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Addictive Drugs: The Cigarette Experience

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Cigarettes are among the most addictive substances of abuse and by far the most deadly. In this country smokers know it and try to stop. Their success has been dramatic but partial and excruciatingly slow, and until recently quite uncoerced by government. Cigarettes and nicotine have characteristics distinct among addictive drugs, and some of these help explain why efforts to quit smoking are so often frustrated. Nicotine itself is the most interesting chemical in the treatment of addiction and, in some forms, can pose a dilemma: compromise by settling for pure nicotine indefinitely, or stay with cigarettes and keep trying to quit. Nicotine is not alone among addictive drugs in becoming increasingly identified with the poorer classes.

HALF THE MEN WHO EVER SMOKED IN THIS COUNTRY have quit, and nearly half the women. At the end of World War II, three-quarters of young men smoked; the fraction is now less than a third and going down. Fifty million people have quit smoking, and another 50 million who would have become smokers since 1945 did not.

This dramatic abandonment of a life-threatening behavior was entirely voluntary. Until recently there was virtually no regulation of smoking by any level of government. The situation changed sharply in the late 1980s after dramatic changes in smoking behavior were well under way.

Surveys documented that the public was aware of the risks (*1*). Ninety percent or more answered yes to whether smoking caused cancer and heart disease. The facts were impressive. In 1982 the Surgeon General estimated 130,000 premature cancer deaths, in 1983 170,000 deaths from heart disease, and in 1984 50,000 deaths from lung disease (*2*). The total was later increased to more than 400,000.

Where do people learn about these dangers? Newspapers reported the annual reports of the surgeons general, but smoking was rarely news and inherently a dull subject. Only recently have city ordinances, airline restrictions, liability suits, advertising bans, and excise taxes made cigarettes occasional front-page news. Magazines rarely mention smoking; some of the most popular magazines report more than 25% of their advertising revenues from cigarettes.

The only emphatic repetitive communications about the hazards of smoking are the advertisements on billboards, and in magazines and newspapers. For two decades the central theme has been tar and nicotine. The message sent is that lighter cigarettes are safer but the message received must also be that smoking is dangerous. It is anybody's guess whether the cumulative impact is to entice people into smoking and to keep them smoking, or to drill home the deadly message about tar and nicotine.

No surgeon general has ever publicized the benefits of lower tar and nicotine, but the tar and nicotine have fallen by half. Smokers can infer that the government would not require labeling unless tar and nicotine made a difference.

Thirty years ago smoking was not much associated with social

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class. It is now. In 1980, a quarter of professional men smoked, a third of white collar men, and almost half of blue collar men (40% overall); for women the figures were similar (30% overall) (*3*). Among high school seniors in the 1980s, more than 20% of the noncollege bound smoked half a pack or more daily, but less than 10% of the college bound (*4*).

Which is more astounding, that some 50 million people have quit smoking or that nearly 50 million still smoke, most of them knowing that it is potentially fatal? Why don't they try to quit?

The answer is that they do. In 1980, two-fifths of all current smokers said they had made three or more serious attempts to quit. Among the youngest age group, more than half said they had made an attempt within the preceding 12 months. In fact, a third of the men of all ages and two-fifths of the women who smoked in 1980 said that they had attempted to quit within the preceding 12 months (*5*).

Quitting is evidently attractive and, even more evidently, hard. Is it that some can quit and already did and others cannot and never will? Probably not. In 1970, 1975, and 1980, former smokers, both women and men, had smoked as many cigarettes per day as current smokers (*6*). And while two-fifths of the men and women still smoking in 1980 had made three or more attempts to quit unsuccessfully, in 1975—the question was not asked in 1980—more than half the former smokers, men and women, claimed to have made three or more attempts before they succeeded (7).

Quitting was hard for those who succeeded and hard for those still trying. Why so hard? I shall turn to that shortly but first bring our history up to date. For those who hope to quit and desire reinforcement through restrictions on their smoking, the situation changed dramatically in the second half of the 1980s. The military services not only took cigarettes out of the field rations but banned smoking in most buildings and vehicles. The General Services Administration imposed controls on smoking in all federal buildings under its jurisdiction. Major cities were imposing tight restrictions on smoking in public places and the workplace. Smoking was eliminated on all domestic airline flights. Only 10 or 12% of the nation's largest corporations had restrictions on smoking in the early 1980s, mostly to avoid the risk of fire and contamination; more than half had restrictions by the late 1980s, and the increase was due to the publicized hazards to health as well as to complaints about the disagreeableness of environmental smoke (*8*).

