

## **Tobacco Industry Manipulation of Epidemiological Studies Regarding Damage of Environmental Smoke**

According to inforesearchlab (2009), a research center, each year around half a million Americans die of tobacco related diseases, fifty thousand of them die from secondhand smoke. It is alleged that tobacco consumption has a negative effect on people's cardiovascular system and it increases stress levels, to say nothing of the fact that smoking causes a bad smell. With virtually unlimited resources (or at least being perceived as such), it is both easy and common to portray tobacco companies as a type of Disney villain, guilty of world destruction and scheming how to make everybody miserable. Thus, tobacco companies have been accused on countless occasions of denying that nicotine is addictive, of hiding the fact that smoking can be harmful, of abnegating the link between smoking and cancer (despite evidence to the contrary). What is perhaps even more serious than their simple denial of knowing everything about the deleterious effects of tobacco-smoking, or defending the free-choice argument simply because it is profitable at the given time, is the fact that the tobacco industry has reduced public trust in medical and scientific studies. Indeed, many scientific research papers devoted to the connections between smoking and various ailments that have been commissioned or funded by the tobacco industry are notorious for their failure to keep up with decent scientific standards and rigor. This leads to an ambivalent perception of the case by many people, while there is no rationale for it. This paper will focus on the tactics used by the tobacco industry to deny the link between deterioration of health and environmental smoking. In particular, it will address the question of how epidemiological studies were discredited whilst 'alternative' studies were buttressed. Finally, this paper will contextualize those findings and overview the possible venues for possible changes in the near future.

Smoking is now one of the major causes of deaths in many countries all over the globe. Moreover, recent studies (as well as some older ones), have found that not only first-hand smoke is linked to various health problems, such as lung cancer, heart disease etc. Indeed, some health problems are also caused by environmental or secondhand smoke which has been shown to have a negative impact on, for example, the health of smokers' children (who obviously do not smoke themselves).

The World Health Organization has been trying to publicize this knowledge for a long time now. According to this organization, at the turn of the century, smoking was the main cause of over four million deaths annually all over the globe. If the rates of increased smoking in developing countries continue at their current trend, smoking will be responsible for a total of over ten million deaths annually. However, as it is said in an article by Capdevila (2001, p.1) for the Inter Press Service, the efforts of the World Health Organization have been countered, to a large extent effectively, by the tobacco industry. These efforts on behalf of the smoking industry have been largely responsible for the lack of new legislation which would improve citizens' health by reducing the access to tobacco products.

Epidemiological studies about the possible connections between smoking and health problems have been around at least since the 1970s. Although public health awareness is now much greater than at the beginning of the research, the process has been surprisingly slow. Indeed, there used to be many campaigns funded by the tobacco industry denying the negative effects of smoking and secondhand smoke on personal health. This is largely due to the fact that the tobacco industry has long waged campaigns whose aim was to diminish various studies which had been conducted to prove the harm of smoking. The change was largely spurred by the rising number of court cases brought by former smokers who had developed health problems, notably lung cancer, and who accused the tobacco companies of

hiding the information about the link between smoking and those health problems. However, the tobacco industries continue to play an important role in trying to question the veracity and reliability of current studies.

The tobacco industry has also attempted to discredit the institutions that are in charge of researching the area. In a report for the WHO, Zeltner, Kessler, Martiny & Randerer (1999) found that the tobacco industry had staged events to divert the attention from public health issues, attempted to reduce budgets for the scientific and policy activities, tried to provoke conflicts between the various agencies that were responsible for studying the situation and discrediting the institutions involved, notably the WHO.

