

WHAT IS TOBACCO AND WHAT MAKES TOBACCO HARMFUL?

A custom loathsome to the eye, hateful to the nose, harmful to the brain, dangerous to the lung, and in the black, stinking fume thereof nearest resembling the horrible Stygian smoke of the pit that is bottomless.

—King James VI

There is nothing quite like tobacco: it's the passion of decent folk, and whoever lives without tobacco doesn't deserve to live.

—Moliere

- Tobacco use is a serious public health problem
- Tobacco is big business
- We are doing far too little to understand 'tobacco' and what to do about it
- A market place filled with disinformation
- Summary and Conclusion

Tobacco is as defined by the American Heritage Dictionary (4th Addition 2000):

1. Any of the various plants of the genus *Nicotiana*, especially *N.tobacum.*, native to tropical America and widely cultivated for their leaves, which are used primarily for smoking. 2. The leaves of these plants, dried and processed chiefly for use in cigarettes, cigars, or snuff or for smoking in pipes.

Tobacco Use is a Serious Public Health Problem

In the US, the use of tobacco is accountable for more than 400,000 premature deaths, and costs the nation well over \$ 100 billion dollars in medical care costs and lost productivity. The majority of these deaths and disabilities are caused predominantly by cigarette smoking. Tobacco remains the nation's single most preventable cause of death. Tobacco use is

associated with a number of different types of cancers, with cardiovascular disease and stroke, with chronic obstructive lung disease and emphysema, with premature births and a host of other health problems. Millions of people are dependent on and addicted to tobacco.

A recent report issued at the World Conference on Tobacco and Health in July 2006, noted:

Tobacco, the only consumer product proven to kill more than half of its regular users, is responsible for about 5 million deaths worldwide every year...today the burden is roughly evenly divided between industrialized and developing nations. However if current trends continue through 2005, tobacco will kill 10 million people worldwide each and every year and 7 million of these deaths will be in the developing world, in nations least prepared to deal with the financial, social, and political consequences of this global public health tragedy.

If we fail to act to prevent this tragedy, the consequences will most certainly be dire. Tobacco will eventually kill about 650 million smokers alive today, about 10% of current total world population.

In the last century alone, tobacco killed 100 million smokers. If left unchecked, tobacco will kill more than 1 billion people in this century.

This extraordinary suffering and death is not inevitable, however. Without intervention, the tobacco pandemic will be the worst case of avoidable loss of life in recorded history. Yet, with comprehensive, concerted action, we can eliminate the global scourge of tobacco and save hundreds of millions of lives in the next few decades.

(A Message from John Seffrin PhD, CEO, American Cancer Society, Foreword to The Tobacco Atlas, Second Edition, July 2006, J. Mackay. M. Erikson, O.Shafey www.cancer.org/international)

The shocking statistics should be of concern not just to the medical and public health community, but to consumers, producers, manufacturers, policy makers and the public alike. Without dispensing with current policies and strategies that work, we need to consider new strategies that can meet the needs of the over one billion smokers worldwide.

Tobacco is Big Business

The production, manufacturing, and marketing of tobacco and tobacco products remains a multibillion dollar industry with tobacco being produced in over 100 countries and sold and manufactured in almost every nation (conservative estimates put the tobacco economy at close to \$ 400 billion dollars a year). Tens of thousands of people are dependent on the production, processing, manufacture, sale, distribution and marketing of tobacco and tobacco products.

As the Tobacco Atlas further notes:

Globally, tobacco production has almost doubled since the 1960's, totaling nearly 6.5 million metric tons in 2004. In developing countries, increasing demand and favorable policies have resulted in a threefold increase in production, while production has declined by more than 50% in developed countries. If this trend continues as projected in 2010, more than 85 percent of the worlds tobacco will be grown in developing countries.

Tobacco agriculture causes widespread environmental and public health problems. Pesticide and fertilizer runoff from fields and massive deforestation associated with tobacco curing damage the environment. Workers suffer pesticide poisoning, green Tobacco sickness (an occupational hazard unique to tobacco), and lung damage from exposure to tobacco and field dust.

Although tobacco farming is very profitable for multinational corporations, many small farmers are caught in a debt trap perpetuated by the tobacco companies. (p.48)

Every year, more than 5 trillion cigarettes are manufactured worldwide. China is bay far the largest cigarette manufacturer followed by the USA.