The trend toward restriction was given a push by the Surgeon General's Report of 1986, which concluded that secondhand smoke could cause respiratory cancer and could aggravate respiratory difficulties in children. (That the estimate of deaths due to environmental smoke was two orders of magnitude smaller than deaths due to smoking did not weaken the impact of this new report.) Two committees of the National Academy of Sciences expressed concern about the effects on health of environmental tobacco smoke, and especially the contamination of air in passenger airlines.

It remains your choice whether to be more impressed, and heartened, by the massive change in smoking behavior in the United States over the past two or three decades or to be more impressed, and disheartened, by the massive recalcitrance of smoking among 45 million continuing smokers, most of whom have tried unsuccessfully to quit. Both phenomena are impressive. Can we expect the growing unpopularity of smoking to continue and, if so, can we foresee the end in this country of a dangerous and somewhat offensive behavior?

It is too soon to declare victory. Still, fewer are smoking in all occupations and social classes. It is not surprising that those with more favorable life prospects, like those who go to college, should be the most sensitive to information about behaviors that affect mortality late in life, whereas people lower in socioeconomic status with lower life expectancies follow a decade or two behind.

Some Pertinent Characteristics

Why is it so hard to quit? How does nicotine compare with other drugs?

Cigarettes are cheap; a pack a day costs less than half an hour's work at the federal minimum wage. Cigarettes are quickly available; smokers are rarely more than a few minutes from the nearest cigarette. Smoking requires no equipment other than a match. Cigarettes are portable and storable; a pack fits in a shirt pocket and requires no refrigeration. Being commercially available and brand named, cigarettes pose no problem of quality control. There is no fear of overdose; nicotine is a poison in large quantities, but a smoker feels the effects before any dangerous quantity can be inhaled.

Until the last few years, when regulations began to restrict smoking, the habit had an almost universal compatibility. People smoked anywhere, indoors and out, at work and at play, alone and with others, on the telephone, on horseback, with coffee or soft drinks or alcohol, at any time of day or night. There is almost no moment in a former smoker's life when a cigarette might not have been appropriate, and the former smoker's day is full of occasions and activities that would once have prompted a cigarette and still may prompt the thought of one.

Cigarettes produce no impairment of any faculty. There is no intoxication, no slurring of speech or loss of balance, no loss of visual acuity. Smoking is the only drug, with the possible exception of caffeine, that my airline pilot may indulge in without my being the least concerned.

Until smoking began to fall into disrepute in the last few years, there were hardly any social norms governing where or when or with whom it was appropriate to smoke. A person would not think of attending an afternoon conference with a bowl of hot soup or a pitcher of martinis—usually not even a sandwich or a candy bar—but smoking was never impolite. Perhaps the most powerful norm governing smoking behavior was that one offered a cigarette to a companion before lighting one's own.

Smoking is a socially facilitating activity. People who want to appear poised get support from the motions of extracting a cigarette, lighting it, exhaling the smoke, and holding the cigarette. This benefit is probably independent of the nicotine. Smoking is something that every smoker is good at.

The damage is slow in arriving. The people who suffer cancer and lung and heart disease from smoking have typically smoked for three decades or more before symptoms appear.

Addiction to Nicotine

Cigarettes are extremely addictive. Most users are addicted; few who have smoked regularly for a year or more find it easy to quit. Relapse rates may not measure the "strength" of an addiction, in the sense of pain, discomfort, and obsession upon withdrawal, but in the balance between desire to quit and desire to stay free, cigarettes are among the hardest to stay away from. Most studies indicate a success rate—at least two years' abstinence—at about one in five per attempt. (That half of all smokers in this country eventually made it is due to repeated attempts.) The Surgeon General devoted his entire annual report for 1988 to the behavioral and chemical criteria according to which nicotine is a highly addictive substance.

Inhaled nicotine in cigarette smoke provides an instant response—10 seconds or less to reach the brain—and a short high. Unlike any other addictive or psychoactive substance, cigarettes have a pleasurable effect that lasts no longer than the lighted cigarette. The recycle time is short, less than an hour on average. With the possible exception of benzedrine inhalers when they were

still on the market, there is no drug that has been taken with comparable frequency or in which the user is so practiced; a pack a day is 7,500 cigarettes per year, 75,000 inhaled puffs.

It is generally thought that nicotine is the main chemically addictive substance in cigarette smoke. The Surgeon General's Report treated nicotine exclusively as the addictive agent. There are two additional possible contributors to addiction. One is the taste of tobacco smoke. Without the nicotine one probably would not become addicted, but after smoking tens of thousands of cigarettes the association of nicotine with the flavor may give the flavor itself addictive qualities. The taste of cigarettes gives the addict something tangible to crave; if there were no tobacco it is not clear what a nicotine addict would crave other than relief from withdrawal symptoms.