One of the problems with epidemiological studies, not only with these which are linked to tobacco consumption but also of more general issues, is their reliance on statistical methods. And, as everybody knows, “there are lies, big lies, and there are statistics”. Statistical studies, virtually by definition and by epistemic nature, are prone to methodological problems. Indeed, statistics are used primarily in cases of incomplete knowledge, particularly about the population. They can infer information about the population with a certain degree of certainty, but rarely with 100%. The tobacco industry has organized numerous symposiums during which “independent scientists” challenged methods and research which would prove that cigarette smoke had negative effects on people's health. Indeed, in a study by Diethelm and McKee (2006, p. 10-18), the authors demonstrated that the habit of creating such symposiums could be traced back to 1972. Such symposiums, financed by the tobacco industry continued for the following decades. Moreover, scientists who presented the most solid and groundbreaking cases against the tobacco industry were the ones who would find their methods to be challenged the most severely.

One of the first major statistical problems of epidemiological studies used to determine the effects of smoke on a person's health stems from the use of multivariate

regression, which is quite problematic, as shown by Cerrito (2009, pp.1-18). The trick with regression analysis is that it cannot show causal relationships, but it is nevertheless used to demonstrate them. In fact, regression analysis can only indicate covariance between two or more variables, but never causality, as shown in Armitage, Berry and Matthews ( p. 645-8). However, in case of epidemiological studies (and medical studies more generally), it is safe to assume that the causality goes in one way (one of the first causal problems of regression analysis being that one does not know if one variable influences that second, or if it is the other way around, or both influence each other, or if a third influences both), but it is never certain. This is easy to use in discrediting the analysis by rival studies.

The second problem results from the choice of variables, in particular, control variables. There is no way to know that the variables which are used in regression are in fact the ones that explain the response variable's variation, even if they appear to do so (although there are ways to verify this and increase certainty). One challenge to such a method is to claim that the control variables are inappropriate because they capture variance that is due to more important variables, but they themselves are not the reason behind the variance. The second problem concerns the fact that the tobacco industry can produce (and did produce) alternative studies which recoded or altered the variables in a seemingly legitimate way (once again there are no absolute truths) but also in a way that led to the results becoming insignificant.

Another method involves discrediting the data on which the studies are based. This can be done in virtually as many ways as a statistician can imagine (while perhaps not being the epitome of creativity, statisticians can have quite a few rabbits up their sleeves). First and foremost, one can challenge the assumptions of regression analysis. This would include the normal distribution of the response variable, whether there is autocorrelation between variables, whether the errors are random (if this is not the case, this might mean that an

important variable has been left out, in this case the whole study must be redone), whether the variables are reliable and valid (if they really measure what they are supposed to measure, and what kind of errors they have) etc... If these are perfectly accounted for (which is almost impossible), tobacco companies can challenge sampling issues. They can ask if the samples are representatives of the population. Is the sampling method the most appropriate for this kind of study? Do they have any bias incorporated into them? Is the sample size sufficiently large? Is the inference of the information entirely reliable? Whilst being technical, these details are extremely important to the given study. Moreover, almost none of the questions can be simply answered “yes” or “no”. This strategy was notably used to discredit the influential study by Takeshi Kirayama, which found that wives of smoking men in Japan were more prone to lung cancer than those that married non-smokers. Hong and Bero (2002 p. 1415), identify that challenging Hirayama's sample was the major element of the tobacco companies' strategy to discredit his research.

Thus the main problem of epidemiological studies is that they are both an easy prey for the tobacco industry and the only meaningful way to prove any links between smoking and health problems, as shown by Ping (2009). One cannot seriously consider a medical study that would be based on a qualitative assessment of the problem. Thus, medical researchers are forced to use statistics, and statistics are based on a rule of thumb and judgment calls. While the distribution of a variable may seem to be sufficiently normal for one researcher (and indeed, for 80% of researchers), it is still legitimate to say that the lack of normality (because nature rarely is a perfect match for mathematical models) may cause some problems. One researcher will say that non-random errors in the sample should not significantly influence the results of the analysis, but another one will say that they may still influence the results to a certain degree, and both would be right (in most cases). However, for people who do not have the time or will to indulge in technical and often obscure

methodological debates about the validity of one analysis rather than another, will simply remember: “well there seems to be an effect, but it is not 100% certain, and the results are inconclusive.” Consequently, the tobacco industry has had the perfect weapon against even the most rigorous epidemiological studies conducted. Considering how easily discrediting such reports are, it is perhaps more surprising that the tobacco companies spent so much money on it, rather than the fact that they did try to manipulate the public opinion with non-objective studies.

