not be identified, directly or through identifiers liked to the subjects.

Rationale for the Choice of Statistical Methods

Parametric tests, such as repeated measures Analysis of Variance, assume that the data are normally distributed with constant variance. Those assumptions appeared to be justified for the session 6-10 smoking data, but not for the number of cigarettes smoked during the week. When the assumptions for parametric tests cannot be justified, non-parametric tests such as the Wilcoxon Matched Pairs Signed-Ranks test, and McNemar's test are more appropriate because they do not require normal distributions.

Statistical Methods and Test Names

All analyses were carried out using the Statistical Package for the Social Sciences (SPSS, Version 12.0). Both descriptive and inferential statistical methods were employed. All testing was based on determining statistical significance at a two-sided alpha level of 0.05.

Wilcoxon Matched Pairs Signed-Ranks tests were used to compare the distribution of continuous/ordinal scaled variables pre and post intervention.
The McNemar's test was used to compare the percentages of subjects that were in the action stage of change at pre and post intervention. The action stage was computed by dividing the subjects into two groups: Those who selected the pre and post response, "I am trying to quit or cut down right now" were considered in the action stage; all others were not.

The pre and post 13-question Likert questionnaire on attitude toward tobacco use was computed as the sum of questions 1-13. Questions 4 and 12 were reverse coded prior to computing the sum so that larger scores represent better attitudes and smaller scores represent worse attitudes.

Test of Hypotheses

Hypothesis I: A reduction will occur in the number of cigarettes smoked for all participants who complete the intervention.

Statistic Used for Hypotheses 1: Wilcox Matched Pairs Signed-Ranks Test

Table 2 shows the test statistics for the average number of cigarettes smoked in a typical week at pre and post-intervention. At Pre-Intervention the average number of cigarettes smoked was 8.4 (SD=7.5). At Post-Intervention the average number of cigarettes smoked was 6.3 (SD=5.8). Test of statistics based on positive ranks resulted in a standard deviation of .021; based on the standard deviation of statistical significance (p=.05), this number is lower and the null hypothesis that states that the average number of cigarettes smoked was the same before and after intervention can be rejected, and a conclusion made that there was a "statistically significantly" smaller number of cigarettes smoked on average after the intervention. Thus this hypothesis is supported. Tables 3 and figure 1 provide further support that a decrease in smoking occurred.
Table 3 is a summary of smoking behavior for pre and post and for S-6 to S-10. Study participants were asked (S-8 to S-10) to provide, verbally the number of cigarettes smoked per day since the last scheduled session. The pre and post summary of smoking indicated that zero participants reported no increases in smoking behavior. There was a decrease in smoking by one cigarette as the intervention progressed and the number of days between sessions, which included a weekend, increased (from 5 days to 6 days). Perhaps the study participants had an opportunity to put their learned skills into action (also see discussion section).

Table 2: Test of Statistics (b) for the average number of cigarettes smoked in a typical week pre-and post- intervention, for all participants

<table>
<thead>
<tr>
<th>Average number of cigarettes smoked in a typical week</th>
<th>Mean</th>
<th>SD</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-Intervention</td>
<td>8.4</td>
<td>7.5</td>
<td>8</td>
</tr>
<tr>
<td>Post-Intervention</td>
<td>6.3</td>
<td>5.8</td>
<td>8</td>
</tr>
</tbody>
</table>

Pre and Post Intervention Average Number of Cigarettes smoked in a typical week.

\[ Z = -2.23 \] (a) 

Significance (2-tailed) at \( p = .05 \)

(a) Based on positive ranks
(b) Wilcoxon Matched Pairs Signed Ranks Test
Table 3: Summary of Reduction for Number of Cigarettes Smoked for Pre and Post and, Per Day, Since the Last Scheduled Intervention Session for S-6 to S-10.

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>Pre &amp; Post</th>
<th>S-6 5 days</th>
<th>S-7</th>
<th>S-8 6 days</th>
<th>S-9</th>
<th>S-10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of participants reporting an increase in the number of cigarettes smoked</td>
<td>0</td>
<td>2</td>
<td>5</td>
<td>5</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Number of participants reporting a decrease in the number of cigarettes smoked</td>
<td>6</td>
<td>6</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>Number of participants reporting no change in number of cigarettes smoked</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

Figure 1 is a chart for all the study participants showing the average number of cigarettes smoked, per day, since the last scheduled intervention meeting for sessions 6-10. The average number of cigarettes smoked for sessions 6 to 10 was 3.8 (SD=2.2), 3.9 (SD=2.9), 4.4 (SD=2.6), 4.1 (SD=2.9) and 2.5 (SD=2.3). The pattern of change over time is characterized by a slight increase from session 6 to session 8, a slight reduction from session 8 to 9, and a sharp reduction at session 10.
Significance versus Clinical Significance

