Established oesophageal carcinogen in adenocarcinogen, regardless of route of butanone (NNK), and N-nitrosonornicotin subamines: analytic study

Variation within global cigarette brands in tar, nicotine, and certain nitrosamines: analytic study

Letters intended for publication should be a maximum of 500 words, 10 references, and one table or figure, and should be sent to the editor at the address given on the inside front cover. Those responding to articles or correspondence published in the journal should be received within six weeks of publication.

Letters to the Editor—While the content of food, pharmaceutical products, drugs, and many other consumer goods are tightly regulated by governments, tobacco products, surprisingly, are not.

Tar and nicotine yields of cigarettes have progressively, but not universally, appeared on cigarette packets and advertising since 1967. These figures have been used to justify terms such as “light” and “mild” in descriptive evidence. In 1981 a US public health report concluded: “the preponderance of scientific evidence strongly suggests that the lower the ‘tar’ and nicotine content of the cigarette, the less harmful would be the effect.”

Some early reports concluded, plausibly, that a decrease in lung cancer mortality could be ascribed to smoking reduced tar cigarettes, although more recent data suggest that there is little if any difference in the long term outcome of smoking “low tar” as against “regular” cigarettes. Further there has been an increase in adenocarcinoma relative to squamous carcinoma, more pronounced in women than men, and this may be caused by the increases in tobacco specific nitrosamines and certain nitro-substances, and to nicotine.

We decided to test three global brands (Camel, Lucky Strike, and Marlboro) for consistency of tar and nicotine yields and for two tobacco specific nitrosamines, 4- (methyl nitrosamino) - 1- (3-pyridyl) - 1- butanone (NNK), and N-nitrosornicorcinic (NNN). The former is a powerful lung adenocarcinogen, regardless of route of administration, and the latter is an established oesophageal carcinogen in animals. The methods used have been described by Hoffmann and others.

The cigarettes were purchased in 29 countries by volunteers (the International Cigarette Variation Group), who purchased the premium example available, which were, in most cases, filtered. No “light”, “mild”, “menthol” or other variants were purchased. Forty cigarettes of each brand were analysed at the Institute of Carcinogenesis in Moscow. Not all brands were available in each country and it is not known whether those purchased were locally produced, imported or smuggled, or how long they had been stored before sale. This is not a representative sample—the cigarettes were acquired as they would be by the person in the street. Our aim was to investigate international variation.

The results of the tar and nicotine testing were unremarkable. Generally they conformed to the packet statement (where present). Tar yield ranged from 10.6 mg/cig to 15.7 mg/cig for Camel, 11.8 mg/cig to 20.4 mg/cig for Lucky Strike, and 8.4 mg/cig to 15.9 mg/cig for Marlboro. Nicotine yield ranged from 0.85 mg/cig to 1.3 mg/cig for Camel and Lucky Strike, and 0.68 mg/cig to 1.25 mg/cig for Marlboro.

Differences in nicotine yields were substantial. There is a threefold difference between the lowest and highest yields of NNK for Camel, a fivefold difference for Lucky Strike, and ninefold for Marlboro (fig 1). NNK and NNN yields are highly correlated (correlation 0.88, 95% confidence interval 0.83 to 0.93), so only NNK is shown in the figure.

We have shown that a three- to ninefold variation in carcinogen dose can be given to the smoker, without any warning, in products that are trademarked and globally advertised. In 1998 some of us proposed the setting of upper limits on such carcinogens by establishing the market median as an initial upper limit. Clearly lower nicotine cigarettes can be, and are, produced, and there is no excuse for the wide, within brand, variations described here.

We see these results as a compelling and urgent argument for government regulation and changes in the histopathology of lung cancer. J Natl Cancer Inst 1997; 89:422–6.


