

University of Massachusetts Medical School

eScholarship@UMMS

---

Family Medicine and Community Health  
Publications and Presentations

Family Medicine and Community Health

---

2005-12

## The Family Physician's Role in Identifying and Treating Tobacco Addiction among Adolescents

Joseph R. DiFranza

*University of Massachusetts Medical School*

*Et al.*

Let us know how access to this document benefits you.

Follow this and additional works at: [https://escholarship.umassmed.edu/fmch\\_articles](https://escholarship.umassmed.edu/fmch_articles)



Part of the [Community Health and Preventive Medicine Commons](#), [Pediatrics Commons](#), [Preventive Medicine Commons](#), [Primary Care Commons](#), and the [Substance Abuse and Addiction Commons](#)

---

### Repository Citation

DiFranza JR, Wellman RJ. (2005). The Family Physician's Role in Identifying and Treating Tobacco Addiction among Adolescents. Family Medicine and Community Health Publications and Presentations. Retrieved from [https://escholarship.umassmed.edu/fmch\\_articles/271](https://escholarship.umassmed.edu/fmch_articles/271)

Creative Commons License



This work is licensed under a [Creative Commons Attribution-NonCommercial 3.0 License](#)

This material is brought to you by eScholarship@UMMS. It has been accepted for inclusion in Family Medicine and Community Health Publications and Presentations by an authorized administrator of eScholarship@UMMS. For more information, please contact [Lisa.Palmer@umassmed.edu](mailto:Lisa.Palmer@umassmed.edu).

# The Family Physician's Role in Identifying and Treating Tobacco Addiction among Adolescents

\*Department of Family Medicine & Community Health, University of Massachusetts Medical School, \*\*Behavioral Sciences Department Fitchburg State College, USA

Joseph R. DiFranza, M.D.\*,<sup>†</sup>, Robert J. Wellman, Ph.D.\*,\*\*

Smoking and tobacco addiction are serious public health problems worldwide. New research reveals that addiction to tobacco can begin very early, with very low levels of smoking. Family physicians are in a unique position to prevent smoking initiation by youths and to diagnose and treat tobacco addiction in young smokers. In this paper we discuss the factors that prompt youths to try smoking, how quickly addiction to tobacco begins after the onset of smoking, how a family physician can determine whether a young patient is addicted, and what the physician can do to prevent adolescent patients from beginning to smoke or to assist them to quit if they already smoke.

**Key words:** family physician, tobacco addiction, adolescents, hooked on nicotine checklist

About one in five 13- to 15-year-old teens smoke, with 80,000 to 100,000 beginning each day; approximately half of these initiators live in Asia.<sup>1)</sup> The early onset of smoking is of particular concern because it results in a more severe addiction.<sup>2)</sup> More than 50% of people who begin smoking during adolescence continue to smoke for another 15 to 20 years.<sup>3)</sup> Smoking kills one in ten adults, resulting in four million deaths worldwide each year.<sup>1)</sup> Family physicians often encounter young patients who are just beginning to smoke, and therefore have opportunities to intervene to address this enormous public health problem. It is important for family physicians to understand why youths smoke, how they become addicted, and how physicians can evaluate and treat tobacco addiction in their adolescent patients.

## What Factors Prompt Youths to Try Smoking?

Research has identified two broad categories of factors that place individual youths at risk for smoking initiation. Personal factors include low self-esteem, poor bonding to parents, peers

and school, poor school performance, participation in other risky behaviors, and emotional distress including anxiety and depression.<sup>4,5)</sup> Youths who hold favorable attitudes toward smoking, or who lack of confidence about being able to refuse a cigarette offered by friends, are more likely to start. Societal risk factors include socioeconomic or other demographic characteristics that would disadvantage a youth in relation to peers (e.g., ethnicity, religion, etc.), family structure, or siblings and peers who smoke or approve of smoking.<sup>4,5)</sup> Parental smoking was a risk factor among youths in six European nations.<sup>6)</sup>

Adolescents who are particularly likely to initiate smoking can be identified simply by asking three questions: (1) "Do you think that you would try a cigarette soon?" (2) "If one of your best friends were to offer you a cigarette, would you smoke it?" and (3) "Do you think you will be smoking one year from now?" A youth is considered susceptible to initiating smoking unless she or he answers "no" or "definitely not" to all three questions.<sup>7)</sup> This index of susceptibility was validated in a longitudinal study of 4,500 American adolescents. Compared to youths who were not susceptible, those who were most susceptible were more than three times as likely to have experimented with smoking four years after the initial survey, while those who were moderately susceptible were 90% more likely, after controlling for many of the other predictors of smoking initiation discussed above.<sup>7)</sup> Thus family physicians can

<sup>†</sup> Corresponding author: Joseph R. DiFranza  
Tel: 508-856-5658, Fax: 508-856-1212  
E-mail: difranzj@ummhc.org.

easily identify patients who are likely to start smoking and provide preventive counseling.