The other possible dimension of addiction may be in mood control. A person may smoke at one time to calm down and at another time to perk up. (This homeostasis is almost unique to cigarettes; most drugs are stimulants or depressants but not both.) Once a person has smoked several thousand times to reduce tension or to stimulate alertness, lighting a cigarette may be an acquired habit that makes a person keep lighting up after saturation, when all the effect is gone. Many smokers smoke so much that they report getting little pleasure except on those occasions when, unable to smoke for an hour or two, they have gotten rid of the overdose.

From all I have read, users of most drugs, including prescription and over-the-counter drugs, have a good idea of the effect they are seeking, especially of drugs that produce a high or a rush or a "euphoria" of some kind. Most tobacco smokers cannot describe any attractive effect except what they might describe as the "taste" of tobacco smoke in their mouth and lungs and nasal passages. Being addicted to cigarettes is more like being addicted to chocolate than to the hard drugs, more like the flavor of a dinner wine than the perceived alcohol content. True, as mentioned, some rely on a cigarette to calm down; but what a deprived smoker is conscious of wanting is usually not the calming but the taste of the cigarette. I belabor this point because it is an important contrast between nicotine, which is always administered through tobacco smoke that is the object of craving, and drugs that need no such medium. (Possibly people who chew coca and betel leaves have a sense of appetite for the leaves, not just a desire for the medicinal effects.)

Some addictive substances require increasing doses to get a given effect as one cumulatively experiences the drug; most smokers within the first few years stabilize on a steady diet. A narrow range of daily dosage covers most smokers; the preponderance of smokers smoke between 1 dozen and 4 dozen cigarettes per day. There appears to be greater variance among users of coffee, alcohol, marijuana, the hard drugs, and the medicinal drugs.

There is, in contrast, great variability in the time it takes to get over withdrawal symptoms and especially the craving for cigarettes. For some the worst is over in 3 days, for others 3 weeks, for others 3 months, and for some 3 years. How much of that variability is physiological and how much due to environmental stimuli is hard to guess.

Few smokers attempt to reduce the amount they smoke. The two responses to the publicized hazards are trying to quit and switching to lower tar and nicotine.

There is experimental evidence that people who switch to low nicotine compensate by inhaling more deeply, holding the smoke longer in the lungs, smoking more cigarettes or more of each cigarette, and even holding the cigarette in a way that lets less ventilation into the cigarette (reducing the dilution of nicotine). They probably end up with less tar and nicotine than they used to get but nothing like proportionately less unless they smoke extremely low-nicotine cigarettes. (They may get more carbon monoxide.)

In the drug literature there is evidence that many people mature out of their habits. Other interests take over, use of the drug ceases to match a more mature lifestyle; marriage, job or parenthood becomes incompatible with continued use. Hardly anybody "matures out" of cigarettes. Smokers quit, but not through loss of interest; quitting requires determination.

A few medicinal substances have shown an apparent ability to suppress a craving for cigarettes for people undergoing withdrawal. But the interesting drug is nicotine itself. For about 4 years a chewing gum with the trade name Nicorette has been available by prescription. Nicotine is released through controlled chewing and absorbed through the mouth to maintain a steady level of nicotine in the blood. The instructions are to use it with a dosage that tapers off over 90 days. It is reported to reduce the withdrawal discomfort but to provide no pleasure; it reduces the craving for cigarettes but is not itself desired. The principle is like that of methadone, which reduces withdrawal discomfort for heroin addicts but provides little of the pleasure that heroin can provide. There are currently experiments with other less troublesome methods of self-administering nicotine during withdrawal. (Nicorette requires a lot of chewing, enough to fatigue the jaws.) Skin patches and subcutaneous implants are reported to be undergoing testing.

There have been a few reports on the efficacy of Nicorette: the permanent success rate may be as high as one-third or better; that would be about double the usual estimate of successful quitting. If the reports are true, the self-administration of pure nicotine on a tapering-off schedule is the first major advance in quitting technology to be successfully marketed.

Nicotine may not deserve all the credit. Nicorette is available only by prescription; every user is under the supervision of a physician, who may be an important support. And just having something to do at regular intervals through the day, every day, may keep the patient engaged in a constructive quitting regime. We should keep in mind that the users of Nicorette are self-selected, and limited to people who see a physician, either to seek help in quitting or in circumstances that make the subject of smoking pertinent to the visit.

An altogether different approach would be to deliver the nicotine in the quantity a smoker wants and in a form that offers the usual satisfaction but causes less damage. One proposal has been to develop tobacco that is high in nicotine but low in tar. This is not easy to do naturally; nicotine and tar are highly correlated in the tobacco leaf. One method would be to add nicotine to a low tar, low nicotine cigarette. As far as anybody outside the cigarette companies seems to know, that has not been done.