The economic value of tobacco products amounts to hundreds of billions of dollars per year. Very little goes to farmers for growing tobacco leaf. More is spent on paper, filters, and packaging than on tobacco. In the USA, the manufacturing sectors share of the tobacco dollar has almost tripled since 1970.

The tobacco industry has taken advantage of countries with inexpensive labour and a more friendly business environment to open new factories in Eastern Europe for example. Technological advances both in farming and manufacturing are reducing the demand for manpower, this has a far greater impact on jobs than tobacco control efforts.

Aside from using less tobacco per cigarette, the composition of the cigarette is also changing. Manufacturers are increasingly using low-quality reconstituted tobacco because adding chemical additives is easier and making cigarettes from previously discarded parts, leaf stems and tobacco dust increases profit margins. (P. 50)

The different types of tobacco grown in the US and the world are almost as diverse as are the products that are on the market. Tobacco is grown, harvested, processed, cured, manufactured and used in many different ways. Yet, there is no uniform system either in the US or elsewhere that tracks tobacco production or tests the tobacco for quality and safety assurance. Nor are there uniform and sufficient standardized testing methods for tobacco products or the necessary regulatory structures in place to effectively oversee their manufacture and marketing, although it is hopeful that there will be significant changes as the Framework Convention for Tobacco Control continues to be implemented by the ratifying countries, now well over 100.

We are doing far too little to really understand the effects on tobacco use and what to do about it as an agricultural commodity and as a manufactured product

A recent paper published in the journal **Nicotine and Tobacco Research** concluded that:

With the growing introduction of PREPs, it is imperative that research and action be undertaken now to ensure that the public will be protected and to avoid a potential public health disaster. But more important, to have a significant impact on public health, all tobacco products should be regulated and undergo comprehensive evaluation. (Nicotine and Tobacco Research, Volume 7, Number 6, December 2005, " Methods to assess potential reduced risk products," page 841).

This also raises important questions about the use of techno-

logical advances in the production of tobacco such as technologies to significantly reduce the levels of tobacco smoke toxicity or the cancer causing agents polycyclic aromatic hydrocarbons (PAHs), tobacco specific nitrosamines (TSNAs), as well as monitoring the use of pesticides and other chemicals applied to the tobacco both in the US and overseas. It also raises questions about the use of additives and flavorings in tobacco as well as other chemicals that may further increase the risks associated with tobacco use. And it also raises questions about the use of genetically modified tobacco which has the potential for removing toxins, reducing the use of pesticides, etc. but at the same time might present certain added risks. While all tobacco has inherent risks, it is the form of tobacco, what is done to the tobacco and how it is used that can determine a wide spectrum of the level of risk.

While the tobacco companies are in some ways incredibly sophisticated in their efforts to manufacture, and market their products, tobacco as a whole remains in the 'dark ages'.

The tobacco industry is in some ways where the food and pharmaceutical industries were in the early 1900's when there were no regulations and oversight of those industries and which were made up of manufacturers and salesmen often selling dangerous foods and 'snake oil' medicines. Science and technology, coupled with regulation (creation of what would become the FDA) were seen as a way to, on the one hand, protect the public while, at the same time encourage and allow for innovation, science and commerce. Today we find the tobacco industry existing and surviving under what can only be described as a 19th century system, the result being that what we don't know about tobacco and tobacco products can and does hurt us. I have often said in my presentations and several white papers that we need to bring tobacco into the 21st century. I highly recommend that those in industry, the public health community, the scientific community, the agriculture community, policy makers and the media consider reading Philip Hilts' book on the history of the FDA, Protecting America's Health: The FDA, Business, and One Hundred Years of Regulation, Alfred A. Knopf Publishing, New York, 2003. Some of the parallels are striking.

For decades many in the public health community have taken the approach that the use of all tobacco and all forms of tobacco are equally harmful. This approach is comparable to saying that all automobiles in the market place are equally dangerous (or safe), or that all drugs products in the market place carry equal risks and are equally effective. This however, is not the case. One reason for

making such broad statements is that we may not know where the lines are drawn between products because there are no obligations for the industry to provide the information that is so urgently needed. Another part of the underlying reason for taking that approach may be to counterbalance the tobacco industry's historical efforts to deny consumers truthful information while aggressively and irresponsibly marketing their products in a nonexistent regulatory structure with no standards. For years the industry denied that their products caused harm and were addictive even while their own scientists were confirming such dangers – one of the major reasons why the federal government and others have sued the tobacco industry.

