NOTE FOR: Mr M G Cannon
Mr R L O Ely
Miss A Johnson
Mr H A Morini
Mr G K Richardson
Dr R E Thornton
Miss R Sim

Please find attached the latest version of my Chelwood talk.

I would be grateful if all previous copies (salmon-coloured cover) could be destroyed.

I. C. F. BLACKMAN

10 May 1984

Enc

THE CONTROVERSY ON SMOKING AND HEALTH
- SOME FACTS AND ANOMALIES

Notes on talks given at the
BAT Staff Training Centre, Chelwood
by Dr L C F Blackman

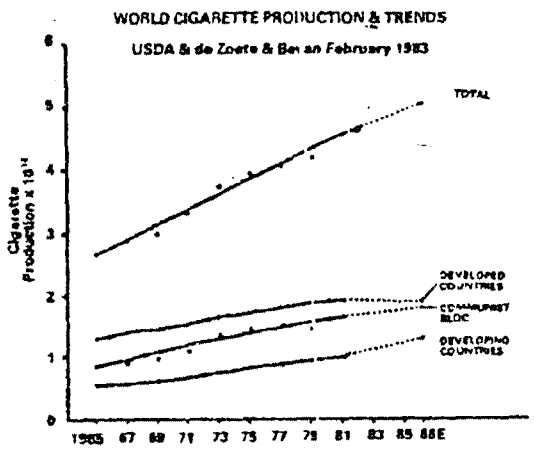
THE CONTROVERSY ON SMOKING AND HEALTH

- SOME FACTS AND ANOMALIES

CONTENTS:

BACKGROUND TO THE CIGARETTE INDUSTRY

Cigarettes constitute a massive, still growing industry with approximately 1000 million smokers worldwide ..... approximately one quarter of man-kind. Placed end to end, cigarettes from the current annual production would go from the earth to the moon and back more than 400 times!



Despite a great deal of research there are no clear answers as to why people smoke:

Donald Gould in the 'New Scientist' (4.3.1976):

> "Cigarettes calm, they comfort, they give pleasure, they act as a kind of stockade, a visible barrier between the naked individual and a hostile and perplexing world."

Dr W S Cain of the Yale University School of Medicine (1979 Cold Spring Harbour Conference):

> "Full flavour serves as a sign of effects soon to follow - such as a sense of
> * Relaxation
> * Reduced Anxiety
> * Power to Concentrate
> * Self-Confidence
> * Social Facilitation
>
> or any of the many other positive features that smokers attribute to smoking.
>
> "Without the benefits of such features, most smokers would never establish the habit in the first place."

Atsuko Chiba in the New York 'Tribune' (25.4.1983):

"Without the benefits of such features, most smokers would never establish the habit in the first place."

Atsuko Chiba in the New York 'Tribune' (25.4.1983):

"The prevalence of smoking in Japan, 70.1% of men and 16.2% of women, is a result of the tensions in the country, social psychologists said. Men in particular, locked in fierce competition to succeed, smoke and drink heavily as a release from stress."

Whatever the reason, smoking is a very stable practice: Ruth Roemer, a lawyer from the School of Public Health in Los Angeles, reviewed the legislation against smoking for the World Health Organisation. As stated in an editorial article in The Lancet (24.7.1982):

"A frustrating part of her review is the lack of evidence that particular laws - on advertising, selling to young people, or smoking in public or at work, for example - have had much impact."

BACKGROUND TO THE MEDICAL CONCERN

Following on from some reports issued before the second world war, the first major epidemiological* or population study was by the British Medical Association - where 34,440 doctors took part in a twenty-year prospective survey of their lifestyle and health between 1952-1972.

Interim reports were published, and these stimulated major reviews of smoking and health by, for example, the Royal College of Physicians and the US Surgeon General.

The final report of the BMA Doctors' study was published in the British Medical Journal in December 1976 by Professor R Doll and Mr R Peto. The annual mortality risk for the main categories of illness were computed for non-smokers and for various levels of smokers. The table below for non-smokers versus the average for 'current and ex-smokers' summarizes the data for the two most often reported smoking-associated diseases, lung cancer and heart disease. The relative statistical risk for these diseases are not widely different from those reported by other subsequent studies.

From R Doll and R Peto - British Medical Journal: 25.12.76

	Number of Deaths	Computed Annual Death Rate per 100,000 Standardised for Age	
		Non-Smokers	Current or Ex-Smokers
LUNG CANCER	441	10	83
HEART DISEASE	3191	413	554
ALL CAUSES	10072	1317	1748

Footnote: *Epidemiology is the study of large population groups, matched for such factors as age, sex, race, in which their health is monitored in relation to lifestyle - either retrospectively by questionnaire, or prospectively by periodic re-examinations.

It may be noted that:

1. The computed annual mortality rate for lung cancer in smokers is about one in 1000.

2. The computed annual mortality rate from heart disease in non-smokers is some 5 times that for lung cancer in smokers.

CONTROVERSY OVER THE CENTRAL ISSUE OF CAUSALITY

Though Professor Doll and Mr Peto believe that smoking is a direct cause of certain illnesses, they acknowledged in their publication that statistical association does not imply causation. Thus, apropos the published full table of diseases, they stated:

> "To say that these conditions were related to smoking does not necessarily imply that smoking caused (or prevented) them.
>
> "The relation may have been secondary in that smoking was associated with some other factor, such as alcohol consumption or a feature of the personality, that caused the disease."

This scientific fact was supported in the July 1983 issue of the consumer magazine "WHICH" concerned with cancer - where the following cautionary statement was made regarding epidemiology:

> "This kind of research does not prove that particular features of lifestyle cause cancers, but can point to possible causes. Even when these appear to be plausible in the light of what is known about how the body works, and how cancers form, further research is needed."

Much earlier the famous English statistician Sir Ronald Fisher stated in his 1959 book "Smoking - the Cancer Controversy":

> "..... correlation is not causation. The fact is that if two factors, A and B, are associated - clearly, positively, with statistical significance, ... it may be that A is an important cause of B, it may be that B is an important cause of A, it may be that something else, let us say X, is an important cause of both."

