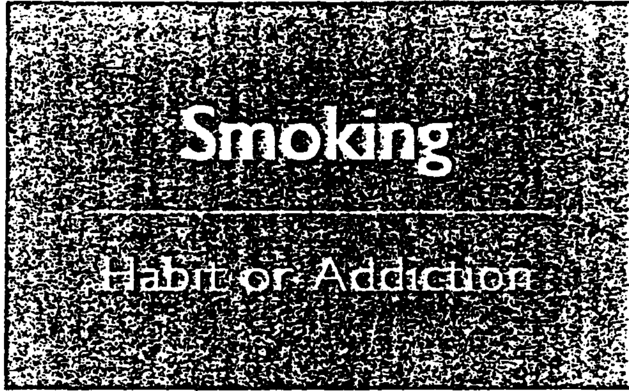

500056533

BATCo document for Province of British Columbia 28 October 1999

CONTENTS

1. **Cigarette Smoking – Habit or Addiction** *page 1*
   What is addiction?

2. **Cigarette smoking and general definitions of Addiction** *page 3*
   Physical dependence
   Psychological dependence
   Tolerance
   Relapse
   Craving
   Danger to the individual or to society
   Loss of self-control – compulsive use
   Conclusion

3. **Definitions of 'Tobacco dependence' or 'Nicotine addiction'** *page 6*
   The American Psychiatric Association
   The US Surgeon-General
   Psychoactive effects
   Drug-reinforced behaviour
   Stereotypic patterns of use
   The Royal Society of Canada
   Conclusion

4. **If Nicotine is not addictive, then why do people smoke?** *page 10*

5. **References** *page 10*

500056534

BATCo document for Province of British Columbia 28 October 1999

BATCO 00092218

Cigarette Smoking – Habit or Addiction

Over the past few years there have been a number of suggestions, culminating in the publication of the US Surgeon-General's Report entitled 'Nicotine Addiction' in (1988)[1], that cigarette smoking is addictive. The potential for addiction is presumed to be due to the presence of nicotine in cigarette smoke, because nicotine has been shown to act on the brain to produce minor psychological effects. This document considers the question of whether cigarette smoking can, on the basis of scientific evidence, be considered to be addictive, and proposes alternative reasons for why people smoke.

What is addiction?

A major problem with the subject of addiction is deciding what the word actually means. In everyday usage, the term 'addiction' is applied to many behaviours which people enjoy and therefore find it difficult to give up. For example, people claim to be addicted to certain foods such as chocolate, or to television soap operas, or to work. The Shorter Oxford Dictionary lists a number of activities that have been described as addictive, including work, business, study, sport, play, melancholy, wine, vice and prayer.

Besides the everyday use of the word 'addiction', it is important to know whether or not there is an accepted medical or scientific definition. A review of medical literature reveals many different definitions of addiction or 'dependence', a term now preferred by many scientific authorities. Two major types of medical definition exist. One type stresses the all-importance of 'physical dependence' to a drug, which would be shown by the presence of a 'withdrawal syndrome' (severe physical and psychological stress) when the drug is no longer available or used. The second type of definition concentrates primarily on the notion of 'compulsive use', implying loss of control over use of the substance.

There has been considerable disagreement between scientists and medical bodies in developing a satisfactory definition of addiction, and in agreeing which of the two above processes is the more important feature of the problem. Some definitions of addiction stress the importance of more sociologically-based criteria e g deterioration of individual and social functioning as a result of use of the substance. Some definitions of addiction state that physical dependence is crucial; others do not. Some involve tolerance and the need to increase the dose of the subject in question, and some do not. Some specify compulsive use and uncontrollable craving, and some do not. The meaning of addiction and dependence is confusing not only in everyday usage, but also to scientists. Examples of some of the more recent definitions of addiction and dependence by medical authorities are given below:

World Health Organisation (1969)[2]: Drug dependence is "A state, psychic and sometimes also physical, resulting from the interaction between a living organism and a drug, characterised by behavioural and other responses that always include a compulsion to take the drug on a continuous or periodic basis in order to experience its psychic effects, and sometimes to avoid the discomfort of its absence. Tolerance may or may not be present".