Statistical significance refers to the p-value or probability that an event did not happen by chance, and clinical significance refers to practical significance. If the p-value is less than 0.05, it is statistically significant. However, statistical significance does not necessarily imply practical significance. For example, this study found a statistically significant difference in the number of cigarettes smoked per day between pre- and post-intervention. If, on average, the difference between pre- and post-intervention was one cigarette, then each adolescent reduced his smoking by exactly one cigarette per day, and this result might not be statistically significant because of a small sample size, but clinically significant because everyone reduced his smoking, and due to the health risks associated with smoking any reduction in cigarette use is significant.
There was a variation in the number of cigarettes smoked by the study participants. Some smoked an average of 2 to 5 cigarettes in a typical week, yet others reported as many as 18 to 20 cigarettes smoked in a typical week. These variations in smoking may appear as large effects, for example, a greater number of reduction in cigarettes smoked; smaller variations in the number of cigarettes smoked may appear as minimal to no change in reduction of cigarettes smoked. This variation in smoking may be related to differences in the stages of change and readiness for change among study subjects. According to Prochaska and DiClemente (1992), the stages of change follow a spiraling path rather than a linear one. For the purpose of this study, to evaluate the effectiveness of a smoking cessation intervention, any attempt at reduction or complete abstinence in smoking is positive regardless of the amount reduced.

Hypothesis 2: There will be an increase in the number of study subjects, at the end of the study, in the Action stage of change.

Statistics used for hypothesis 2: McNemar Chi-Square

The action stage was computed by dividing the subjects into two groups. Subjects who selected option 5 of the question, “Check the answer that best fits you right now” were considered to be in the Action stage. Table 4 shows that the number of participants that were in the Action stage of change was not different at pre and post-intervention, thus, this hypothesis was not supported.
Table 4: Distribution of Subject Responses to Determine Action Stage

Check the answer below that best fits you right now:

1) I have no thoughts of quitting (Pre-Contemplation)
   PRE: 1  POST: 2

2) I need to quit some day
   PRE: 1  POST: 0

3) I think I should quit, but I’m not quite ready
   PRE: 1  POST: 1

4) I am thinking about quitting
   PRE: 2  POST: 2

5) I am trying to quit or cut down right now (ACTION)
   PRE: 3  POST: 3

Chi-Square Tests for Participants in the Action stage of Change

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
<th>Exact Significance (2-sided) at p = .05</th>
</tr>
</thead>
<tbody>
<tr>
<td>McNemar Test</td>
<td>1.000</td>
<td>a) Binomial distribution used.</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>8</td>
<td></td>
</tr>
</tbody>
</table>

Hypothesis 3: There will be an increase knowledge based on scores on attitude toward tobacco use.

Statistic used to test hypothesis 3 - Wilcoxon Matched Pairs Signed-Ranks test

The Attitude toward tobacco questionnaire consisted of 13 questions focusing on personal beliefs, behaviors, and attitude toward cigarette use, as well as on questions pertaining to knowledge on physical health and the social impact of smoking. All 13 topic questions were derived from the intervention's curriculum; the topics were discussed and explored.
Figure 2 is a box plot showing the distribution of attitudes toward tobacco use score pre-and post-intervention. There is some evidence in the figure of an increase in the score from an approximate average score at pre-intervention of 42 to an approximate score of 48 at post-intervention. Thus this hypothesis was supported. It may be possible to imply that the study participant’s gained knowledge about smoking could lead to informed decisions regarding the decision to quit or reduce smoking. Considering that at the time of this intervention, the study participants were receiving no smoking education, this finding could be used for future studies to examine the impact of knowledge on smoking.

Figure 2: Distribution of Attitude Toward Tobacco Pre and Post Intervention
DISCUSSION

The Not-On-Tobacco program is an empirically based intervention that was designed as a cognitive-behavioral smoking cessation program for teenagers in public school settings (ALA, 2001). The purpose of the current study was to test the feasibility and effectiveness of using a modified version of this program in a residential treatment facility for male adolescents. Conducting this study has resulted in suggestions for a further modification and a better understanding of providing a smoking cessation intervention with adolescent males who have been diagnosed with behavioral problems and maladaptive personality traits. Because only males were studied, this study would not transfer to female adolescents without consideration to developmental issues specific to adolescent females, such as body image. The discussion that follows addresses these suggestions in the context of the benefits and disadvantages to the modifications made to the N-O-T program, challenges to implementation presented by the unique population and setting, and reviews the study’s results and limitations.

One of the three hypotheses was not supported, perhaps in part due to limitations of the instruments and to a small sample size. The instrument used contained questions derived from validated instruments, such as Miller and Tonigan (1996) SOCRATES – Stages of Change Readiness and Eagerness Scale; however, the questionnaire contained only one question from a validated instrument, therefore, it was considered limited in measuring what it was intended to measure.

The focus of this study, a decrease in the number of cigarettes smoked, was statistically demonstrated. Based on these results and the fact that this study was a small sample (n=8), a definitive conclusion that the intervention was effective cannot be made
without validation of the data. It remains to be seen whether or not these results can be substantiated in a randomized comparative experimental design using a larger sample.