Reference will be made later to the possible explanation of the factor "X".

Despite more than 30 years of research the controversy on smoking and health continues - with research being undertaken in many parts of the world by scientific and medical researchers. The recent reference by the President of the American Cancer Society (reported in the Daily Mail 21.2.84)) to some 80,000 publications on smoking and lung cancer bears witness to the

continuing complexity of the subject. As does the recent statement of Mr R Peto when speaking at a conference on nitrosamines and human cancer (Banbury Report No 12, 1982):

> "..... this idea that you can analyse the chemistry of tobacco smoke and marijuana and predict what their human effects are going to be is completely inappropriate. After 30 years of analysis, still one has no clear idea of what the carcinogenic components of tobacco smoke are."

Thus, the causal theory remains a theory, not a proven fact. This statement of fact does not rely, in any way, on the strictly scientific definition of causality, cf van Nostrands Scientific Encyclopedia (52nd Edition 1976):

> "Causality is the hypothesis that a precisely determined set of conditions will always produce precisely the same effects at a later time."

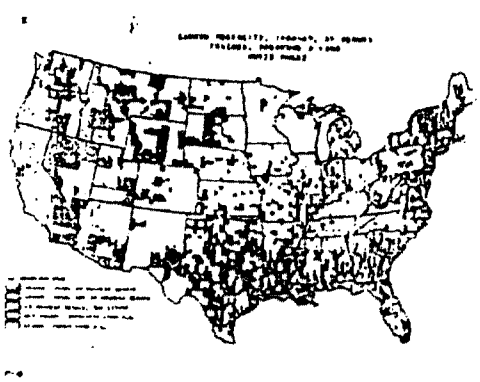
FACTS AND ANOMALIES IN THE LITERATURE REGARDING LUNG DISEASE

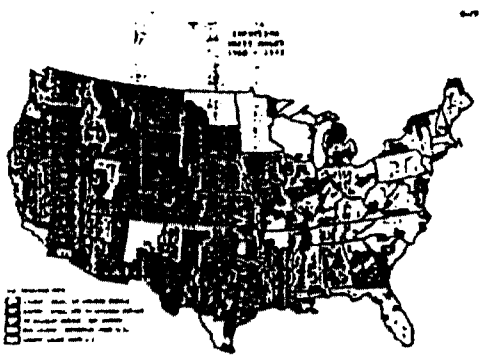
The worldwide controversy on smoking and lung cancer is well illustrated by the following examples of facts and anomalies in the medico/scientific literature.

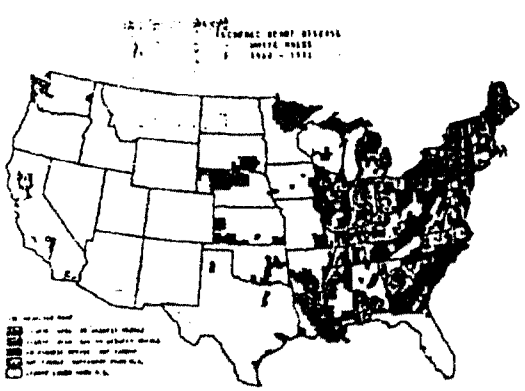
US Atlas of Mortality

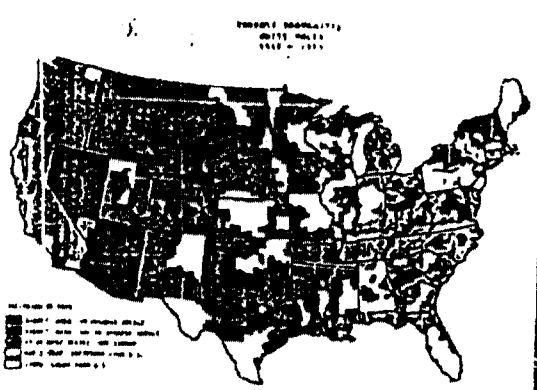
The Department of Health, Education and Welfare publish periodically the comparative incidence of all major categories of disease (male and female, black and white) throughout the USA.

If, as is frequently claimed, cigarette smoking is the single most important cause of lung cancer, emphysema, bronchitis and heart disease, it is difficult to reconcile the extreme differences in geographical incidences for those four diseases:









It is significant to note the following comment that was made apropos lung cancer:

> "The maps for lung cancer indicate that excessive mortality is not limited to highly populated urban areas where cigarette smoking and air pollution are most prominent. In fact, the rates are highest along the coast of the Gulf of Mexico, particularly in Louisiana.
>
> "Further studies are needed to identify the environmental and demographic factors contributing to the increased risk of lung cancer in these predominantly rural and port areas."

[redacted]

variations in the experience of mortality from lung cancer. Even if cigarette smoking is accepted as the major etiological cause of this disease, it is important to study the pattern of smoking between the sexes and between age groups or social classes within a country, and also the mode of smoking."

Cohort Analysis

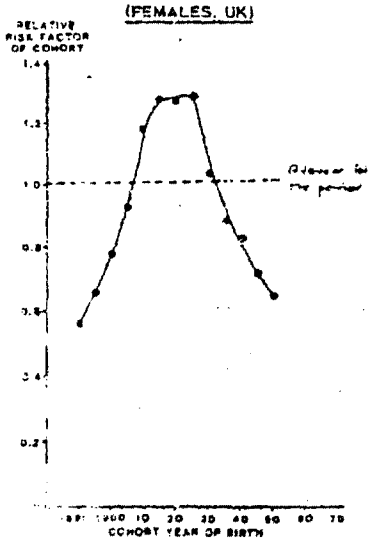
In such analysis mortality is correlated with year of birth (the cohort) rather than the more usual 'period of death'.

The Epidemiological Research Unit of the Medical Research Council published in late 1983 a detailed analysis on "Trend in "Cancer Statistics" in England and Wales for women and men aged 25-69 years, who were born between 1890-1950 and died between 1950-1980.