500056535

BATCo document for Province of British Columbia 28 October 1999

BATCO 00092219

National Institute on Drug Abuse (1979)[1]: "An addicting substance is one that has (l) pharmacological properties leading to compulsive use; (2) a capability of producing organ and/or behavioural toxicity; (3) a use pattern associated with adverse social consequences".

Although each individual medical definition of addiction can be criticised for lack of completeness or failure to take into account all possible factors, a number of key concepts emerge when they are considered all together. These include:

- physical dependence psychological dependence
- tolerance
- relapse
- craving
- danger to individual danger to society / adverse social consequences
- loss of self-control / compulsive use

500056536

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BATCO 00092220

Cigarette smoking and general definitions of addiction

The question of whether cigarette smoking can be classified along with drugs that have for many years been believed to be addictive can be approached by considering whether or not smoking fits into the criteria listed above that are normally used in general medical definitions of addiction.

The following section considers what these terms actually mean, and whether they can be said to apply to cigarette smoking.

Physical dependence

Physical dependence occurs when the body has become so accustomed to a substance that it adapts itself to the drug's presence. As a result of this adaptation, when the substance is no longer available, or when an attempt is made to discontinue use, the body reacts adversely, and a 'withdrawal syndrome' is observed. The existence of physical dependence can only be inferred by the presence of a measurable withdrawal syndrome.

Shiffman (1979)[4] concluded that "...the presence of an abstinence [withdrawal] syndrome is crucial to the definition of drug dependence". However, the existence or not of a tobacco withdrawal syndrome is still a matter of controversy. There is still a conflict amongst those scientists who believe that the symptoms occasionally observed in smokers who give up are a result of a withdrawal syndrome because the body is dependent on nicotine for its normal functioning, and those who believe that they are merely symptoms of frustration encountered by people who have given up something that they enjoy.

Symptoms observed when people give up smoking differ widely from one individual to another, and many people have no significant symptoms at all. Whatever the degree of symptomatology that is experienced, it is minor compared to that experienced by people who use 'hard' drugs such as heroin and cocaine. A smoker who has given up may typically experience subjective changes in physical or psychological functions eg changes in mood, arousal and appetite, inability to concentrate, irritability and anxiety. In extreme cases, headache and constipation may occur.

Psychological dependence

Psychological dependence is an extremely difficult factor to quantify, because it is inevitably based on dependence a subjective assessment of their state by the individuals concerned. The problems inherent in the use of this term reflect the problems discussed above with the meaning of the word 'addiction'. In theory, people can be 'psychologically dependent' on anything that they enjoy doing that would make them unhappy if they stopped. Scientifically, the only available measure of *potential* to cause psychological dependence is to rate the substance in question for its ability to produce euphoria in those individuals who use it. Warburton (1988)[5] has argued that nicotine is not scored highly on euphoria/liking scales.

500056537

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BATCO 00092221

Tolerance

The concept of 'tolerance' is based on the idea that, as the use of a given substance continues, the individual might need to take progressively higher doses of it to maintain the same level of effect that he obtained when he first started to use it. This is because the body adapts itself to the frequent presence of a drug; this adaptation is called 'tolerance'.

Evidence that tolerance occurs in cigarette smokers to the presence of nicotine is lacking. The only evidence that exists is for tolerance to the effects of nicotine on the body that some people experience when they first begin to smoke eg nausea, headache, palpitation. These effects rapidly disappear. However, no scientific studies have yet been published that suggest that tolerance might develop to the reported psychological effects of nicotine ie its ability to reduce stress and improve performance.

Relapse

Relapse in smokers who have tried to give up is also a matter of some controversy. Some authors have written that relapse rates for cigarette smokers are the same as those for heroin addicts. However, with cigarette smoking, millions of people worldwide have given up successfully and without the professional help usually required by heroin addicts. In fact, Jaffe and Jarvik (1978) commented: "While we may continue to wonder what drives the ex-opiate addict to relapse, given the multiple motives for smoking that have been postulated and the number of cigarettes that a heavy smoker may have consumed over a 10-year period, we may find it remarkable that relapse is not universal". Once they have given up, some people do indeed begin smoking again. However, this does not necessarily mean that they are 'addicted'. It may mean that, for them, the perceived benefits of smoking are great enough that they prefer to continue to smoke. People frequently give up certain behaviours or habits, only to begin again.