This study did show a clinically significant reduction in the number of cigarettes smoked during a typical week, although not a statistically significant one. Reduction in smoking was noted when pre-intervention was compared to session 6 (quit day). This reduction implies that the study subjects were moving along the continuum of change out of pre-contemplation and toward action, and is especially noteworthy because both referred and volunteer intervention participants reported a decrease in cigarettes smoked. Prochaska and DiClemente (1984) indicate that during the preparation stage, a behavioral commitment to change is planned and implemented in the future. The stage in the future in which the plan is executed is called the action stage. Sessions 6 through 10 are also consistent with the Action stage of change because the sessions focus on teaching skills to prevent reversal to full return to the problem behavior (smoking). However, Prochaska and DiClemente (1992) report that, for adults, if successful action is sustained for a period of three to six months, the individual moves into the maintenance stage. The results for adolescent smokers are similar, except that adolescents are twice as likely to be releasers and particularly so if they have had an extensive history of cigarette use (Pallonen, Murray, Schmid, Pirie & Luepker, 1990). Attempts at reducing the number of cigarettes smoked could be considered the action stage; this is noteworthy considering that this population has never been formally offered a smoking cessation intervention while in treatment.

An increase in smoking occurred between sessions 6 and 7, with 5 days between sessions, but not in session 8 and 9, with 6 days between sessions (see table 3). Five or
six days between sessions included a weekend where, and due to staffing issues; there was less supervision of RTC adolescents and greater opportunities to smoke. However, session 8 to 9 resulted in a reduction in smoking. A possible explanation could be related to the content of the theme of session 8 (Assertive Skills Training) which may have had an impact on the outcome reported at session 9. The greatest reduction in the number of cigarettes smoked occurred at the final session, which included a pizza party. There was one day in between session 9 and session 10. Eight study participants reported a decrease in smoking and one remained the same. There are three possible explanations for this reduction: 1) the intervention was effective, 2) the response was expected, 3) subject error.

There was no evidence to suggest that the intervention was effective in terms of moving participants into the Action level of change. This may have been due to limited instruments and the small sample, and could be an area of focus for future research. While the hypothesis was not confirmed, it is significant and important to note that the program subjects did report a reduction in the number of cigarettes smoked.

Finally, there was evidence to suggest that participants’ knowledge of and attitude toward tobacco use increased.

Limitations of This Study in Using a Small Sample

The biggest limitation of this study was the small number of subjects (n=8). The small number of subjects does not provide statistical power on which to draw conclusions of significance. However in light of the fact that there have not been other studies of smoking cessation with adolescents in residential treatment, this study provides some clinically relevant information that could be further studied with a larger sample.
Another limitation is that this intervention, originally designed for teenagers in the public school setting, was used with a population that was diagnosed with psychological disorders and who lived in a restricted setting where smoking is prohibited. This means that “real life” experiences encountered in the community by most adolescents in residential treatment, such as dealing with drug dealers in the neighborhood are not addressed. Additionally, learned skills, for example, refusal and assertive skills, and smoking behaviors such moderation in smoking until abstinence is achieved may have real consequences in residential treatment facilities. Again, considering that there have been no other studies done with this population on smoking cessation and few smoking cessation modules specific to adolescent males in residential treatment, as well as to the health consequences associated with smoking, this study could provide future direction for possibly developing, modifying, and implementing smoking cessation programs for adolescent males. For example, Colby, Barnett, Monti and Rohsenow (1998) conducted a study using brief motivational interviewing with a small sample (n=37) of adolescent smokers in a hospital setting who were not selected on the basis of their motivation to quit. The outcome of this study showed encouraging results on quit attempts at a 3-month follow-up and the authors’ reports that, given the feasibility and broad transportability of their intervention, as well as its ability to target smokers who would otherwise be unlikely to receive treatment for their smoking, the potential for a clinically meaningful application is promising.

Another limitation is the generalizeability of the findings to other populations, even to females in residential treatment. These findings cannot be applied to females in residential settings because of gender differences in development such as differences in
emotional and physical maturity levels. However, the N-O-T curriculum was designed to be delivered to both females and males with special notes to guide the facilitator on gender specific issues.

Discussion of Modifications Made, Rationale, Advantages, and Disadvantages

Length of time

The 10-week intervention was offered bi-weekly over 5 weeks. The rationale for this was to allow consecutive contact with the participants before their next scheduled home leave, to avoid attrition of the study participants. Often times the RTC adolescents do not return to the RTC after their home leave. This may be due to a family emergency, a sudden court notice that the adolescent has been officially discharged, or that the adolescent refuses to return to the RTC.

Another reason for this modification was to avoid the use of other drugs while in the study. On scheduled home visits, the RTC adolescents are transported by an RTC van to the bus stop where they are to be picked up. Some RTC adolescents may choose to exit the bus prior to their home stop, or have friends pick them up at their scheduled stop, and they may choose to socialize with them in the community rather than going home. These unsupervised activities provide opportunities to engage in smoking and other drug use. Parents have called the RTC to report that their children never made it home or that they arrived the next day. If this infraction occurs, the adolescent would probably not be allowed to continue in the program upon return to the RTC.

The advantage of offering a condensed program is to avoid opportunities for these behaviors, which could interfere with the study. The disadvantage is that the participants do not get an opportunity to practice the learned skills, such as assertiveness, in a “real world” setting. Another disadvantage is that the learned skills cannot be practiced in the
RTC with cigarette smoking adult staff, where the inherent power differential could lead to the possibility of having a home visits suspended.