Tobacco marketing is another important contributor to the initiation of smoking. Children are easily manipulated by tobacco companies, who have targeted youths worldwide for decades. Tobacco advertising portrays smoking as a solution for adolescents' insecurities about their image, appearance, popularity or maturity.<sup>8-11)</sup> Advertising also contributes to the false perception that smoking is a healthy part of the rite of passage into adulthood, or that smoking is a good way for a child to establish his or her independence from parental authority. When foreign multinational tobacco companies entered formerly restricted markets in the Republic of Korea, Japan and Thailand and began employing western marketing strategies, smoking among adolescents and women increased drastically.<sup>1)</sup> Smoking among Korean teenagers increased from 18% to 30% within one year after the ban against American tobacco was lifted, with a five-fold increase (from 1.6% to 8.7%) among teenage girls.

Tobacco marketing may increase an adolescent's susceptibility to smoking. Most young children express antismoking attitudes<sup>12-15)</sup>, so the initiation of tobacco use is often predicted by a shift in susceptibility. In one longitudinal study, non-susceptible youths who were receptive to owning and using promotional items imprinted with tobacco logos were almost three times more likely to become susceptible.<sup>16)</sup> In another study, high receptivity to tobacco marketing doubled or tripled the odds of becoming a smoker over four years of monitoring.<sup>17)</sup> Based on evidence from nine longitudinal studies involving over 12,000 nonsmokers, the authors of a recent critical review concluded that "tobacco advertising and promotion increases the likelihood that adolescents will start to smoke".<sup>18)</sup> Therefore, a sound approach to preventing youth smoking is to advocate for banning all tobacco marketing efforts.

### Once Youths Begin Smoking, how Quickly does Addiction Begin?

For a long time, conventional wisdom held that addiction to tobacco developed slowly, over years of moderate to heavy smoking.<sup>19)</sup> According to this view, youths first experiment with tobacco, they develop habits surrounding the use of tobacco, and their use increases to at least 10 cigarettes per day, at which point addiction may develop. Young smokers

experience the same symptoms of addiction as adult smokers.<sup>20)</sup> These include failed attempts at cessation, feeling addicted to tobacco, strong cravings to smoke or need for a cigarette, difficulty refraining from smoking in situations where it is inappropriate or prohibited, and withdrawal symptoms-anxiety or restlessness, difficulty concentrating, irritability, or urges to smoke-when abstinent or having reduced their level of consumption.

Contrary to conventional wisdom, it is now clear from a growing number of studies that although the progression in the amount smoked may develop slowly, the onset of symptoms of addiction may occur very quickly.<sup>20-23)</sup> In the first prospective study of the onset of tobacco addiction, first use of tobacco occurred on average at 11.7 years of age, and the mean latency from first use to smoking at least once per month was 486 days (median=158). The mean latency to daily smoking was 766 days (median=696), with no significant gender differences.<sup>20)</sup> Thus it took 280 days on average for a youth to move from starting to smoke at least once per month (monthly smoking) to daily smoking. In contrast to the slow progression in the frequency of smoking, symptoms of addiction developed rapidly after the onset of monthly smoking, with a median of 21 days for girls and 183 days for boys.

Youths had to smoke very little to develop symptoms of addiction. About half of the youths who developed symptoms had experienced at least one by the time they were smoking two cigarettes in one day each week, and about two thirds had symptoms by the time they were smoking one cigarette per day.<sup>20)</sup> Despite the low levels of tobacco consumption, these symptoms have strong clinical significance. The appearance of any single symptom strongly predicted that a youth would continue to smoke.<sup>20,24)</sup> Indeed, many youths attempted unsuccessfully to quit smoking during the period before they became daily smokers.