Craving

'Craving' is a rather tenuous concept that no scientist has been able to define satisfactorily, because it does not apply solely to drugs, and certainly not solely to 'addictive' drugs. People can 'crave' for anything that they enjoy doing, once they are deprived of it or are not able to do it at a particular time. Are all such behaviours 'addictive'? The World Health Organisation (1957) noted that "... a term such as 'craving' with its everyday connotations should not be used in the scientific literature to describe (certain kinds of alcoholic drinking behaviour) if confusion is to be avoided". Kozlowski and Wilkinson (1987) point out that tobacco researchers and alcohol researchers may be talking about different phenomena when they use the word 'craving'. They suggest that, with tobacco, the effect is a mild one in which 'craving' is equivalent to missing or thinking about smoking, compared with severe physical withdrawal symptoms in the case of alcohol.

500056538

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BATCO 00092222

Danger to the individual or to society

Whether or not cigarette smoking causes certain diseases has still to be established, and further scientific and medical research is required. However, even if it should be established that it constitutes a health risk, humans frequently indulge in behaviour that may involve potentially harmful consequences, e g flying, driving. The fact of participating in an activity that has a risk associated with it does not mean that one is addicted to it. In spite of regular warnings by health officials that certain behaviour (e g eating certain types of food) may entail harmful consequences, these behaviours are continued. In many definitions of addiction the concept of harmful consequences has also been used to refer to adverse social consequences. Heroin use can lead to serious consequences for society e g theft, prostitution and spread of disease, but it cannot be claimed that tobacco use has led to such consequences. The American Psychiatric Association (1987)* commented about tobacco smoking: "...there is no impairment in social or occupational functioning as an immediate and direct consequence of its use".

Loss of self-control – compulsive use

Loss of control over intake of a substance is widely held to be a major component of addictive behaviour. It is widely observed in alcoholics in particular, for whom one drink invariably leads to more, to the point of intoxication. It is less conceivable that this applies to smokers. The concept of 'compulsion' also hardly seems to apply to smoking. Many smokers have patterns of smoking behaviour by which they smoke at work but not at home, and vice versa. Many smokers refrain for relatively long periods, for practical or religious reasons, with no apparent difficulty[10].

Conclusion

In summary, the evidence that tobacco smoking is able to fit into classical definitions of 'addiction' is unconvincing. For any given criterion it is not possible to show that tobacco smoking fits or can be satisfactorily likened to the effects of 'hard' drugs such as heroin or cocaine. However, noting that it was extremely difficult for tobacco smoking to be classified as 'addictive' by these methods, some authorities e g the American Psychiatric Association and the US Surgeon-General have constructed definitions of addiction that are specifically designed to classify smoking as addictive. Nevertheless, even in these cases the evidence remains unconvincing. This will be discussed in the next section.

500056539

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BATCO 00092223

Definitions of 'Tobacco Dependence' or 'Nicotine addiction'

The American Psychiatric Association

The APA[11], in the 1980 edition of its 'Diagnostic and Statistical Manual of Mental Disorders' (usually referred to as DSM III) produced a set of criteria specifically defined to detect 'tobacco dependence'. The revised version of this manual, DSM III-R, published in 1987, substitutes the term 'nicotine dependence'. This definition stresses the importance of withdrawal as a characteristic of dependence, although notes: "In any given case it is difficult to distinguish a withdrawal effect from the emergence of psychological traits that were suppressed, controlled, or altered by the effects of nicotine or from a behavioural reaction (e g frustration) to the loss of a reinforcer". It is generally agreed that this is not a particularly helpful definition: it begins by assuming a priori that nicotine is addictive (the definition provides no criteria to decide either way) and simply provides a set of criteria for recognising a set of symptoms which may or may not represent withdrawal.