Perhaps a better approach would be to extend the study to a weekly program that allows participants to go home and share with the study group the temptations they experienced and how they handled them. For those subjects who smoked while on leave, the study group could help in reviewing the event that led to smoking and help identify alternatives for the future. Another suggestion is to include the parents in the study by providing them with smoking education and encouraging their collaboration with homework assignments.

Unsupervised Activities modified to the RTC

Group exercises that called for unsupervised activities, such as riding a bike or going for nature walks, were modified to activities that would be acceptable at the RTC, such as activities in school, and gym class. Participants were asked to identify additional activities that could be done while at home. The rationale for this was to maintain adherence to the program’s structured intervention while abiding by the RTC rules. The rationale involved in asking participants to identify ideas to do at home was that the next home leave was scheduled for two days after the study intervention’s completion; therefore, the study participants would have a plan available for alternate things to do. The disadvantage was that the participants were limited in their selection of independent activities, primarily because the intervention was written for teenagers in the community, and RTC residents are more restricted and must be adult-supervised at all times. Perhaps a solution would be to offer this intervention over a longer period of time, and incorporate the family, community, home, and RTC environment.
Homework

Homework was done during sessions and discussed as a group. The rationale for this was to ensure that the participants would not forget to do their homework or lose their assignments. The advantage was that all homework was completed, discussed and reviewed in the same day. The disadvantage was that the participants did not have ample time to complete, integrate or research the homework contents on their own. Perhaps a better idea would be to assign to each study participant a homework coach who would work in collaboration with the school. During the school’s scheduled study periods, the program’s homework could be completed.

From session 6 to session 10, smoking behavior was documented. This process involved asking each participant to report out loud the number of cigarettes smoked, per day, since the last scheduled session. The rationale for this was that the success of a study group member would encourage others, and the study group members would rally in support of a peer struggling with quitting. The disadvantage was that it might have contributed to competition among peers in under-reporting or over-reporting the actual number of cigarettes smoked. Perhaps a better method would have been to speak privately to each individual for a confidential recording of the number of cigarettes smoked, followed by chemical validation, informing the study group that on the last day of the program (session 10), the results for all participants would be revealed.

Completion of Questionnaires

All questionnaire items were read out loud and explained to all participants, and the facilitator was available to answer questions. The rationale for this was to help those with poor reading comprehension, without targeting anyone. The advantage was that no
one would feel targeted. The disadvantage was that asking a clarification question or asking for assistance could draw attention to that participant, and he would be at risk of being ridiculed by his peers. Perhaps a better way to handle questionnaires would be to provide each participant with a personalized coach who would provide assistance on all questions regardless of reading comprehension.

Snacks

Snacks were provided at the beginning of the group to all program participants because the study took place immediately after school. The advantage was that it was an attractive attendance incentive because the snacks, such as chocolate candy bars were not found at the RTC. The disadvantage was that many of the participants spent time socializing while eating, became more physically active, or were not as engaged in the group activities unless prompted by the group facilitator. Perhaps offering lighter, more healthful snacks would have helped, and offering the program during school hours would have made for a shorter day.

Opposite Sex Facilitator

The intervention calls for the N-O-T facilitator to be a nonsmoker, and of the same sex as the study subjects; however, the facilitator for this program was a female nonsmoker. There is no rationale for this modification other than the fact that the facilitator was the only N-O-T trained facilitator at the RTC. The advantage was that an opposite-sex facilitator might feel less threatening, communication might be easier and participants might be more willing to participate in group discussions. The disadvantage was that being an all-male RTC, most adolescents were intrigued by the presence of a female and often flirted instead of focusing on the session topic. Perhaps a better
approach would be to offer to the RTC adolescents who complete the program this facilitator training so that they could co-facilitate future studies, as well as train interested RTC male staff members.

Challenges of Implementing the Program

Participation and Schedule

One of the biggest challenges for implementing this program was schedule reminders. Phone calls were made to the cottage staff in the morning and afternoon of the program meetings, and the program was still often overlooked. As a result, when an adolescent did not present at the cottage for a scheduled intervention session, the security department was called and the participant was reported as missing. In addition, announcements over the school’s public announcement system informed the study participants that the program would be taking place at the end of school. Despite this, several participants failed to show up, prompting the program’s facilitator to look for the participants and transport them back to school, a hardship when no co-facilitator was available to assist. In these cases, the participants were not left unattended, and everyone joined in the quest for unaccounted study participants. This activity cut into the scheduled time and the session started late and ended late. The upside of this was that an event like this became a topic of conversation, and it appeared that the group was developing a supportive bond. Perhaps having co-facilitators providing reminder calls to the cottage in the morning and afternoon, gathering snacks, picking up unaccounted program participants, and helping with clean up, would be helpful.
Staff Who Smoke

Another challenge was having RTC staff smoke in front of the RTC adolescents. Some participants talked in group discussions about the challenges of wanting to quit smoking while at the same time enjoying the second-hand smoke released by adult RTC staff smokers. Perhaps providing alternatives to adult employees would help reduce the number of RTC staff members who smoke, while at the same time making it easier for them to model good behavior to the RTC adolescents. Alternatives to smoking may include educational pamphlets on smoking, offering employee discounts for joining a smoking cessation program, offering a nicotine patch through the RTC medical staff.