For both women and men, the risk factor for a given "cohort", relative to the average for the whole period covered, varied strongly and systematically. The interpretation of cohort data is complex, but it may be noted, in relation to cigarette smoking, that the 1950 cohort of women, most of whom are still alive, have already smoked about twice as many cigarettes as the 1985 cohort smoked in their entire lifetime - yet both groups have similar risk factors. For men, also, there is no direct correlation of the rise and fall of the risk factor with cigarette consumption. (cf earlier reference to cohort analysis by G F Todd et al, TRC Occasional Paper 3, 1976.)

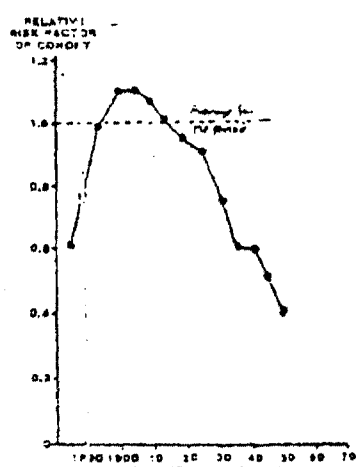
COHORT MORTALITY RATE LUNG CANCER

(FEMALES, UK)



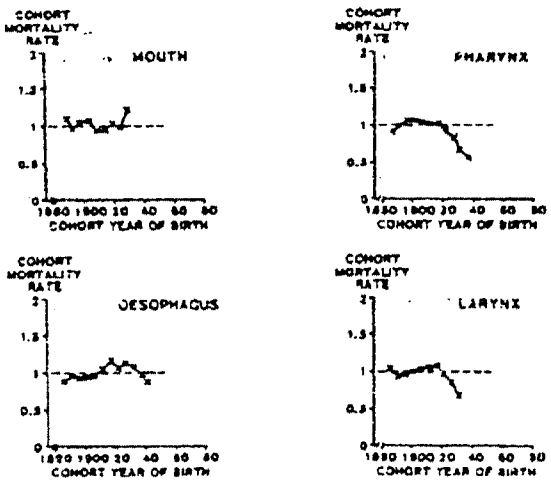
COHORT MORTALITY RATE LUNG CANCER

(MALES, UK)

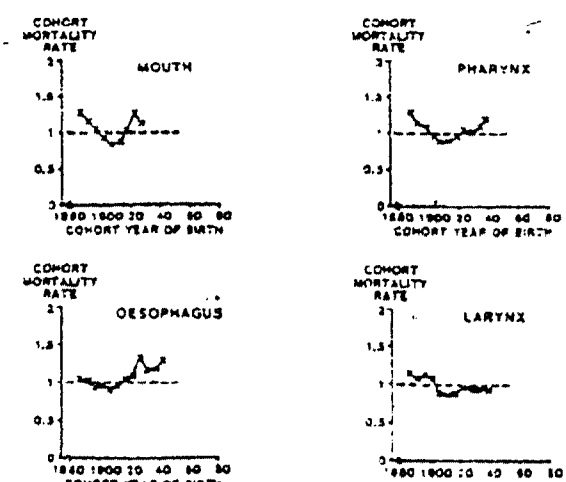


The publication contains the further anomaly that the time trends of the relative cohort mortality rate for other closely related smoking-associated cancers do not correlate either with lung cancer or with themselves - which would be expected if smoking was, as frequently cited, the major factor in all diseases.

COHORT MORTALITY RATE FOR OTHER SMOKING ASSOCIATED DISEASES (Female, UK)

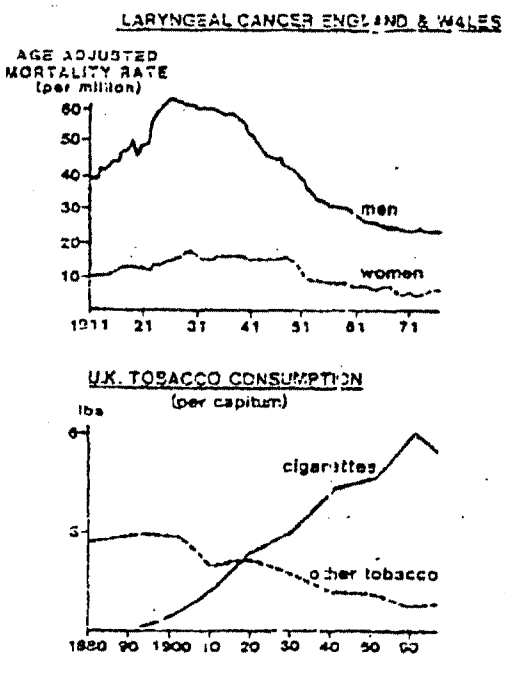


COHORT MORTALITY RATE FOR OTHER SMOKING ASSOCIATED DISEASES (Males, UK)



Laryangeal Cancer in England and Wales

In the 1981-2 University of Liverpool Research Report, Professor R Morton of the Department of Oto-Rhino-Laryngology drew attention to the lack of correlation between age-adjusted mortality rates for men and women in England and Wales with the use of tobacco and cigarettes through this century.



As stated by Professor Morton:

> "..... This casts considerable doubt on the often reported statement that cancer of the larynx is due to smoking".

Nasopharyngeal Cancer

Claims in the literature (eg 1979 Report of the US Surgeon General) that smoking is causally associated with nasopharyngeal cancer are at variance with the findings of the Laboratory of Epidemiology and Immunology of Tumours at Lyons, France (Letter from the Director of Research to BAT, 13.3.1984):

> "Indeed, we have made more than 200 publications on nasopharyngeal carcinoma, but probably what you would like to know is if there is any relationship with tobacco-smoking. In fact, tobacco-smoking is not a risk factor for this type of cancer."

Vitamin A and Cancer

Vitamin A deficiency in blood serum has been linked in several studies to the occurrence of cancer.

One such study was reported in 1980 by Dr N Wald, then of the Cancer Epidemiology and Clinical Trials Unit, University of Oxford, and Dr A Bailey of the BUPA Centre, London.