The US Surgeon-General

The US Surgeon-General, in 1981[1], published a report entitled 'Nicotine Addiction'. The Surgeon-General also noted that nicotine or tobacco smoking did not fit readily into standard definitions of addiction. His response was different from that of the APA, who produced a narrower definition of tobacco dependence alone. Instead, the Surgeon-General broadened the definition of addiction so widely that it could now include smoking or use of nicotine (as well as virtually any other behaviour that people regularly indulge in).

The Surgeon-General's criteria for addiction fall into two categories: primary criteria and additional criteria:

Primary criteria
- Highly controlled or compulsive use
- Psychoactive effects
- Drug-reinforced behaviour

Additional criteria
Addictive behaviour often involves:
- stereotypic patterns of use
- use despite harmful effects
- relapse following abstinence
- recurrent drug cravings

Dependence-producing drugs often produce
- tolerance
- physical dependence
- pleasant (euphoriant) effects

500056540

BATCo document for Province of British Columbia 28 October 1999

BATCO 00092224

The Surgeon-General's criteria for addiction are open to exactly the same criticisms as previous definitions of addiction, and there is no justification for considering it as definitive. More importantly, this definition of addiction differs in various important ways from previous definitions:

(i) the Surgeon-General relegated certain key criteria of previous definitions of addiction (tolerance, physical dependence and euphoria, or 'psychological dependence') to the bottom of his list, as occasional, but unnecessary correlates of addiction.

(ii) these previously important criteria now take second place to some new, and rather vague, criteria e g 'psychoactive effects' and 'drug-reinforced behaviour'.

Most of the Surgeon General's criteria, and the reasons why they do not easily apply to tobacco smoking, have been discussed in the previous section. However, the new criteria are discussed below.

Psychoactive effects

This criterion is a new one for definitions of addiction, or in the field of substance use in general. It is also a trivial one, and to consider it as a primary criterion is highly questionable. 'Psychoactivity' means that the substance in question can alter mood by its effects on the brain. Many substances have effects on mood, but this does not make them addictive. Different substances can have very different psychological effects. Minor tranquillisers such as valium or barbiturates depress mood by sedating the person who uses them. Substances such as amphetamine lead to stimulatory effects on mood and general activity. Heroin and cocaine, whilst inducing euphoriant effects, impair performance and judgement. Nicotine, in contrast, is not usually reported to induce euphoria, improves performance and concentration, and has been reported to induce either stimulatory or depressant effects on mood depending on the person's circumstances. Anti-depressant drugs alter mood to improve a state of depression, and yet there has never been a suggestion that they are addictive. Similarly, major tranquillisers are used to improve mood and other psychological processes in illnesses such as schizophrenia, but are not believed to be addictive. It is clearly invalid to use, as a major component of a definition of addiction, a concept that applies to the many different effects of many different kinds of drug, some of which are clearly not addictive.

Drug-reinforced behaviour

This criterion is included on the basis of studies carried out in laboratory animals. Studies show that animals such as laboratory rats can be trained to produce a certain behaviour (e g pressing a lever in a box) by giving them a reward. The reward is said to 'reinforce' the behaviour, and thus another word for 'reward' in this situation is 'reinforcer'. Some evidence suggests that nicotine can act as a reward in such situations. Some scientists have argued by analogy that nicotine is therefore like heroin and cocaine, which can also 'reinforce' behaviour in this way, and that therefore it is, like heroin and cocaine, addictive. However, many different things can act as rewards for laboratory rats, who cannot by any stretch of the imagination be considered to lead exciting lives. Novel food or drink,

500056541

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BATCO 00092225

chocolate, access to a female for the deprived male rat... all of these things will induce a rat to press a lever in a box. 'Addiction' is *not* a necessary corollary.

Also, early studies in this field suggest that rats will only press a lever to obtain nicotine under certain conditions: if they can predict when the nicotine is going to arrive, and if they do not have to work very hard for it. In contrast, rats will press a lever hundreds or even thousands of times, under virtually any circumstances, to obtain a dose of heroin. It is therefore quite invalid to state, on the basis of such results, that nicotine is like heroin. It is in fact far more like food, chocolate chips, or sex.