Conflicting Activities

There were times when participants were scheduled for other activities during the intervention session. Such activities included basketball, swimming, and meetings with the social worker. Those participants had to be provided with an additional session to make up for the one they missed, and because there was only one trained facilitator, this was often time-consuming. Perhaps developing a bulletin board in which all special activities and events with student names could be posted in the cottages and school would address this confusion and allow for better scheduling.

Transportation

Transporting adolescents back to their cottages after the study was necessary and it was imperative for the facilitator to check in with the cottage staff supervisor to confirm that the study participant was safely back in the cottage. Even though the facilitator received approval to transport subjects, with only one facilitator, transporting the participants could have been a liability issue; many unforeseen things can happen
while traveling a short distance in a car loaded with eight adolescents. A suggestion would be to have a Para-professional counselor staff for escorting, snacks and cleanup.

**Participant Motivation**

This intervention was done after school with participants who were mandated to residential treatment. Five participants were referred and three volunteered. Those who volunteered reported the following as a motivation for participation in the study (1) a change of routine, (2) a desire to stop smoking, (3) an addition to nicotine. (4) a plan to use their certificate of completion to help with heir discharge planning.

Although all participants were polite, some voiced the opinions that they were not interested in quitting smoking. They wanted to smoke until they got older, and then they would quit. These subjects were less willing to initiate conversation and participate in group discussions, but over time, the group developed into a supportive network and the group was able to engage those who were less-willing into group discussions. Some participants emerged as “class clowns” and the group appeared to enjoy their humor. Perhaps having one or more male co-facilitators would be helpful, and at the same time these male co-facilitators would be modeling positive behaviors.

**Data Interpretation Using The Stages of Change Model**

In accounting for the limited success of programs to treat addictions, Prochaska, DiClemente, and Norcross (1992) suggested that programs are designed for individuals who are ready to take action to change their behaviors, even though many individuals have not reached that stage of readiness (Hewes & Janikowski, 1999). Based on Hewes and Janikowski (1999); this study’s age-appropriate intervention may have contributed to the decrease in the number of cigarettes smoked. Additionally, the fact that smoking
decrease was evident when pre and post intervention were compared, may indicate that the subjects had transitioned out of the pre-contemplation stage.

Implications

The inception of this study occurred while completing a doctoral internship at a residential treatment facility. An impetus for further research was provided by personal communication with staff, physical evidence of smoking, and the fact that an extensive literature review yielded next to nothing on residential treatment and smoking. Given the number of adolescents who are admitted each year to residential treatment, and the percentage of those admitted who self-report that they smoke, a study was warranted. The results of this study, a reduction in the number of cigarettes smoked, and increased knowledge in smoking attitude can serve to bring attention to this topic and unite parents, teachers and health psychologists to provide the "bigger" picture which could result in changes in the law.

Advocacy

The findings of this study, although limited due to a small sample size, may pave the way for future studies that could benefit this underserved population. Similar to the Colby, et al. (1998) study, independent studies could have a broad usefulness to these male adolescent smokers in residential treatment. After developing an overview of smoking in residential treatment, the number of active adolescent smokers in residential treatment, and the number of adolescents who are active smokers, broader attention could be brought to this issue. Parents, teachers, lobbyists, and health psychologists could use this data to influence policy makers to include smoking cessation programs in residential treatment with reimbursable services through third parties, since it has been noted that
this is a top reason why this service is not offered. With enough media attention and lobbying efforts, then perhaps policy makers, managed care organizations, and other people in key positions may be more amenable to considering third party reimbursement, especially if there is empirical evidence that smoking cessation programs are efficacious at reducing the number of cigarettes smoked with adolescent smokers in residential treatment. Getting a clear “big picture” of the reality of adolescent smokers in residential treatment, bringing attention to this subject, and helping focus parents, teacher, health psychologists, and other child workers, could help propel action that could provide resources and funding to further develop programs, interventions, and other related services.

Based on the results of this archival study, the empirical study described in the following chapter is proposed to answer questions raised and clarify issues of the present study.
CHAPTER 4: PROPOSED EMPIRICAL STUDY

Based on the results of the current study, an empirical study is proposed to evaluate whether or not a modified cognitive-behavioral intervention is effective with adolescent males in residential treatment using a large study sample and incorporating the study’s participants, parents or care takers in treatment. Parental consent and participant’s assent will be collected. A commitment should be obtained from the RTC that participants will not be punished for admitting they smoke or for getting caught smoking while in the study, as a pre-requisite for holding the study in that institution.

The specifics of this proposed study make up this chapter.

Methods

Participants

The participants in this study will be adolescent males residing in a residential treatment community (RTC) located in the Northeast region of New York State who are active smokers and are either referred or volunteer for the study.