Of some 16,000 men aged 55-64 years who underwent health-screening examinations at the London BUPA Centre between March 1975 and December 1978, 86 had developed cancer. When all their clinical data was compared with 172 controls who had not developed cancer, the following was the finding (as reported in The Lancet on 8.10.1980):

> "Low retinol [Vitamin A] levels were associated with an increased risk of cancer. The association was independent of
>
> - age
> - smoking habits
> - serum-cholesterol level
>
> and was greatest for men who developed lung cancer."

More recently, Professor G Cumming, Medical Director of the Midhurst Research Institute and a noted lung research specialist, stated on BBC Radio 4 on 12.1.1983:

> "What's interesting about cigarette-related diseases is that the majority of people who smoke cigarettes don't suffer ill-effects.
>
> "..... particularly some American work has shown that in cancer of the lung in smokers, this is related to another environmental cause, and the environmental cause that they have identified is the level of Vitamin A in the blood of the smoker.

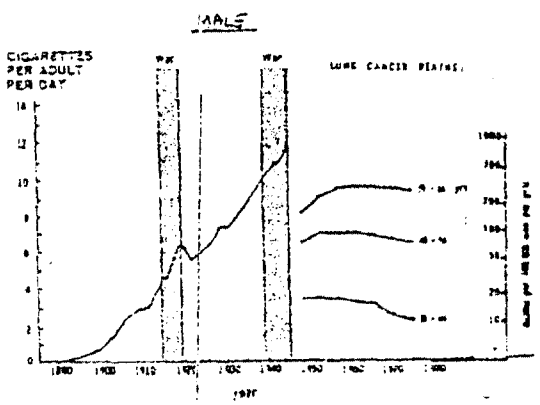
"..... if the Vitamin A level is high then they don't get cancer. Their risk is the same as if they were non-smokers."

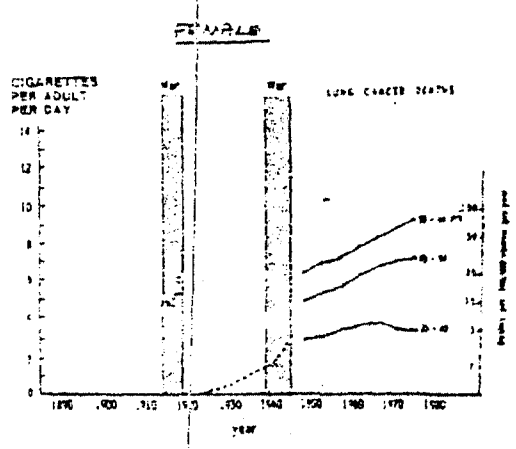
Time Dependence of Smoking and Lung Cancer

The 4th Royal College of Physicians' Report notes that while the development of female lung cancer in England and Wales may reflect the delayed effects of increases in cigarette usage during, or even before, World War II:

"The trends in male lung cancer deaths in the United Kingdom do not follow this pattern and so are of particular interest."

This is illustrated below for younger age groups:





Animal Testing

Animal Testing

In testing for carcinogenic activity, the usual approach has been the exposure of laboratory animals to test agents by one or more routes; for example, by feeding, inhalation, application to the skin, or subcutaneous injection.

In cigarette smoke research, mouse-skin painting, using either whole or separated fractions of smoke condensate ("tar"), was a major approach during the 1960's and 1970's. Despite intense research in many countries, very little, if any, advance has come from such studies. Irrespective of this lack of outcome, the particular problem of extrapolating from mouse-skin to human lung has been succinctly summarised in the aphorism:

> "The wrong material (smoke condensate not smoke) applied to the wrong tissue (external skin not ciliated bronchial epithelium) in the wrong species (mouse not man)."

A similar lack of postive outcome has emerged from large-scale smoke inhalation studies using a variety of animals (but mainly rats and hamsters). Quite simply, these studies failed to produce the type of lung cancer commonly associated with cigarette smoking in humans. (An interesting feature of such experiments is that groups of smoking animals have tended to live longer than the non-smoking control groups.)

Chronic Obstructive Lung Disease

This disease, often loosely termed 'bronchitis', is frequently cited as being causally related to smoking. It is of significance, therefore, to note the striking social class dependence for England and Wales in 1961 when, according to the 4th Report of the Royal College of Physcians, "smoking habits were fairly similar in all social classes".

UK classification of Social class	"Bronchitis" : Standardised mortality ratios among people aged 15-64	
	Males by own occupation	Married females, by husband's occupation
I	28	33
II	50	51
III	97	102
IV	116	118
V	194	196

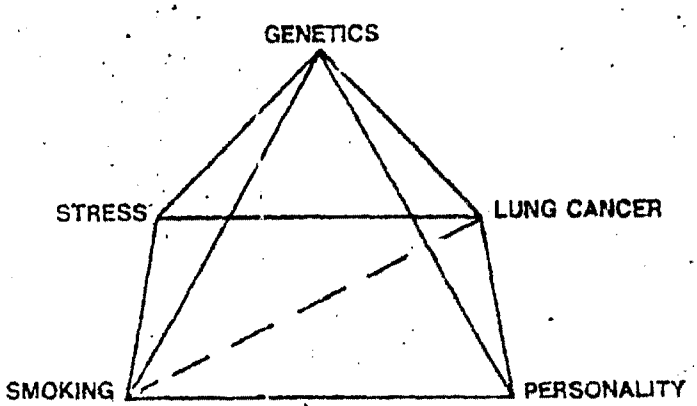
ALTERNATIVE THEORIES REGARDING LUNG CANCER

Genetic Predisposition I

Professor Hans Eysenk, who has long spoken out against taking dogmatic views about smoking and lung cancer said at a research conference (Daily Mail report, 31 August 1983):

> "Orthodoxy in medicine is a fearsome thing. It leads us to believe that lung cancer is caused by smoking, and that is all".