Stereotypic patterns of use

This means that a behaviour may develop into regular temporal and physical patterns of use. The implication is that use becomes less flexible, less an activity with social meaning, and something done primarily for its own sake. This may apply to heroin, but it does not apply to cigarette smoking, which for many people is an activity in response to certain social situations, or to the end of a meal, or the arrival of a cup of coffee. Heroin use may be primarily under the control of withdrawal symptoms, but cigarette smoking is more frequently under the control of the particular situation in which a smoker finds himself.

In addition, many other human activities develop into regular patterns. Eating is one of them. Is eating also addictive because, like heroin use, it is usually carried out in response to physical symptoms (ie hunger)? Again, this criterion is so broad as to be ineffective.

The Royal Society of Canada

In 1989 the Health Protection Branch of Health and Welfare Canada requested the Royal Society to prepare a report entitled 'Tobacco, Nicotine and Addiction'[12]. The question put to the Royal Society was: "which is the most appropriate term ('addiction', 'dependence', or 'habit formation') to characterise the risk of dependence on nicotine and, by extension, the use of tobacco products?". Beginning with a priori assumption that nicotine *does* have the capability of inducing dependence, this report comes to the following conclusion: "The term dependence, as recommended by the World Health Organisation, is potentially ambiguous unless further specified by the use of modifying terms that limit its general applicability to drugs of different pharmacological classes. The terms habit, habit formation, and habituation are even more ambiguous, vaguely defined and scientifically ill-founded in relation to drug use, and should no longer be used in this context". It is then concluded that the term 'addiction' is more appropriate: however, along with every other group that have considered this issue, the Royal Society finds it necessary to produce yet another definition of addiction: 'Drug' addiction is a strongly established pattern of behaviour characterised by (1) the repeated self-administration of a drug in amounts which reliably produce reinforcing psychoactive effects and (2) great difficulty in achieving voluntary long-term cessation of such use, even when the user is strongly motivated to stop". What the Royal Society do not take into account is the fact that the term 'addiction' is equally ambiguous, because of its everyday usage and it is completely arbitrary to decide to define this term more rigorously and not one of the others.

500056542

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BATCO 00092226

Conclusion

There have been two responses to the realisation that nicotine or tobacco smoking does not fit very comfortably into standard definitions of addiction. One, the response of the American Psychiatric Association, is to assume a priori that nicotine is addictive, and to concentrate simply on producing a list of 'diagnostic criteria' that can help to recognise certain characteristic 'symptoms' of giving up cigarettes.

The second type of response is typified by the report of the US Surgeon-General in 1988. As has been discussed above, this report broadened the definition of addiction so far that it has become meaningless. Trivial activities fall into the various criteria just as well as does heroin use, and one is therefore left with the choice of accepting virtually all daily activities as addictive, or of rejecting the definition as inappropriate and invalid.

Warburton (1989)[11] took the latter approach. He notes: "The Surgeon-General's Report concludes that nicotine is addictive on the basis of 10 criteria. These criteria do not fit nicotine use very well, except in a superficial sense... Of course, nicotine use *can* be called an 'addiction'; someone, like the Surgeon-General, just has to say that it is... However, the most important measure for a scientific claim is experimental verification, not political pronouncements, however masterful".

500056543

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BATCO 00092227

If nicotine is not addictive, then why do people smoke?

Many scientists have suggested reasons for why people smoke. Their theories range from suggestions that people are genetically predisposed to smoke, to proposals that certain personality characteristics predispose a person to smoke. However, the most widely accepted idea is that smoking provides certain psychological benefits for the smoker. It is presumed that this is due to the presence of nicotine in tobacco smoke.

Professor David Warburton and his colleagues at Reading University in the UK have carried out a number of studies which suggest that nicotine, or cigarette smoking, can improve attention and vigilance processes and thus enable people to function more effectively in tests of performance. Warburton has theorised that smoking is an activity that has the function of controlling arousal, ie the smoker smokes to increase arousal when bored or fatigued, and to reduce arousal when bored or tense. He concludes that people smoke not because they are addicted to nicotine, but because of the beneficial effects of smoking: "The beneficial effects from the functions that smoking serves for the individual.... the functional model sees smoking as an important resource.... thus, smoking is a purposeful activity for smokers; it provides them with a resource for managing their lives". (Warburton, 1989).

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