There needs to be a broader and more extensive educational effort to break down barriers and misperceptions about what tobacco is and what it is not, and to deal with the facts. There needs to be greater transparency among stakeholders, as well as participation and involvement of experts outside the tobacco environment (which has become potentially too confined and restricted). Broadening the discussions will not only force positive commercial changes in the tobacco industry itself but more importantly benefit public health goals.

We are finally beginning to see some public understanding and recognition that not all tobacco products are equally harmful. As noted in a Special Communication in Tobacco Control :

The epidemiology tells us that tobacco products delivering nicotine vary considerably in harmfulness. Within each category there is a (sometimes wide) variation of dose and manner of use, but the extreme ends of the spectrum differ in harmfulness by orders of magnitude. (Towards a comprehensive long term nicotine policy, Tobacco Control 2005;14:161-165.)

An article in **The New Zealand Medical Journal** offered some interesting observations and challenges everyone to think 'outside the box' about what we are trying to do and how we might get there.

The authors wrote:

Inhaling tobacco smoke is a remarkable and exquisitely refined mechanism, for delivering nicotine to the central nervous system. Remarkable for its acute safety

and chronic catastrophe, and unique because it is tobacco not nicotine that causes the damage. Failure to make this crucial distinction is a tragedy.

Perversely the very success of tobacco control has left remaining smokers and most of the world's developing countries in the unfettered embrace of a demonized tobacco industry. The outrage from public health at the tobacco industry's intransigence and tactics has clouded the entirely separate issue of tobacco and nicotine, rendering the idea of developing recreational or long term replacement nicotine a heresy.

(The New Zealand Medical Journal, "Time for major roadworks on the tobacco road?", Vol.117 No 1190)

When it comes to implementing policy reforms and changes amongst the various stakeholders, little to no substantive engagement or discussions have taken place about what tobacco is, the reasons why it is harmful, what can and should be done about it, and how to better communicate accurate information to the public. While many studies have dealt with what causes tobacco related disease, much of it goes unrecognized by the health advocates except as ammunition for the perpetuating of an ongoing war with the tobacco industry. On the industry's side, there has been little to no flow of information and transparency in the industry research endeavors and marketing strategies. Their approach has been and for the most part remains to deny, suppress, and mislead the public. While the 'war' must continue on numerous levels the time has also come to begin to look seriously at other issues related to scientific research, tobacco's production, manufacturing and marketing.

Today there is a great deal of legitimate scientific research being conducted on tobacco that may hold promises for not only reducing risks associated with the use of tobacco products but also developing new products (pharmaceuticals, industrial enzymes) that may one day save lives. Transgenic tobacco (GMO tobacco) has been described by some as the 'white rat' of the plant world. Unless one wants to take a prohibitionist view (and there are clearly those who do) on tobacco, it is far more appropriate to talk about what it is about tobacco that causes harm and what can be done about it other than to make broad over-reaching statements that all tobacco is equally harmful. Such 'oversimplification', while useful as

a public relations tool, now may in fact be a disservice to the public health goals of reducing disease and death caused by tobacco use- especially in an environment where products will continue to be modified and changed.

Mark Parascandola, an epidemiologist with the Tobacco Control Research Branch of the National Cancer Institute has noted that:

Despite the overwhelming amount of scientific knowledge available today about the harmful effect of tobacco products on human health, the need to expand scientific research efforts to understand specific characteristics of tobacco products and their effects is more urgent than ever.

(Science, Industry, and Tobacco Harm Reduction: A Case Study of Tobacco Industry Scientists' Involvement in the National Cancer Institute's Smoking and Health Program, 1964-1980, Public Health Reports, May/June 2005, Vol. 20, p.338)

In a recognized need and effort to better understand the differing risks associated with the use of tobacco, the World Health Organization (WHO) observed:

There is no single product testing model that is perfectly adaptable to tobacco product testing, although experience in testing foods and drugs of tobacco product emissions have provided the basis for the observations and protocols ... For example, foods are generally labeled on the basis of ingredient content, while drugs are labeled on the basis of either content or estimated systemic delivery. In the case of non-combusted tobacco products, content provides an important starting point, but consideration must also be given to the components emitted from the product under the conditions in which it is actually used. In the case of combusted tobacco products the complexity of assessment is escalated dramatically because the hundreds of constituents in the unburned product can result in more than 4,000 products in the emitted smoke, and many of these newly created products are among the most deadly emissions. The generation of these products involves a complex chemical process that is influenced by factors ranging from the products ingredients and design to the way in which the product is physically smoked. Finally, the products themselves are rapidly

evolving, as indicated above, and this rapid change means that a testing protocol that is well suited to one product may be inadequate for a modified or novel product.