Professor Eysenk hypothesises that some humans possess controlling genetic predisposition towards the establishment of personality, stress, smoking and lung cancer - as illustrated below:



On this basis, the statistical association between smoking and lung cancer would be a secondary consequence of genetic make-up - which could be the 'Factor X' as expressed earlier by Sir Ronald Fisher (see page 5).

of the active subjects and the controls. In theory, at least, this can to a large extent be overcome by studying genetically identical twins - provided sufficient numbers can be found where

and lung cancer would be a secondary consequence of genetic
make-up - which could be the 'Factor X' as expressed earlier
by Sir Ronald Fisher (see page 5).

of the active subjects and the controls. In theory, at least, this can to a large extent be overcome by studying genetically identical twins - provided sufficient numbers can be found where one is a smoker (or predominantly so) and the other is not.

Friberg and co-workers reported in 1973 (Archives of Environmental Health, vol 27) an 11-year monitoring from 1961 to 1972 of 572 Swedish twins (both sexes). The results were:

SWEDISH TWINS STUDY

Cause of Death:	Non-smoking group	Smoking group
Cancer of lung	1	1
Other cancer	6	7

Six years later in 1979 the work was reviewed in the Bibliography on Smoking and Health:

> "The findings seem to be yet another indication of the incomparability of smokers and non-smokers. The results from the twin study clearly demonstrate the importance of genetic, behavioural and psychosocial factors which have not been considered in conventional epidemiological studies. Such factors should as far as possible be included in future epidemiological research, not only in the context of smoking and health, but also in studies on other similar exposure factors that may be linked to risk factors of this type or to genetic predispositions."

Natural Cycles of Cancer

In the early days of the debate on smoking and health, some researchers (notably Lees 1959 in the UK and Gilliam and co-workers 1961 in the US) considered the evidence from American and British mortality statistics and adduced that, based on the decreasing rate of increase in mortality from lung cancer in the younger age groups for men, deaths from lung cancer would be on the decrease by the mid-1970's to 1980's - independent of smoking habits.

It was later noted by Belcher (1971) that in the UK the mean age at which patients were diagnosed as having lung cancer was increasing, and also that the ratios among sexes were changing. From these observations, Belcher likewise predicted that, if this pattern of change persisted, there would be a fall in the total incidence of lung cancer - irrespective of any change in smoking habits.

Certainly the statistics from the US and England and Wales, for males of younger age groups, are in agreement with these early predictions.

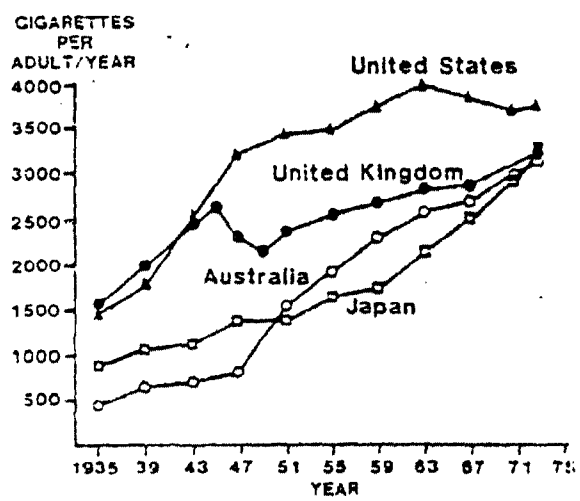
FACTS AND ANOMALIES IN THE LITERATURE REGARDING HEART DISEASE

International Comparisons - I

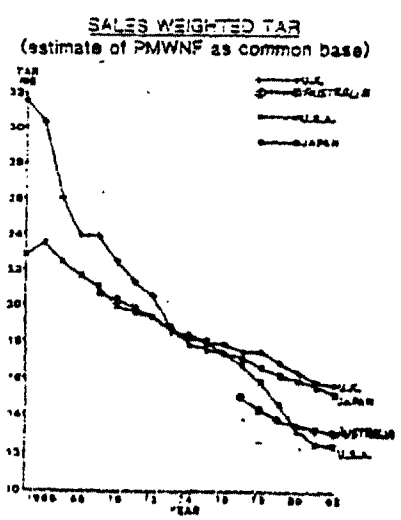
There are striking anomalies between heart disease mortality in the UK, US, Australia and Japan.

In all four countries the development of the smoking habit and the change (reduction) in average smoke deliveries per cigarette closely parallel one another:

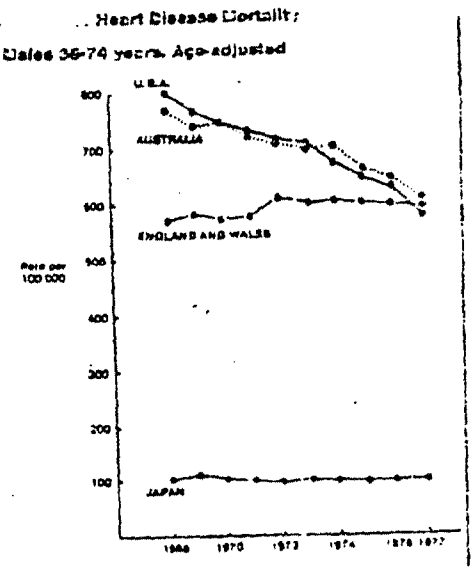
CIGARETTE CONSUMPTION
USA, UK, AUSTRALIA AND JAPAN
1935-1973



Ref.: Int. J. of Epidemiology, vol. 9, No.1, 55-57, 1980.



The level and time dependence of heart disease mortality are, however, significantly different:



This difference was referred to in an editorial article in the British Medical Journal (10.7.1982) reporting a London meeting on the 'Science and Strategy of Coronary Heart Disease Prevention":

> "Professor Geoffrey Rose and other speakers from the United States and Europe seemed agreed that in population studies dietary changes had the most important effect on the incidence of coronary heart disease - much more than did changes in smoking.
>
> "The relative freedom of the Japanese from coronary heart disease, despite their very heavy smoking, was good evidence that tobacco has no great threat to an otherwise healthy heart."