Inclusion Criteria

Adolescent males in residential treatment who smoke cigarettes who volunteer or are referred to the study by any RTC personnel will be considered for the study. Study participants must have had a complete medical examination, be in good health, and have documented in their clinical charts the average number of cigarettes smoked in a typical week reported upon admission to the RTC.
Exclusion Criteria

Adolescent males in residential treatment who do not smoke, who reside in a substance abuse cottage, have been at the RTC of 3 months or less, or who will be discharged from the RTC within one week of the study's inception will be excluded from the study.

Measures

Blood Measure of Nicotine

The most commonly used biochemical measure of nicotine in blood, cotinine, and its main metabolite, is found in blood, urine, saliva, or expired breath. Nicotine has a short half-life (2 hours), so the concentration in blood is closely related to time since the last cigarette smoked. Cotinine has a longer half-life (20 hours) and can be accurately measured in saliva. (Dappen, Schwartz & O'Donnell, 1996).

Carbon Monoxide and Saliva

Carbon monoxide breath analyzers are accurate for up to 4 hours after the last smoked cigarette, and have a short half-life of 5 to 8 hours. Carbon monoxide measurements are affected by the number of cigarettes smoked on the day of the measurement, but can be a good predictor of smoking outcome; for example, those with higher baseline carbon monoxide levels are less likely to succeed in achieving long-term abstinence (Dappen et al., 1996). Expired carbon monoxide can be measured easily, using a handheld digital monitor after a 15-second breath-hold and can have an advantage as a motivational tool, because the results are obtained immediately. A high result can be explained to the smoker as an indication that the poisonous gas, carbon monoxide, is replacing oxygen in the blood, which means that the heart has to do more work to pump
oxygen to the body, but when the smoker quits smoking, the carbon monoxide reading will drop to that of someone who has never smoked.

Measurements for Stages of Change

Clinically validated instruments will be used to assess readiness to change. The Stages of Change Readiness and Treatment Eagerness Scale (SOCRATES), developed by Miller and Tonigan (1996) will be used.

Measure for Nicotine Dependence

The Fagerstrom Tolerance Questionnaire [FTQ] (Fagerstrom, 1978) is the measure of nicotine dependence suggested to assess the level of nicotine dependence.

Measurements for Readiness for Change

The Stages of Change Scale-Substance Abuse (SCS-SA) will be used to measure readiness to change. The instrument was developed to measure readiness to change among individuals in treatment. The SCS-SA is based in part on the SCS scale, which was originally developed to assess readiness for change in psychotherapy (McConnaughy, Prochaska, & Velicer, 1983).

Knowledge on Attitude Toward Tobacco Use

The N-O-T questionnaire survey consisting of 13 questions focusing on personal beliefs, behaviors, and attitude toward cigarette use, as well as questions pertaining to knowledge on physical health and the social impact of smoking will be used (ALA, 2001). All 13 topic questions will be covered in the intervention discussion and group exercises. The questionnaire will be administered pre and post intervention.
Design

The proposed study is a 2-year longitudinal, randomized, comparative experiment with a sample size of 140 participants. Each group will consist of 70 participants who will be randomly assigned to one of two groups: a control (no treatment) or treatment group. Each group will be further divided into seven groups of 10 participants each. All groups will meet biweekly, during school hours, for 12 sessions, and again at 3, 6, 9 and 12 months post-intervention for follow-up documentation of cigarettes smoked, using expired breath and blood samples. Make-up sessions will occur on the same week of the intervention for participants who may have missed a session due to unforeseen circumstances, such as a family emergency.

Procedures

The intervention module N-O-T (ALA, 2001) will be used with two additional sessions added; these will focus on assertive skill and readiness for change. Validation of self-reported smoking will be done using expired breath, blood and saliva. A baseline of cigarettes smoked will be established upon admission to the RTC by asking adolescents, as part of their routine medical examination, the number of typical number of cigarettes smoked on a typical day. This baseline will be compared to the number of cigarettes smoked as reported in sessions 1, to establish a second baseline of cigarette smoking, and a third baseline at session 10. Smoking assessments will be done at post-intervention follow-up at, 3, 6, 9, and 12 months.

While in the study, participants will have minimal or no consequences for smoking and will be allowed to go home on their scheduled monthly home visits. Before a scheduled home leave, the focus of the sessions will be assertiveness and refusal skills.
 Upon return to the residential treatment community from home leave, participants’ experiences with the outside community will be discussed with the study group. Participants who report smoking during their home leaves will discuss the high-risk events that led to smoking, and the study group will collaboratively assist in identifying alternative behaviors.

Participants’ Parents or Caretakers

Family workers or social workers who are nonsmokers will make home visits to the parents or caretakers of the study participants. These workers will provide educational information on how to help their children remain smoke free. If parents or caretakers are interested, they will be provided with referrals and resources on smoking cessation in their communities. The home visits will occur concurrently with the start of the study. Each parent or caretaker will also receive follow-up visits at 3, 6, 9 and 12 months to obtain their assessment of their child’s smoking behavior. Family workers will receive training and education in adolescent smoking and smoking cessation programs, and will be made aware of the local community resources available. They will be expected to follow an ethical code of conduct with families, and all home visits will be videotaped to ensure that accurate information is relayed and that family workers are following protocol. Two raters will evaluate 50% of a random sample of videotapes to assess protocol adherence.