Carbon monoxide in the expired air of smokers who smoke so-called “light” brands of cigarettes

EDITOR,—Tobacco smoke is an important source of carbon monoxide (CO). Smokers with expired CO values of 11–21 parts per million (ppm) are defined as mild smokers, whereas those with expired CO values of more than 21 ppm are defined as heavy smokers. We report on the expired CO readings of smokers who smoke “light” brands compared to those who smoke regular brands. The approach chosen was designed to reflect real smoking habits, and was not laboratory based. Many health agencies measure tar and CO values using smoking machines under standardised laboratory conditions. However, cigarettes are not smoked by machines, and smokers may titrate their nicotine intake by varying their smoke inhalation and cigarette consumption. Here we show that there is no difference in CO concentrations in the expired air of smokers who smoke “light” brands versus smokers who smoke regular brands.

The study assessed 178 smokers (83 males, 95 females; mean age 49.05 years), whose cigarette consumption was diagnosed according to the Vienna Standard Protocol. (CO includes the measurement of CO in expired air). The sample consisted of first visit clients attending publicised information meetings held by the Nicotine Institute, Vienna during a three week sampling period. The smokers were divided into two groups: those who smoked a brand of cigarette with the word “light” indicated on the packaging (n = 63), and those who smoked a brand that did not carry this marking (n = 115). This information was gained by asking smokers whether they smoked “light” cigarettes, and by checking their cigarette packs. There was no difference in sex distribution between the two groups. Tobacco dependence was measured by the Fagerström test for nicotine dependence (FTND). The two groups (“light” and regular smokers) did not differ in this respect. Expired CO measurements were obtained with the Bedfont EC-50-Micro Carbon Monoxide Monitor. The smokers were not informed of the test before the measurement, which was performed at 5 pm. None of the smokers refused this measurement, and none were excluded from the analysis. None of them had changed their cigarette brand during the previous three months.

Analysis of the data focused on the relation between the “light” claim and the expired CO measurement, intentionally not taking into account the (relatively unreliable) information on cigarette consumption reported by the smokers. Reported cigarette consumption is not very reliable compared to objective measurements of CO concentrations, because these concentrations depend on the puff rate and inhalation habits of the individual. No significant difference (p > 0.55) was found in the distribution of CO readings of the “light” cigarette smokers compared to regular cigarette smokers (fig 1). The mean CO value achieved by the regular cigarette smokers was 27.85 ppm (SD 12.34, SE 1.15), and the mean value of the “light” cigarette smokers was 29.63 ppm (SD 10.90, SE 1.37). These results support the findings of other studies that questioned the possible advantage of cigarette brands claiming to be “light”.

The method used in this study was very much related to the situation in real life, where consumers might be attracted by “light” cigarettes because they assume these will reduce their health risk. Other variables may affect the present results, but it is likely that further studies will confirm the present assumption that tobacco consumers are misled by the information on the packages. If expired CO values are indicative of the intake of harmful substances, this might indicate some limitations in the CO haemoglobin saturation curve. (From the machine measurement of these values there is a correlation between tar and expired CO—letter from laboratory government chemist, London). Different cigarette brands may also differ in the labelling of cigarette brands, but as the smokers in this study were all exposed to the same information about cigarettes (in Austria), these findings are at least reliable for this market. These results support the suggestion that smokers titrate their nicotine intake by varying their inhalation habits.

ERNEST GROMAN
DORIS BLAUNSTEINER
URSULA KUNZE
RUDOLF SCHÖBERBERGER
Institute of Social Medicine, University of Vienna, Alserstr. 21/12, 1080 Vienna, Austria

Correspondence to: Dr Groman nicotineneveriste@teleweb.at

8 Kozlowski L. Smokers are unaware of the filter vents now on most cigarettes: results of a national survey. Tobacco Control 1996;5:265–70.

Figure 1 Distribution of carbon monoxide (CO) readings of “light” cigarette smokers and regular cigarette smokers.
cannot compete at the insider game with the cigarette manufacturers, which do both to an almost unparalleled extent. But, “[t]he agencies . . . enjoy high name recognition and credibility with the public. By contrast, the tobacco industry has very low public credibility.” The disparity in public standing means that outside strategies are likely to be the public health community’s best means to achieve good tobacco policy, because the skills and resources of the voluntary health agencies tend to be amplified in public arenas while those of the tobacco industry are muted. But outsider strategies require a commitment of resources to a continuous public information effort. Equally important, they require a willingness to anger powerful politicians and interest groups by publicizing their misdeeds.”