These data support a new view of the progression of smoking. One need not smoke daily to become addicted. Addiction can begin very early after the onset of intermittent smoking. Our ongoing research reveals that withdrawal symptoms are common among intermittent smokers, but can be held at bay by smoking a cigarette every few days. During the phase of intermittent smoking, the appearance of symptoms of addiction may prompt youths to attempt cessation.<sup>25)</sup> If smoking continues, tolerance develops to the effects of nicotine, and the frequency of smoking must be increased to avoid withdrawal symptoms. In the past, it was thought that daily smoking must

precede addiction; we now understand that addiction precedes daily smoking. Increasing consumption beyond one cigarette per day almost always follows the appearance of symptoms.<sup>25)</sup>

The early and rapid development of symptoms of addiction suggests that cessation counseling could profitably be targeted to smokers well before they smoke daily.

### How Can One Tell if a Youth is Addicted?

The concept of nicotine dependence is fraught with uncertainty. Clinical criteria for diagnosing dependence require a dichotomous classification.<sup>26,27)</sup> A smoker must meet a set of criteria, usually involving a certain number of symptoms in a specified time frame, to be declared “dependent.” If she or he does not meet the criteria, dependence cannot be diagnosed, even if the smoker experiences some of the symptoms of addiction. However, there is a growing consensus that dependence is in fact a continuum.<sup>28)</sup>

Attempting to characterize nicotine addiction more accurately at its onset, we proposed that autonomy over tobacco is a more useful concept than dependence.<sup>29)</sup> A smoker is fully autonomous if she or he can choose whether to smoke or can quit without effort. In contrast, a smoker whose symptoms present a barrier to quitting has lost some autonomy over tobacco. We believe that autonomy diminishes progressively. Individual youths may experience different symptoms, or symptoms may appear in different sequences, but more autonomy is lost as each symptom appears. We developed the Hooked on Nicotine Checklist (HONC) to screen smokers for

diminished autonomy over smoking.<sup>29)</sup>

Physicians can use the HONC to screen patients for tobacco addiction. It can be filled out by patients while they wait for the doctor or included in a diagnostic interview. As each of the ten HONC symptoms (Table 1) makes it more difficult to quit smoking, the presence of any symptom signals a loss of full autonomy and therefore the beginning of addiction. This allows the HONC to be used as a dichotomous measure, with a cut-point between full autonomy (no symptoms) and diminished autonomy (any symptoms). This is very useful for identifying the point at which addiction begins, or for determining the prevalence of diminished autonomy in a population. Summing the number of symptoms a smoker endorses indicates the severity of the person’s addiction, which is useful for determining the level of clinical intervention that may be necessary to help the person quit smoking. Table 1 presents the proportion of youths endorsing each HONC item. Proportions were derived from five samples totaling 801 adolescents between ages 13 and 20 in the United States and Canada.

The HONC performs better than the Modified Fagerström Tolerance Questionnaire, which has often been used with this age group.<sup>24)</sup> In particular, the HONC was a far better predictor of who would continue to smoke. In a prospective study of young Canadian adolescents the HONC was far more sensitive to symptoms of addiction than the ICD-10 criteria for diagnosing nicotine dependence.<sup>27)</sup> Large majorities of intermittent smokers and all youths who smoked at least weekly reported at least one HONC symptom. In contrast, very few intermittent smokers and only 66% of daily smokers met the

Table 1. Proportion of youths endorsing each item on the hooked on nicotine checklist.

	n	%*
1. Have you ever tried to quit, but couldn’t?	801	40.2
2. Do you smoke now because it is really hard to quit?	298	29.2
3. Have you ever felt like you were addicted to tobacco?	801	41.2
4. Do you ever have strong cravings to smoke?	801	62.3
5. Have you ever felt like you really needed a cigarette?	801	66.9
6. Is it hard to keep from smoking in places where you are not supposed to?	560	19.1
When you haven’t used tobacco for a while... OR When you tried to stop smoking...		
7. Did you find it hard to concentrate because you couldn’t smoke?	560	31.3
8. Did you feel more irritable because you couldn’t smoke?	560	34.0
9. Did you feel a strong need or urge to smoke?	801	45.3
10. Did you feel nervous, restless or anxious because you couldn’t smoke?	801	35.3

\*Median percentage based on five studies of youths between 14 and 20 years old. Subjects’ smoking experience ranged from simply inhaling on a cigarette to daily smoking.

ICD criteria.<sup>23)</sup> This indicates that youths who are already hooked on tobacco may often be missed when assessed with less sensitive measures than the HONC, and may therefore not receive the treatment they need.