N-O-T Facilitators

N-O-T facilitators and moderators will be nonsmoking, paraprofessional males who receive training from the American Lung Association on delivering the structured protocol. The para-professionals will assist with escorting study participants to the
program, delivery of snacks, and clean-up, and will have experience facilitating groups. To ensure consistency in program delivery, all groups will be videotaped and reviewed for protocol adherence. Two raters will evaluate 50% of a random sample of videotapes to ensure protocol adherence.

**Participant Coaches**

Each study subject will be assigned a personal coach who is a nonsmoker, a trained psychology technician. There will be a total of three psychology technicians assigned for each group. Each psychology technician will be assigned three to four study participants in one of the 7 groups. To ensure attendance, the coaches will escort the study participants from their classroom to the study’s assigned school location. The coaches will also be available to assist the study participants with homework assignments, and with in-group reading assignments and reading comprehension. The coaches will also assist by helping and explaining all study assignments, handouts and homework. Coaches will also be checking in with their assigned participants if they become ill and do not attend school.

**Control Group**

The control group will receive the same amount of interaction time as the treatment group, including chemical validation of smoking status at sessions 6 to 10, and at the follow-up sessions, but the control group will not receive the treatment intervention. This group will be a psychological process group in which adolescents can talk about anything involving their day’s activities.
Research Hypotheses

_Hypothesis 1_

The treatment group will show a greater reduction in the number of cigarettes smoked than the control group.

_Hypothesis 2_

*A greater* percentage of subjects in the treatment group will be in the Action stage of change than the control group at the end of the study.

_Hypothesis 3_

The intervention group will show a greater increase in knowledge of, and greater change in attitude towards, tobacco use than the control group.

Plan for Statistics

For hypotheses 1 – 2, Pearson Chi-square tests will be used to compare the percentages between groups. Chi-Square will be used instead of ANOVA because only two groups are being compared.

For Hypothesis 3, the Mann-Whitney Test will be used to compare the distribution of attitude scores between treatment groups. The Mann-Whitney Test is more robust and sensitive to departures from normality; therefore this test will be used instead of ANOVA.

This study will use a sample size of 140 (70 per group), which would take attrition into account. A sample size of 130 (65 per group) achieves 80% power to detect a difference of 25% between the null hypothesis that both groups have a 25% rate, versus the alternative hypothesis that one group has at least a 50% rate using a Person Chi-
square test at a 0.05 level of significance. A sample size of 130 would produce 80% power to detect a difference of 4.8 between the null hypothesis that one group has an attitude knowledge score of 46.2 at the 0.05 level of significance, assuming both groups have a standard deviation of 9.4, using a Mann-Whitney test.

Limitations of the Study

1. There may be significant attrition during the end of the study due to unforeseen circumstances, such as court approval of discharge from the RTC
2. Scheduled groups during school hours may mean a longer school day because the school has to comply with the State’s regulations on education credits.
3. Participants may decide to volunteer; therefore they may be able to smoke without harsh consequences
4. Participants with no intent to quit may volunteer for the study and feel that attending is a better alternative than doing school work
5. Adult RTC employees may model poor behavior by smoking in the presence of participants without regard to participants’ efforts at quitting
6. Some parents may allow their children to smoke in their presence or may smoke with their children and they may not want to participate in the study.
7. Generalizeability will be specific to this population for reasons noted in Chapter 3.
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APPENDIX A

Pre- and Post-Intervention Questionnaires
Pre-Intervention Assessments Completed at S-1

DEMOGRAPHIC INFORMATION (Form 1 of 3)

Today’s Date_________ Assigned ID Number_____

You are (1)----Male  
(2)----Female

Age?  (1)-----13  
(2)-----14  
(3)-----15  
(4)-----16  
(5)-----17

What grade are you in?  
(1)------8th  
(2)------9th  
(3)------10th  
(4)------11th  
(5)------12th

What is your race/ethnic group?  
(1)-----Non-Hispanic White  
(2)-----Non-Hispanic African-American  
(3)-----American Indian or Alaska Native  
(4)-----Asian American or Asian  
(5)-----Hispanic  
(6)-----Native Hawaiian/Pacific Islander  
(7)-----Other_____________________

How long have you been at this residential treatment community?  
_____________________________________________________________________

On a scale of 1 to 10 with 10 being the highest. How would you rate the stress level you experience at the RTC?_______
SMOKING HISTORY, USAGE, MOTIVATION / INTENT TO QUIT (Form 2 of 3)

Today’s Date_________________ Assigned ID Number_________________

1. On a typical week, about how many cigarettes do you smoke a day? (1p pack=20)

2. On a typical weekend-day, about how many cigarettes do you smoke a day? (1p pack=20)

3. Do you believe you can quit smoking
   Not at all
   Not very much
   Not sure
   Somewhat
   Very much

4. Check the answer below that best fits you right now:
   I have no thoughts of quitting
   I need to quit some day
   I think I should quit, but I’m not quite ready
   I am thinking about quitting
   I am trying to quit or cut down right now