(WHO Study Group on Tobacco Product Regulation Guiding Principles for the Development of Tobacco Product Research and Testing Capacity and Proposed Protocols for the Initiation of Tobacco Product Testing, page 6.)

The health consequences of using tobacco (or breathing in cigarette smoke) thus depends on a spectrum of interrelated conditions which include:

- Whether the tobacco is combusted or noncombusted
- The type of tobacco (including whether the tobacco is reconstituted)
- The manner in which the tobacco is grown, harvested, cured and processed
- What pesticides (and combination of other chemicals) may have been used on the tobacco
- What additives and chemicals are used in the tobacco product (including quantities, how such additives may interact with one another in a raw or burned state)
- The manner in which the tobacco product is manufactured
- The frequency and manner of use
- Family history and pre-existing conditions

While all of the above items play some role in the risks and relative risks of using tobacco, currently, one of the most significant and visible of the above variables is whether the product is combusted or non-combusted. When tobacco is combusted, it produces 4,000 chemical constituents-many of which have been identified as carcinogenic. Others, such as gases like carbon monoxide, are associated with cardiovascular disease and stroke. It may well be that science coupled with fair and effective oversight will soon allow for a far better understanding of the risks and relative risks for combustible products as well as noncombustible products.

A market place filled with disinformation

The tobacco industry, and in particular the larger companies who have controlled the market place, have been guilty of failing to disclose critical information about the tobacco used in the products they manufacture and market. They have denied

that their products caused harm, or were addictive, all the while developing marketing strategies designed to give consumers the false belief that there were 'safer' cigarettes. They pointed to so-called scientific studies designed to undercut the findings and conclusions of the Surgeon General and scientists in the public health community. They have spent billions of dollars over the years on marketing campaigns that provided little to no verifiable health information or health benefit to the consumer. They have done this in spite of 'arguing' that they are trying to serve their customers interests in providing products and information that the tobacco consumer wants.

In recent years, many health advocates have taken on similar tactics, advocating that the withholding of truthful and accurate information from the public and users of tobacco, or the exaggeration of information, is 'for their own good'. These positions are in many ways inconsistent with long held positions which have demanded full disclosure from the tobacco industry, as well as full disclosure in the labeling and marketing of tobacco products.

Today we are confronted with a market place in which a consumer has little to no substantive information about the tobacco and the tobacco product upon which to truly understand the dangers, risks and relative risks associated with various products. Verifiable substantive information about products is what is going to be required in an environment where we will see an increasing number of harm reduction products entering the market place. Currently, there is no level playing field. Warnings are outdated. Useful, truthful information about the products and the relative risks of products is suppressed or withheld, or distorted. We don't know where the tobacco comes from, what's been done to it or what if any tests may or may not have been done. We are in some ways, truly in a 19th Century 'snake oil' environment.

In both the case of the tobacco industry and to some extent the public health community, science has often been manipulated, and misused to achieve self-serving goals. While the public health goals obviously represent the higher good, two wrongs don't make a right. Taking the position that providing selective, exaggerated, or even false information can be justified sets a dangerous precedent and gives science a black eye. In the end, such an approach may dampen the respect and reliance that the public has come to expect from the well established public health organizations, government officials, and the scientific community. Yet,

as long as the industry continues to shirk its responsibility, and as long as we do not have a regulatory agency (or other avenues) that can ensure that the information flow is truthful, it may be that for the public health community, the 'end will continue to justify the means'.

The results of the disinformation campaigns conducted by a spectrum of interests have had effects on the public and the consumer of tobacco products. Below are just a few of the many examples where the withholding of information or the misuse of information can and has had negative public health impacts. It seems almost inconceivable to me that after more than 25 Surgeon General's Reports we would find ourselves in such a state.