An extreme version has been tried. R. J. Reynolds (RJR) spent nearly $1 billion developing, and tested in three cities, an almost pure nicotine delivery device, a glass tube the size of a cigarette with ignited charcoal that heated the air drawn through it and vaporized nicotine in a controlled way. Some glycerine was added solely to produce "smoke," and a bit of tobacco was included. (Whether the tobacco was for flavor or to permit classifying the device as a "cigarette," and not as a nicotine delivery system, we do not know.) There was an effort to get the Federal Trade Commission to declare jurisdiction over this "nontobacco" device. Organizations concerned about smoking were unanimously opposed to its introduction. The device was withdrawn after a few months of testing; newspapers reported that it had not caught on with smokers. Maybe RJR will tinker with the flavor and try again. Presumably there would be little or no danger of respiratory or oral cancer, and most lung disease might be eliminated. Such a device might be a replacement for regular cigarettes or perhaps only a replacement where cigarette smoking is not allowed. (The Department of Transportation would have had to decide whether the use of that device in an airplane was "smoking.")

Whether the device should be welcomed or deplored is not obvious. It has been almost unanimously deplored, just as cigarettes low in tar and nicotine have been almost invariably disparaged by organizations concerned about smoking and health. If there are smokers who would like to quit but cannot, denying the pure nicotine condemns them to getting what they need only with carcinogenic tar and poison gases. The alleged objection is that the device gives smokers who might otherwise quit an excuse for inhaling pure nicotine instead.

Lessons and Observations

One heartening observation is simply that there can be massive changes of behavior in the direction of abstinence with a highly addictive substance. And they occurred in the absence, until very recently, of any even mildly coercive efforts by government or any other institutions in our society. Eventually changes in behavior on this scale are associated with changes in attitudes, expectations, and norms. When the efforts at abstinence are numerous enough to be unmistakably noticeable, they generate a social environment that is supportive of efforts to abstain. But the change was very, very slow.

A related observation is less heartening. A habit that was widespread among all socioeconomic groups, with only a gender differential that was on the way to disappearing, has become markedly identified with lower education and employment status. The motivation for quitting is probably strongest among people who are in a condition to appreciate longevity and are best positioned to receive and understand health messages from credible sources. Cigarettes are distinctive among addictive drugs in the extreme delay from use to symptoms. This convergence of use, over several decades of intense efforts to publicize the harm, on the least advantaged and least influential social classes may be proving typical of other drugs. The effects on the politics of prohibition could be substantial.

The information about the health effects of smoking came from a source that never lost its credibility. The Surgeon General's reports patiently brought together, year after year, biomedical and other evidence and presented conclusions that were never really challenged from any reputable quarter. And the one Surgeon General whose face became familiar had a style that inspired trust. In contrast, children had little reason to trust the information they used to be given about marijuana and other drugs. Of course, the Surgeon General had a message that did not need exaggeration.

A possible inference from the cigarette experience is that "society" can tolerate addiction to a chemical substance if the behavioral consequences hurt only the addicted consumers. The drugs policy literature reveals a widespread belief that addiction to any drug is morally offensive and socially degrading. Until recently few Americans were morally offended by the widespread smoking of cigarettes or thought it an index of social depravity. The only behavior that smokers engaged in that nonsmokers did not was smoking. The increasingly explicit mention of nicotine as an addictive substance, the increasing objection of nonsmokers to smoking in their presence, and the increasing identification of smoking with lower classes may succeed in making nicotine addiction per se objectionable.

Even among the youngest adults who smoke, both men and women have been persuaded to try to stop. Except for those lowest in socioeconomic status, motivating people to quit is no longer the problem. The problem is relapse. And there are two parts to coping with relapse.

One is to avoid relapse. Few people who quit just come to decide quitting is not worth the hardship and resume smoking. Most people who relapse had no intention, the day before relapse, of resuming smoking.

The second aspect of coping is recovering from the relapse. When somebody does break down and have a cigarette or two, it is usually not a brief interlude in a quitting program but a crash finish.

One reason why relapse is so common is the shortness of time between loss of resolve and having a cigarette in one's lips. Most smokers who have quit are rarely more than 5 minutes from the nearest cigarette, and it takes only the briefest loss of control to consummate the urge to smoke. If one had to wait until the next day to acquire cigarettes there might be plenty of intervening changes in the stimuli, and plenty of opportunity to get one's self under control; one could wake up the next morning relieved at having been rescued by the unavailability of cigarettes the night before.

Furthermore, as mentioned earlier, there is almost no moment in a former smoker's life when a cigarette might not have been appropriate, and the former smoker's day is full of occasions and activities that once would have prompted a cigarette and still may prompt the thought of one.

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