5. How long have you been smoking? _____ years or _____ months

6. How old were you when you started smoking? _____ years-old

7. Prior to this study, have you ever tried to quit smoking tobacco?
   Yes
   No
   If yes: a. How many times have your tried to quit smoking? ____________
   If yes: b. How did you try to quit?
      On my own
      In a group
      Other
ATTITUDE TOWARD TOBACCO USE (Form 3 of 3)

Today's Date _____________  Assigned ID Number ________________

WHAT I BELIEVE (S-1)

<table>
<thead>
<tr>
<th></th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Not Sure</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
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<tbody>
<tr>
<td>1). I will have to smoke for a long time before it will hurt my health.</td>
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<td>2). Smoking helps people feel calm.</td>
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<td>3). Teens who smoke are more popular than those who don’t smoke.</td>
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<td>4). A person’s body begins to heal quickly after quitting smoking.</td>
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<td>5). Smoking will not hurt my health if I exercise a lot.</td>
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<td>6). Parties are better when people are smoking.</td>
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<td>7). Smoking cigarettes is an effective way of keeping weight down.</td>
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<td>8). Most teenagers who smoke cigarettes can stop smoking whenever they want to.</td>
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<td>10). People have more fun when they smoke.</td>
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<td>11). I can smoke cigarettes without getting hooked.</td>
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<td>12). There should be laws that limit advertising for cigarettes.</td>
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Post-Intervention Assessments, completed at S-10

CURRENT SMOKING STATUS, REDUCTION, MOTIVATION, INTENT TO QUIT

(Form 1 of 3)

Today’s Date __________ Assigned ID Number__________

1. Are you currently smoking?
   - No if no, go to box
   - Yes if yes, to 2-4
     If you are not smoking:
     How many days since your last cigarette?
     Enter number of days.
     Do you plan to be smoke-free during the:
     Next week?  __yes  __no  __maybe
     Next month?  __yes  __no  __maybe

2. On a typical week, about how many cigarettes do you smoke a day? (1 pack=20)

3. On a typical weekend, about how many cigarettes do you smoke a day? (1 pack=20)

4. How many cigarettes have you cut down (reduced) a day on a:
   Typical weekday? ____________ Typical weekend? ____________

5. Do you believe that you can quit smoking
   - Not at all
   - Not very much
   - Not sure
   - Somewhat
   - Very much

6. Check the answer below that best fits you right now:
   - I have no thoughts of quitting
   - I need to quit some day
   - I think I should quit, but I’m not quite ready
   - I am thinking about quitting
   - I am trying to quit or cut down right now
     Assigned ID Number__________
ATTITUDE TOWARD TOBACCO USE (Form 2 of 3)

Today’s Date _____________  Assigned ID Number ________________

WHAT I BELIEVE (S-10)

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<tr>
<th>Statement</th>
<th>Strongly Agree</th>
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FEEDBACK QUESTIONNAIRE (Form 3 of 3)

Post-Intervention for proposed study

Today’s Date______________ Assigned ID Number______________

A version of the N-O-T program may be offered in the future to other students at this facility. Do you have any suggestions that may help improve the program?
APPENDIX B

IRB Approval Letter
Stephanie Felgoise, Ph.D.
Department of Psychology
Philadelphia College of Osteopathic Medicine
4190 City Avenue
Philadelphia, PA 19131

RE: A feasibility study of a cognitive behavioral smoking cessation intervention for adolescents in residential treatment (Protocol #H04-014X)

Dear Dr. Felgoise:

This is to inform you that your above-referenced protocol has been reviewed and approved. It has been determined that this protocol is exempt from informed consent requirements under 45 CFR 46.101(b)(4) - existing data, documents, records, pathological specimens, or diagnostic specimens, if these sources are publicly available or if the information is recorded in such a manner that the human subjects cannot be identified, directly or through identifiers linked to the subjects.

Best wishes with your proposed research. Please notify immediately the Institutional Review Board if you anticipate any changes to the protocol.

Sincerely,

[Signature]
John Smelaro, D.O.
Chairman
Smoking Policy of the Study’s Site
BERKSHIRE FARM CENTER AND SERVICES FOR YOUTH
AND
BERKSHIRE UNION FREE SCHOOL DISTRICT
CANAAN, NEW YORK 12029

NON-SMOKING POLICY

Dear Parents and Guardians,

In accordance with State and Federal Laws prohibiting those persons under 18 years of age to smoke, Berkshire Farm Center does not permit smoking by residents at the Canaan campus or at other settings while supervised by residential center staff. Additionally, we believe that it is our responsibility to protect the health and safety of youth entrusted to our care. Serious health hazards result from smoking. Each year over 300,000 Americans die from the effects of smoking, and due to smoking suffer from heart disease, cancer, emphysema and chronic lung disease.

Our residents will not be allowed to possess cigarettes or any tobacco products while at the Canaan residential campus. Reference to "smoking" shall also include the use of chewing tobacco and other tobacco products ingested in any form. Also, youth will not be able to smoke at our statewide communality services offices, off-grounds, under the supervision of our staff, or when they are being transported in a vehicle operated by our staff.

If your youth is a smoker, please encourage him to stop smoking. Also, please do not send this youth cigarettes. Our staff will also be providing support and encouragement throughout this effort. We appreciate your cooperation and support.