Glantz and Balbach understate the importance and necessity of effectively playing the inside game. Effective legislative advocacy helps assure that public opinion is translated into effective, not cosmetic, policy. And they may overestimate the depth and durability of the public’s goodwill once health agencies begin to use it. But the point is well taken. Their halo of disinterested concern for public health is the best weapon voluntary agencies have in fighting the tobacco industry, and its judicious use, combined with effective lobbying, is the surest path to success.

The recent infusion of tobacco settlement money into the US states has changed the political dynamics of tobacco control advocacy. Voluntary agencies, which only recently engaged in an aggressive stance towards Big Tobacco, are now learning that they must confront both the industry’s allies in public office and other interests, some of them quite worthy, competing for the funds. The California experience is sure to be repeated, and careful attention to the history recounted in Tobacco war will help others avoid some of the mistakes made there.

A most depressing element of the California story is the role played by organised medicine. The California Medical Association (CMA) paid lip service to the 1988 Proposition effort while working behind the scenes to undermine it because the CMA wanted to sell its accident insurance to the tobacco industry, with which it had made common cause in weakening medical and product liability laws. When the Proposition was defeated, the CMA enthusiastically embarked on a years-long effort to shift money from the tobacco control programme into medical care accounts (and, incidentally, doctor’s pockets).

One hopes that most physicians would not endorse this kind of political deal making at the expense of public health. But the people they hire through their associations to represent them, committed to playing the inside game, may well sell the tobacco control over pocketbook issues until the membership tells them to do otherwise. Providers concerned about tobacco control need to do more to hold their professional organisations accountable for tobacco control advocacy.

Despite Glantz’s involvement in many of the events described, Tobacco war is a largely evocative and reflective account of the major issues confronted by California’s tobacco control movement, particularly during the 1990s. In writing Tobacco war, the authors drew on interviews with many of the players (from the CMA and the other side), contemporaneous memoranda and news reports, and internal company documents uncovered through state lawsuits against the cigarette manufacturers. These last help elucidate the industry’s strategy and its analysis of the health advocates’ activities.

This reader would have appreciated a brief description of the research methodology, particularly the interview procedures. Not every-one’s viewpoint is adequately represented, and there are occasions when the actions of tobacco control advocates are questioned by the authors or by other participants, without any response from the accused. This is jarring in view of how much of the text consists of verbatim quotes from participants.

But, all in all, this is an important book for the tobacco control movement. It is an interesting, at times compelling, narrative, containing many object lessons that anyone engaged in tobacco control policy advocacy will benefit from.

RUSSELL SCIANDRA

Center for a Tobacco Free New York, 1450 Western Avenue, Suite 303, Albany, New York 12203 USA,

sciandra@email.msn.com

Political history of smoking and health


The British Civil Service documents everything, and eventually makes its papers available to researchers. David Pollock has used some of the papers provided in the Public Records Office at Kew in London to tell the story of how action on smoking was delayed between 1951 and 1964, coincidentally a period of Conservative government. Little did we know at the time how true the 1964 Labour election slogan “Thirteen Wasted Years” would prove to be.

Pollock’s story is limited, for as he points out he has essentially included only one of the various sets of documents available, and his book is less a “political history” than an illustrated journey through official documents. But it is highly illuminating and provides much splendid material to demonstrate the caution of civil servants, the short sightedness of politicians, and—as ever—the iniquities of the tobacco industry.

The story has plenty of gems but few stars. In 1947, when “a large scale statistical study” on smoking and lung cancer was under consideration, Austin Bradford Hill recommended “. . . a very good worker to whom it is well worth giving a wide experience in medical statistical work with an eye to the future . . .”; a judgement about Richard Doll with which none would now argue. A few researchers such as Doll, Hill, Wynder, and Doll recognized the importance of tobacco. A desperately limited number of medical administrators and civil servants (especially in Scotland) sought early action. Horace Joules, a distinguished chest physician, led the early medical campaigners, but his views were often discounted because of his perceived “left wing bias”. Among the bureaucrats, Sir George Godber characteristically became involved long before he was entitled to do so, and pressed every available lever from behind the scenes. Charles Fletcher and Robert Platt set the first Royal College of Physicians report in train. But heroes such as these are few and far between.