- Several studies over the last several years have clearly demonstrated that so-called lower yield (low tar and nicotine cigarettes) are not safer than other cigarettes on the market and that the industry has deliberately withheld information about their use and dangers. See for example, an editorial in the **Journal of the National Cancer Institute** (Vol. 92, No2, January 19, 2000), [It's time for a Change: Cigarette Smokers Deserve Meaningful Information About their Cigarettes.](#)
- A number of studies and surveys have shown that there is a misperception in the public that it is the nicotine in the tobacco product that is the agent that causes disease and in particular cancer.
- Many cigarettes are marketed as being an American blend, or 'made in America' when in fact a large proportion of the tobacco may come from overseas markets. One large US tobacco company that produces only US cigarettes has been suspected of using a very low proportion of US tobacco in its so-called American cigarettes. In addition, it has been suggested that many tobacco companies including some of the largest ones are using 'reconstituted' tobacco which is often called 'trash tobacco' because it consists of 'leftover tobacco' often gathered up from the manufacturing floor, which is then reconstituted for use in cigarettes.
- And finally, a recently published article found that while "A much greater proportion of smokers (82%) were aware of SLT products than were aware of modified cigarettes and cigarette-like products... only 10% of smokers believed that SLT is less harmful than smoking ordinary

cigarettes. Here, smokers are misinformed in the opposite direction. Epidemiological data suggest that SLT products sold in the United States are significantly less dangerous than cigarettes" (O'Connor, Hyland, Giovino, Fong, Cummings, [Smoker Awareness of and Beliefs About Supposedly Less-Harmful Tobacco Products.](#) **American Journal of Preventive Medicine**, 2005, 29(2) page 89).

In the first case (low yield cigarettes) it has been the industry that has perpetuated the myth about the relative safety of these products—withholding valuable information from the public about these products and their risks and relative risks. In the second case (nicotine) it has been the public health community and governmental agencies that have unwittingly allowed the public to be convinced that 'nicotine' causes cancer and other serious health problems. In the third case the tobacco industry has attempted to misuse information about the tobacco used in US cigarettes in an attempt to suggest to smokers that the product has superior qualities including safety. And in the fourth case it has been governmental agencies and public health entities, and the interests of the pharmaceutical industry that have helped perpetuate the position that noncombustible tobacco is as dangerous as combustible cigarettes.

A 2002 Commentary appearing in the medical journal **Addiction**, noted:

Ironically, many smokers do not perceive much difference in health risk between smokeless tobacco products, nicotine medications and cigarettes. Yet if all nicotine products were put on a risk continuum the actual difference between smokeless and nicotine medications would be seen as fairly minor compared to the difference in disease risk between smoked and smokeless products. Until smokers are given enough information to allow them to choose products because of lower risks, then the status quo will remain.

(Can Capitalism Advance the Goals of Tobacco Control?, Society for the Study of Addiction to Alcohol and Other Drugs, Addiction, 97:957-982, 2002)

Summary and Conclusion

The need to separate out science and fact from public relations efforts, political influence peddling, and marketing strategies is imperative. The manner in which tobacco and tobacco products are produced, processed, distributed, manufactured, labeled and marketed needs to be brought into the 21st Century. Our current system is so fraught with problems and so antiquated that I found myself comparing the current state of affairs with how we dealt with drugs and foods in the early part of the 20th century. Tobacco and the tobacco industry has a lot of catching up to do.

In today's environment science should be used to shape and drive policy decisions— not the other way around. Unfortunately, science has often become manipulated for self-serving objectives. But the science and the complexity of the issues surrounding tobacco are what tells us that we do need an agency like the FDA to play the role that has been so critical in both the food and pharmaceutical industries. Understanding what tobacco is, the different levels of risk associated with different types and use of tobacco, how it causes harm, and how it can even be used for beneficial outcomes (such as producing new pharmaceuticals, industrial enzymes, etc.) must be given a high priority, by the industry, public health organizations, scientists, growers, government and consumers. We need to get beyond the rhetoric and state of 'war' mentality and start seeking solutions to what is a major public health problem not only in the US but globally as well.

We have an obligation to ensure that the public and consumers of tobacco have all the facts. Our current understanding of 'tobacco' is comparable to a person being asked to assemble a puzzle blindfolded. The pieces are there but we are blind when it comes to assembling the larger picture and final product. In order to effectively deal with harm reduction, we must be willing and able to remove the blindfold.

THE TOBACCO SILO MENTALITY WE SEE ONLY WHAT WE WANT TO SEE