International Comparison II

A similar result was found in earlier international comparisons of the effect of diet and smoking intervention on the incidence of coronary heart disease. As reported in "Circulation", (April 1970, Volume 1, Supplement 1):

> "In an international cooperative study on the epidemiology of coronary heart disease, international teams examined 12,770 men aged 40 through 59 years in Finland, Greece, Italy, Japan, the Netherlands, the United States, and Yugoslavia. Strictly standardized methods and criteria were used. Cigarette smoking was one of the risk factors studied and it is concluded that smoking cannot be involved in the incidence and deaths from this disease".

As further reported in the Lancet (12.12.1981):

> "In the seven-country study there was no significant association between coronary heart disease incidence and smoking in the different countries, and in the prospective necropsy series of the Oslo study a significant correlation between prevalence of coronary raised atherosclerotic lesions and smoking could not be shown."

International Comparison - III

Multiple Risk Factor Intervention Trial (MRFIT) for Coronary Heart Disease

The largest medical study ever mounted was completed and reported in The Journal of the American Medical Association. The editorial comment in "Health Services" (15.10.1982) stated:

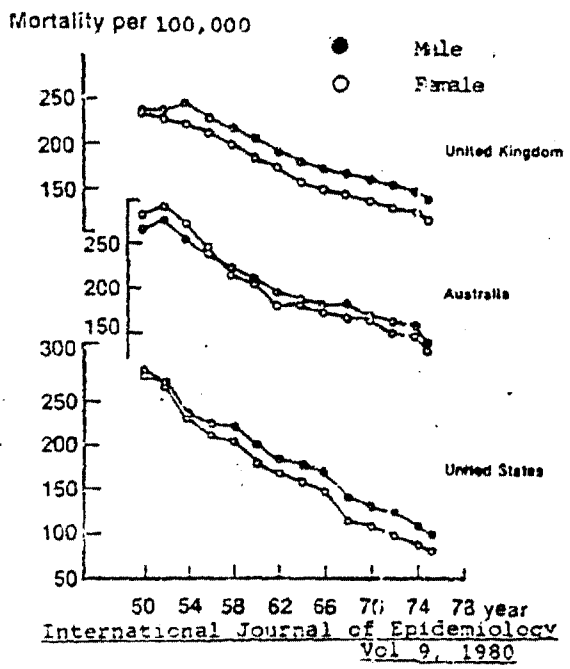
> "A massive, $110m trial of prevention of coronary heart disease (CHD) in the United States has given disappointingly inconclusive results.
>
> "Nearly 13,000 men at high risk of CHD were selected from 360,000 men aged between 35 and 57 who underwent health screening.
>
> "The 13,000 men were divided into two groups. One, the 'intervention' group, was given counselling to help them stop smoking, a diet with only 10 per cent of the food intake as saturated fats, and drug treatment for raised blood pressure."

"Seven years later 265 of the men in the 'intervention' group had died, 138 of heart disease, and 260 of the control group had died, 145 of heart disease."

International Comparison - IV

Hypertension and heart disease are frequently cited as being causally related to smoking. It is interesting to note, therefore, that the time trends for hypertension in the UK closely parallel those for the US and Australia - whereas, as shown above, the same does not obtain for heart disease.

Mortality from diseases due to hypertension



International Journal of Epidemiology
Vol 9, 1980

Deaths in US Physicians

It has been noted by the heart disease specialists H I Russek and L G Russek (Psychosomatics, Vol XVII, 1976) that while some 100,000 US physicians gave up smoking over the 20-year period 1955-1974, physicians' mortality from heart disease remained essentially unchanged.

DEATHS IN US PHYSICIANS

	Deaths recorded in Period January-April			
	1955	1965	1970	1974
Average age of death	69.6	68.9	67.2	68.4
Average age of coronary deaths only	61.0	60.8	59.4	60.5
Total number of deaths	1148	1091	1013	1159

Exercise and Heart Disease

In a review in the journal 'New Scientist' (23.2.1984), reference was made to the findings of Professor J Morris of the Medical Research Council unit at the London School of Hygiene and Tropical Medicine:

> "'Vigorously' exercising men suffered fewer heart attacks whether they were fat or lean, cigarette smokers or not, suffering from high blood pressure or not, and with or without a family history of the disease."

The Framingham Heart Study

S Z Goldhaber et al reported in the American Journal of Medicine (Vol 74, 1983) on the prospective epidemiological study, set up in the US in the late 1950's. 3470 subjects provided input data on age, relative weight, cholesterol level, glucose level, blood pressure, varicose veins and cigarette use.

Of the 998 subjects who died during the following 26 years, 46 had autopsy-confirmed clinically significant pulmonary embolism. The conclusions of the paper were:

> "Among both men and women, systolic blood pressure, cholesterol level, cigarette use, glucose level and varicose veins had no significnt independent association with pulmonary embolism at autopsy, compared to other study participants who died during 26 years of follow-up."

Carbon Monoxide and Heart Disease

Despite repeated statements (or assumptions) in the literature that carbon monoxide in cigarette smoke is a factor in heart disease, there is very considerable doubt on the subject.

In 1979 Lord Hunter, Chairman of the Independent Scientific Committee that advises the UK Government, wrote to the Secretaries of State:

> "Although the epidemiological evidence suggests that tobacco smoke is associated with a number of types of cardiovascular disease, we have found the evidence to indicate that carbon monoxide is the principal factor to be less than convincing."

In similar vein, the 1981 Report of the US Surgeon General stated:

> "Carbon monoxide has been impugned as a harmful constituent of cigarette smoke. There is no evidence available, however, that permits a determination of changes in the risk of diseases due to variations in carbon monoxide levels."

A source of major confusion about health risks from carbon monoxide was a study (Astrup 1967) that claimed that in the pure gaseous form carbon monoxide induced atherosclerotic changes in the vascular system of rabbits. Subsequently, however, many researchers (including Astrup himself) failed to confirm the finding - and Astrup publicly withdrew his early claim, both at the 4th World Conference on Smoking and Health in Stockholm in June 1979, and at the October 1979 Cold Spring Harbor Conference.

In a more recent publication (Hugod and Astrup 1981), the view was expressed:

> "There is no longer evidence for considering CO to be a component of major importance for the enhanced atherosclerosis in tobacco smokers ....."