### What Can be Done to Prevent or Treat Tobacco Addiction in Youths?

In the past, intermittent smokers were considered 'experimenters', but for many of these youths the experiment is over, they are already hooked. Indeed, many youths are addicted to tobacco before they even consider themselves to be smokers. This is because the loss of autonomy can start after the first few cigarettes. Although there are limited data, it appears that youths who attempt cessation earlier are more likely to be successful. One strategy is to prod youths into attempting cessation earlier by helping them to realize that the addiction process has already begun. In this context, the HONC has been well received by young smokers in classroom settings or in health fairs. As an educational tool it helps spark introspection and discussion. Although these anecdotal reports are encouraging, research is needed to determine if this approach is effective in encouraging or helping novice smokers to quit.

Because the HONC identifies the obstacles that stand between the patient and successful cessation, it can also be used as a preliminary step in smoking cessation programs. We recommend using a model of smoking cessation developed by the United States Public Health Service.<sup>30)</sup> Health care providers assist smokers in developing a personalized strategy for (1) coping with their withdrawal symptoms and other potential triggers for relapse, (2) avoiding situations that might prompt relapse, and (3) eliciting social support for abstinence. This approach is effective with smokers of all ages and at all levels of diminished autonomy, and can easily be applied during office visits<sup>31)</sup>, or in cessation programs offered by school nurses<sup>32)</sup>, peer counselors (L. Pbert, personal communication, February 9, 2005) or other trained personnel.

Pharmacological aids, such as nicotine replacement products or bupropion, might be offered to heavier smokers as adjuncts to counseling, although care must be taken in suggesting nicotine replacement. Nicotine patch and gum have proved safe and effective with adolescents who smoke at least 10 cigarettes per day.<sup>33)</sup> However, younger smokers may be hooked long before they develop significant tolerance to nicotine and before their rate of smoking is that high, so the amount of nicotine

in such medications may be toxic to them.

### Concluding Comments

Smoking and its direct consequence, tobacco addiction, are serious public health problems in Korea, as in the rest of the world. New research reveals that addiction to tobacco can begin very early, with very low levels of smoking. Family physicians are in a unique position to prevent smoking initiation by youths and to diagnose and treat tobacco addiction in young smokers.

### REFERENCES

1. World Health Organization. Smoking statistics: fact sheet. Regional Office for the Western Pacific, 2002. Available at [http://www.wpro.who.int/media\\_centre/fact\\_sheets/fs\\_20020528.htm](http://www.wpro.who.int/media_centre/fact_sheets/fs_20020528.htm). Accessed July 12, 2005.
2. Chen J, Millar WJ. Age of smoking initiation: implications for quitting. *Health Rep* 1998;9:39-46.
3. Pierce JP, Gilpin E. How long will today's new adolescent smoker be addicted to cigarettes? *Am J Public Health* 1996;86:253-6.
4. Conrad KM, Flay BR, Hill D. Why children start smoking cigarettes: predictors of onset. *Br J Addiction* 1992;87:1711-24.
5. Tyas SL, Pederson LL. Psychosocial factors related to adolescent smoking: a critical review of the literature. *Tob Control* 1998;7:409-20.
6. de Vries H, Engels R, Kremers S, Wetzels J, Mudde A. Parents' and friends' smoking status as predictors of smoking onset: findings from six European countries. *Health Educ Res* 2003;18:627-36.
7. Pierce JP, Choi WS, Gilpin EA, Farkas AJ, Merritt RK. Validation of susceptibility as a predictor of which adolescents take up smoking in the United States. *Health Psychol* 1996;15:355-61.
8. Biener L, Siegel M. The role of tobacco advertising and promotion in smoking initiation. National Cancer Institute Smoking Control Monograph # 14, 2001. Available at: [http://dcccps.nci.nih.gov/tcrb/monographs/14/m14\\_13.pdf](http://dcccps.nci.nih.gov/tcrb/monographs/14/m14_13.pdf). Accessed July 13, 2005.
9. Charlton A. Children's advertisement-awareness related to their views on smoking. *Health Educ J* 1986;45:75-8.
10. Cummings KM, Morley CP, Horan JK, Steger C, Leavell NR. Marketing to America's youth: evidence from corporate documents. *Tob Control* 2002;11(Suppl 1):15-17.
11. Pollay RW. Targeting tactics in selling smoke: youthful aspects of 20<sup>th</sup> century cigarette advertising. *J Marketing Theory Pract*