The record of the tobacco companies is far from being clean when it comes to the level of conducting objective empirical studies to demonstrate the effects of smoking (and environmental smoking) on personal health. Which is more aggravating is that they tend to promote cigarettes in a manner that would be appealing to adolescents; as a result, their image becomes even further tarnished. Somewhat ironically this goal of tobacco companies has also been proven by empirical studies such as the one conducted by Pierce *et al* (1998, p. 515). However, arguably the most important, and the most negative, effect of the numerous denial campaigns waged by the tobacco companies is the proliferation of such discrediting tactics and their acceptance by the general populace.

Manipulation of public opinion with the use of research of dubious origins and simultaneous discredit of rival research is not something that is new. Recently, a similar strategy has been employed by the National League of Cities that wanted to discredit the findings of a study commissioned by the International Association of Fire Fighters and the International Association of Fire Chiefs (2009, p.2). In this case a study commissioned by the fire fighter associations proved that the smoke inhaled by fire fighters, in their line of work, led to increased cancers and pulmonary problems. A rival study was then created by the National league of cities to discredit the fire fighters' study, questioning the data, the methodology and the possibility of establishing a casual relationship as a result of the

analysis (a *modus operandi* virtually identical to that used by the tobacco industry).

Thus, the main problem that arises from the tobacco industry's tactics is the general disregard for scientific studies (or at least increased disregard) by the general public, as well as the use of rival studies discrediting the objective research. While challenging the existing truths is something good in the scientific community, and has led to much progress, the system of constantly improving knowledge breaks down when it faces non-rigorous, biased and economically or politically motivated research. This results in lack of faith towards the methods, and perhaps more importantly the methodology. The tobacco companies have poisoned the lives of people on more levels than one would perceive at first glance.

Source:

Armitage P Berry G & Matthews JNS. Statistical Methods in Medical Research. Wiley Blackwell 2002. pp. 645-8

Diethelm Pascal & McKee Martin. „Lifting the Smokescreen: Tobacco Industry Strategy to Defeat Free Policies and Legislation”. European Respiratory Society & Institut National du Cancer Report. 2006 p.

Capdevila Guido. WHO Denounce Interference by Tobacco Industry. WHO Report 2001 November 27 2009 <<http://www.corpwatch.org/article.php?id=192>>

Cerrito Patricia B. The Problem of Regression Assumptions and the Use of Predictive Modelling. SAS Global Forum. November 27 2009 <[support.sas.com/resources/papers/proceedings09/106-2009.pdf](http://support.sas.com/resources/papers/proceedings09/106-2009.pdf)>

Hong Mi-Kyung & Bero Lisa. How the Tobacco Industry Resonded to an Influential Study of the Health Effects of Second Hand Smoke. British Medical Journal Vol. 325 p.1415. 1998

InfoResearchLab. How many people die each year because of smoking?. Novermber 27 2009 <<http://www.inforesearchlab.com/smokingdeaths.shtml>>

International Association of Fire Fighters & International Association of Fire Chiefs. Using Tobacco Industry-style Tactics, the National League of Cities Ignores Science... and Turns its Back on Fire Fighters. Press Release 2009, p.2

Pierce John P, Choi Won S, Gilpin Elizabeth A, Farkas Arthur J & Charles Berry C. Tobacco Industry Promotion of Cigarettes and Adolensent Smoking. The Journal of the American Medical Association, 279, No. 7. pp. 515 1998. November 27 2009 <<http://jama.ama-assn.org/cgi/content/full/279/7/511>>

Ping Ho Lai. Application of Statistical Methods to Problems in Epidemiological Studies.

November 27 2009

World Health Organization. WHO Inquiry. WHO Report November 27 2009

[http://www.who.int/tobacco/policy/who\\_inquiry/en/print.html](http://www.who.int/tobacco/policy/who_inquiry/en/print.html)