In 1983, the 3rd Report of the Independent Scientific Committee stated:

> "Carbon monoxide is suspected of having a role in their [heart diseases] development but it is not clearly established that it is a factor in their causation."

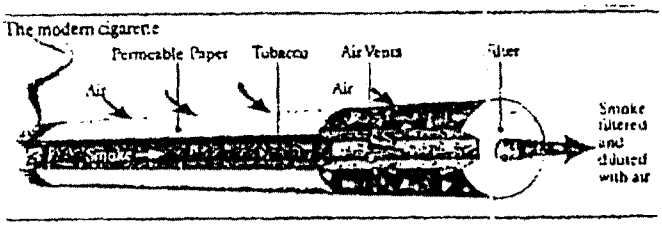
Autopsy and Death Certification

The potential errors in death certification have received much discussion (particularly in respect of errors in the diagnosis of lung cancer, with the complicating factor of primary versus secondary tumours). It is relevant, therefore, to note the editorial comment in the UK medical journal 'Pulse' (18.2.1984):

> "Attributing the main cause of death to specific contributing factors is a thorny problem. To be useful the association needs either to be definite or of a kind which can be made definite by postmortem examination.
>
> "Smoking as a factor in pulmonary or cardiovascular disease does not quite meet either criterion, and a definite anatomical or physiological link is still lacking.
>
> "Pathologists cannot, at postmortem, show evidence that pulmonary or cardiovascular disease is caused by tobacco rather than by any other factor.
>
> "While endorsing the need for public awareness of the hazards of smoking to health, the death certificate does not seem to be a useful or safe way of achieving this."

CONTROVERSY OVER LOW DELIVERY CIGARETTES

As illustrated in the graph on page 18, since the 1960's, there has been a major swing worldwide towards the development and sale of cigarettes of reduced smoke yields. (The so-called 'low tar cigarettes'.) This has been achieved by using more porous cigarette paper (to allow the ingress of air to dilute the smoke) more efficient filters and, in recent years, perforated or ventilated filters:



As a result, in contrast to the high tar deliveries (30-40+ mg/cig) of the earlier plain or non-filter products, cigarettes are today available in many countries with tar (and carbon monoxide) deliveries in single figures - and even down to 1mg and below in some countries:

LOW DELIVERY CIGARETTES — 1960 V 1980

Smoke component	Delivery levels per cigarette (mg)		
	"Typical" before 1960	"Average" in 1980	Commercial products available in 1980
Virginia style cigarettes, e.g. U.K., Canada			
Tar condensate	33	15	1
Nicotine	2	1.2	0.1
Carbon monoxide	20	15	1.5
U.S. blend style cigarettes			
Tar condensate	43	15	1
Nicotine	3	1.1	0.2
Carbon monoxide	23	17	2

Many independent doctors, scientists and government/health authorities believe that the use of filters and other changes in the product have been directly responsible for the significant reduction in recent years in smoking-associated diseases (especially lung cancer) in younger age groups, in countries such as the UK, US and Finland. Certainly the pioneer of smoking and health research, Professor Sir Richard Doll, strongly beleives that this is the case, of his comments at a recent Royal College of Physicians conference in Edinburgh (3.12.82) regarding the drop of about 50% in lung cancer among men under 50 years of age:

> "This reduction can be attributed to people giving up smoking altogether, but probably even more to changing to low-tar cigarettes which, without doubt, produce less harmful effects."

Dr E L Wynder and Dr D Hoffman of the American Health Foundation hold similar views but, they have also drawn attention to the relevance of the time element in the development of cancer (American Journal of Public Health, November 1980):

> "Presently available epidemiological data relate only to those who began to smoke cigarettes with high 'tar' and nicotine yields.
>
> "Only future studies will demonstrate the risks for those who initiated and continued their smoking habit with low yield cigarettes."

But not all scientists and medical authorities agree that low delivery products carry a lower associated risk. They believe for example:

- smokers compensate for the lower satisfaction of modern products by smoking more cigarettes or inhaling more deeply.
- smokers deliberately increase the smoke delivery by blocking ventilation holes.
- a greater use of flavour additives could be deleterious.

Apropos such views, an interesting comment was made by Mr R Peto at a Ciba Foundation meeting on preventative medicine held in London (as reported in the 'New Scientist', 19.4.1984):

> "Even the World Health Organisation won't advocate lowering the tar content of cigarettes. They don't want to believe that lower tar means lower death rates from lung cancer."

Thus, as in virtually all areas of smoking and health, there is continuing controversy.

AMBIENT SMOKE AND "PASSIVE SMOKING"

There is a large literature on both ambient smoke and 'passive smoking'. The view generally expressed until recently is that there is no health risk in non-smokers breathing other people's smoke. Thus it has been noted:

December 1978. Draft Status Report of the US National Cancer Institute:

"The risk of cancer of the respiratory tract, emphysema, or cardiovascular disease does not appear to be increased by passively inhaling smoke generated by others."

1979 US Surgeon General's Report

"Healthy non-smokers exposed to cigarette smoke have little or no physiological response to the smoke, and what response does occur may be due to psychological factors."

1979 Chairman of the American Heart Association Task Force on the Environment and Cardiovascular Disease

"Studies indicate that non-smokers have negligible levels of carboxyhemoglobin under good conditions of ventilation, and with no ventilation have acceptably low levels."

1980 C Hugod, K Hawkins and P Astrup

"It is pointed out that in spite of an often considerable subjective discomfort, exposing non-smokers to tobacco smoke under realistic conditions will not cause inhalation of such amounts of the components of tobacco smoke traditionally considered harmful, that a lasting, adverse health effect in otherwise healthy, grown up individuals seems probable."