Even some of the heroes were naive: they did little lobbying, and made the mistake of thinking they were in a winner’s hon-
with the tobacco industry, but also with its many active and passive allies in government.

MIKE DAUBE
Cancer Foundation of Western Australia, 334 Roeby Road, Subiaco, WA 6008, Australia
mdaube@highway1.com.au

The horrors of smoking


I have never read a book by Stephen King. But I couldn’t resist buying Blood and smoke, available only as an audiobook and read engagingly by King himself. It comes in a flip top box containing a pack of Marlboros and a audiocassette tape, depending on the version you buy. The “book” is actually a series of three short stories, which, according to the packaging, take the listener “inside the world of yearning and paranoia, isolation and addiction...the world of the smoker.” “The new politically incorrect habit plays a key role in the fates of three different men in three unabridged stories of unfettered suspence.”

In Lunch at the Gotham Cafe, Steve Davis is distraught after his wife leaves him. Two days later he quits smoking, after a 20 year history of smoking 20–40 cigarettes a day. For the next two weeks he suffers intense withdrawal from nicotine and his wife, until he meets her divorce lawyer for lunch at a Manhattan restaurant. While arguing at the table, they are attacked suddenly by a psychotic, knife-wielding maître d’. Davis fights him off bravely, saving his own life and that of his ungrateful wife. Afterwards he buys a pack of Marlboros and lights one up, but then discards the rest of the pack. In a brief exchange, Fletcher and the vendor agree that smoking is a “very bad habit” and that “we’re lucky to be alive”.

Each of these stories is creative, suspenseful, and well narrated. Character development is quite strong. As one reviewer on amazon.com commented, “this is bloody good stuff.” My main interest in the stories, though, was in their portrayal of smoking. And King’s treatment of the subject is unmistakably pro-health. Listeners are left with the clear message that smoking is harmful and addictive. A particularly compelling example is this excerpt from Lunch at the Gotham Cafe:

“There are two phases of withdrawal from tobacco, and I’m convinced that it’s the second that causes most cases of recidivism. The physical withdrawal lasts 10 days to two weeks, and then most of the symptoms—sweats, headaches, cold hands, lacking eyes, insomnia, irritability—disappear. “What follows is a much longer period of mental withdrawal. These symptoms might include mild to moderate depression, mourning, some degree of anhedonia (loss of flatness, in other words), forgetfulness, even a species of transient dyslexia. . . . The most common symptom of phase two withdrawal is a feeling of mild unreality. Nicotine improves synaptic transmission and improves concentration—widens the brain’s information highway, in other words. It’s not a big boost and not really necessary to successful thinking, although most confirmed cigarette junkies believe differently. But when you talk it away, you’re left with a feeling—a pervasive feeling in my case—that the world has taken on a decidedly dreamy cast.”

Why has King focused on the evils of tobacco in Blood and smoke? The most likely reason is the trauma he suffered when he was hit by a Dodge van in June 1999, while walking alongside a country road in his hometown of Bangor, Maine. He was hospitalised for three weeks, underwent at least six operations to repair broken bones in his right leg and hip, and suffered broken ribs, a punctured lung, and a laceration of the scalp. He told the Bangor Daily News in August that he hadn’t had a cigarette since the night before the crash. “I took the Dodge van cure,” he quipped (www.bangornews.com/cgi-bin/article.cfm?storynumber=10392).

Two months later King told the Associated Press: “to be able to walk and talk and occasionally crawl on my belly like a reptile has made me intensely grateful to be alive.” No doubt he recognises that smoking is incompatible with the joy of being alive. Now, with his message about tobacco in Blood and smoke, King aims to preach that gift of life to millions of others.

RONALD M DAVIS
Center for Health Promotion and Disease Prevention, Henry Ford Health System, One Ford Place, 5C, Detroit, Michigan 48202-3450, USA
rdavis1@hfhs.org

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