- 1995;3:1-22.
12. Dinh KT, Sarason IG, Peterson AV, Onstad LE. Children's perceptions of smokers and nonsmokers: a longitudinal study. *Health Psychol* 1995;14:32-40.
  13. Oei TP, Burton A. Attitudes toward smoking in 7- to 9-year-old children. *Int J Addict* 1990;25:43-52.
  14. Oei TP, Fae A, Silva P. Smoking behavior in nine year old children: a replication and extension study. *Adv Alcohol Subst Abus* 1990;8:85-96.
  15. Procellato L, Dugdill L, Springett J, Sanderson FH. Primary schoolchildren's perceptions of smoking: implications for health education. *Health Educ Res* 1999;14(1):71-83.
  16. Pierce JP, Choi WS, Gilpin EA, Farkas AJ, Berry CC. Tobacco industry promotion of cigarettes and adolescent smoking. *JAMA* 1998;279:511-5.
  17. Audrain-McGovern J, Rodriguez D, Tercyak KP, Cuevas J, Rodgers K, Patterson F. Identifying and characterizing adolescent smoking trajectories. *Cancer Epidemiol Biomarkers Prev* 2004;13:2023-34.
  18. Lovato C, Linn G, Stead LF, Best A. Impact of tobacco advertising and promotion on increasing adolescent smoking behaviors. *Cochrane Database Syst Rev* 2003;4:CDO034369.
  19. Leventhal H, Cleary PD. The smoking problem: a review of the research and theory in behavioral risk modification. *Psychol Bull* 1980;88:370-405.
  20. DiFranza JR, Savageau JA, Fletcher K, Ockene JK, Rigotti NA, McNeill AD, et al. Development of symptoms of tobacco dependence in youths: 30-month follow-up data from the DANDY study. *Tob Control* 2002;11:228-35.
  21. DiFranza JR. [Onset of symptoms of addiction.] Unpublished raw data from "The Transition of Nicotine Dependence," NIDA Grant # 5 RO1 DA14666-01, 2005.
  22. O'Loughlin J, DiFranza J, Tarasuk J, Meshefedjian G, McMillan-Davey E, Paradis G, et al. Assessment of nicotine dependence symptoms in adolescents: a comparison of five indicators. *Tob Control* 2002;11:354-60.
  23. O'Loughlin JO, DiFranza J, Tyndale RF, Meshefedjian G, McMillan-Davey E, Clarke PBS, et al. Nicotine-dependence symptoms are associated with smoking frequency in adolescents. *Am J Prev Med* 2003;25:219-25.
  24. Wellman RJ, DiFranza JR, Pbert L, Fletcher KE, Young MH, Flint A, et al. A comparison of the psychometric properties of the hooked on nicotine checklist and the modified fagerström tolerance questionnaire. *Addict Behav* 2005;28:[Epub ahead of Print].
  25. Wellman RJ, DiFranza JR, Savageau JA, Dussault GF. Short-term patterns of early smoking acquisition. *Tob Control* 2004;13:251-7.
  26. American Psychiatric Association. *Diagnostic and statistical manual of mental disorders*. 4th ed. Washington, DC: Author; 2000.
  27. World Health Organization. *International statistical classification of diseases and related health problems*. 10th ed. Geneva: Author; 1992.
  28. Strong DR, Kahler CW, Ramsey SE, Brown RA. Finding order in the DSM-IV nicotine dependence syndrome: a Rasch analysis. *Drug Alcohol Depend* 2003;72:151-62.
  29. DiFranza JR, Savageau JA, Fletcher K, Ockene JK, Rigotti NA, McNeill AD, et al. Measuring the loss of autonomy over nicotine use in adolescents: The development and assessment of nicotine dependence in youths (DANDY) study. *Arch Ped Adolesc Med* 2002;156(4):397-403.
  30. The Tobacco Use and Dependence Clinical Practice Guideline Panel, Staff, and Consortium Representatives. A clinical practice guideline for treating tobacco use and dependence. *JAMA* 2000;283(24):3244-54.
  31. Pbert L, Moolchan E, Muramoto M, Winickoff J, Curry S, Lando H, et al. The state of office-based interventions for youth tobacco use. *Pediatrics* 2003;111:e650-60.
  32. Pbert L, Gorak D, Osganian V. School nurse-delivered tobacco cessation intervention for adolescents. Paper presented at the annual meeting of the National Conference on Tobacco or Health: Surviving and Thriving in Difficult Financial Times, Boston, Massachusetts, December, 2003.
  33. Moolchan ET, Robinson ML, Ernst M, Cadet JL, Pickworth WB, Hershman SJ, et al. Safety and efficacy of the nicotine patch and gum for the treatment of adolescent tobacco addiction. *Pediatrics* 2005;115:e407-14.