These conclusions seem entirely in keeping with the measured very heavy dilution of 'sidestream' and exhaled smoke in a typical room, office, train, etc. under realistic conditions:

MEASURED TOBACCO SMOKE CHARACTERISTICS
(W C Hinds and M W First)
New England Journal of Medicine - 17.4.75

	Average Measured Nicotine ($\mu g/m^3$)	Equivalent Filter Cigarette smoked per day
Commuter train	4.9	0.004
Commuter bus	5.3	0.005
Bus waiting room	1.0	0.001
Airline waiting room	3.1	0.003
Restaurant	5.2	0.004
Cocktail lounge	10.3	0.009
Station lounge	2.8	0.002

This generally accepted situation was challenged, however, in 1980 by a paper published by Dr White and Dr Froeb - the former well known as a highly active campaigner against smoking (eg the California Propositions: Number 5 in 1978 and Number 10 in 1980). The report of their work in the New England Journal of Medicine, which was based on measurement of Forced Expiratory Volume of non-smokers - who were claimed either to have been exposed or not-exposed in their working environment to cigarette smoke - received strong criticism from other research workers on the grounds:

(a) the design of the study lacked credibility

(b) the findings lacked credibility (non-smokers said to show effects equivalent to smoking up to 10 cigarettes a day)

(c) Several of the lung-function tests used are controversial as regards their importance in lung disease.

In 1981, even more interest and comment was generated by a paper in the British Medical Journal in which Dr Hirayama reported on a study of the incidence of lung cancer in Japanese non-smoking wives of smoking husbands - and reported an enhanced risk when husbands smoked. The study was based on a 14-year prospective epidemiology study involving some 91,000 non-smoking wives out of a total study group of 265,000 adults. The findings were subject to intense scrutiny by scientists worldwide and criticisms of several aspects of the study continue to date. Some of the points made were:

- the Japanese as a race are very different from the Western world in terms of living environment and social cultures.

- smoking habits were determined only at the beginning of the period

- the majority of the cancers (17 out of 23 in a sample) were not of the type most commonly found in lung cancer

- the two-fold increased risk in wives of heavier smokers is similar to that found by Dr Hirayama for women actively smoking about 5 cigarettes a day - whilst their heavy smoking husbands averaged only about 8 cigarettes a day at home.

At about the same time as the appearance of the Japanese study, details were published in the International Journal of Cancer of a small retrospective 'case control' study of 40 non-smoking women in Greek hospitals. This claimed to show a statistically greater risk of lung cancer where the husband smoked. However, the numbers of cases were small, and the authors themselves stated: "This study has obvious limitations and is offered principally to suggest that further investigation of this issue should be pressed."

Soon after the Japanese and Greek reports, two similar studies, each involving significantly more people, were published from the USA and Hong Kong. Their findings were in striking contrast to the earlier reports.

Thus, Dr L Garfinkel, Vice President of the American Cancer Society reported in 1981 on the combined results of the prospective epidemiological study - the American Cancer Society's 'million person' study and the US Veterans Study (c. quarter million). The paper in the Journal of the National Cancer Institute concluded:

1. Over the period 1960-1972, there was no material trend in lung cancer mortality among middle-aged non-smokers of either sex.

2. Non-smoking wives married to smoking husbands do not have a significantly higher risk of lung cancer compared with non-smoking wives married to non-smoking husbands.

The Hong Kong study reported in 1982 by W.E. Chan analysed 84 female lung cancer patients, who themselves were non-smokers, in terms of the smoking habits of their husbands. The results showed, statistically, a lower risk where the husbands smoked.

Clearly, as with other aspects of smoking, the subject of passive smoking is high complex and calls for much more carefully designed research. In the meanwhile, we may note some recent conclusions:

Clearly, as with other aspects of smoking, the subject of passive smoking is high complex and calls for much more carefully designed research. In the meanwhile, we may note some recent conclusions:

1982 US Surgeon General's Report

"Available evidence is not sufficient to conclude that other people's smoke causes disease in non-smokers."

2nd Workshop on Environmental Tobacco Smoke
Geneva 1983 : Ed R Ryander

"An overall evaluation based on available scientific data leads to the conclusion that an increased risk for non-smokers from environmental tobacco smoke has not been established."

Dr. L. Garfinkel .....

"Passive smoking may be a political matter, but it is not a main issue in terms of health policy."

As will be apparent from this talk, despite more than thirty

As will be apparent from this talk, despite more than thirty years of research - involving laboratory, clinical, epidemiological and animal studies - the causes of the smoking-associated diseases are still unknown. One problem is that the researches have frequently raised as many questions as they have answered.

Eminent scientists and doctors from universities, teaching hospitals and research institutes have spent much of their professional lives studying smoking-related issues; and they continue to do so - which surely underlines the fact that there are major unresolved issues.

Perhaps this relative lack of progress was the reason for the significant change of emphasis at the 5th World Health Organisation conference in Winnipeg in July, 1983 from 'smoking and health' to the 'politics of smoking'.

Despite the fact that the level of research undertaken worldwide on cigarettes and smoking has probably no parallel in any other consumer product area, it is BAT's belief that progress can come only from further continued research and by reasonable and balanced discussions about the subject.

It is also BAT's view that the need for continuing research will not go unheeded by those outside the tobacco industry who seek scientifically valid answers to the highly complex issues that are involved.

SUMMARY OF THE BAT APPROACH TO SMOKING AND SMOKING ISSUES

BAT recognises the desire of certain people to eliminate smoking, but believes that despite the various anti-smoking movements, a substantial proportion of adults worldwide will continue to smoke.

Studies have reported an association between smoking and certain diseases. Many independent scientists and government bodies have said that the association should be considered causal. However, other independent scientists dispute the causal hypothesis and offer alternative explanations. The question of cause continues, therefore, to be a controversy.

Irrespective of this, there is an emerging body of medical opinion that believes cigarettes of low tar content give rise to a lower incidence of certain diseases than the higher "delivery" products which form the basis of most epidemiological studies to date.

Despite the fact that some scientists take the opposite view, certain Government and health authorities have publicly advised consumers to smoke cigarettes with lower smoke deliveries. For this, and perhaps for other reasons, there has been a growing demand worldwide for low delivery products.

The tobacco industry has responded quickly to this changing demand, and to published government advice, by marketing an expanding range of cigarette products - so that each consumer can make his own informed choice of product.

May 1984

BAT (UK AND EXPORT) LIMITED