

First

"A" paper

Dec. 21, 1962

Author: Alan Rodgman

Division: Chemical Research

Notebook pages: none

1963
RDM, 1962, No. 1

Previous Reports:
RDM, 1954, No. 31
RDM, 1955, No. 13
RDR, 1956, No. 10
RDR, 1959, No. 1

*Voided by
R.H.H.*

No. of pages:

THE SMOKING AND HEALTH PROBLEM --
A CRITICAL AND OBJECTIVE APPRAISAL

The cigarette smoke-health problem is discussed, and it is related to the potential involvement of the members of the Company's Research Department. Special emphasis is placed on the lung cancer problem. Arguments by those claiming cigarette smoke as a health hazard are presented, as well as the counter-arguments of those not in accord with such views. The weight of the arguments and counter-arguments is discussed. An attempt has been made to present the arguments objectively. ~~Based on~~ ^{Based on} the ~~blow~~ ^{arguments}, several recommendations are made.

This memorandum presents my position as briefly and as concisely as possible. In a companion memorandum with ~~a~~ identical schematic organization, the same thoughts are presented in more detail. If requested, a thorough, fully documented exposition of the ideas will be prepared.

MEMORANDUM

Although the major part of the sales of this Company consists of cigarettes, what the Company ~~is~~ ^{is} selling is cigarette smoke. This Company, therefore, should be ~~concerned~~ ^{concerned} with the physiological ~~poperties~~ ^{properties} and composition of cigarette smoke. The benefits ~~and~~ ^{from} such knowledge are obvious, particularly if it anticipates possible future governmental regulation. During ~~the~~ ^{the} past two decades, cigarette smoke has been the target of a host of studies relating it to ill-health and particularly to lung cancer. The majority of these studies incriminate cigarette smoke from a health viewpoint.

10013

52134 0102

I. The Evidence - Pro and Con

The cigarette smoke-lung cancer problem has been investigated epidemiologically, pathologically, biologically, and chemically.

Each discipline has yielded pertinent information.

a. Epidemiological Data

¶ The results of 34 different statistical studies show that cigarette smoking increases the risk of developing lung cancer. Many authorities believe the relationship to be one of cause-and-effect.

Contradictory data have been provided by limited statistical studies which suggest that cigarette smoking is linked to a constitutional factor. The results of these studies can, however, account for only a small fraction of the difference in lung cancer incidence observed between smokers and nonsmokers.

The statistical data from the smoking-health studies are almost universally accepted. After more than ten years, criticisms of the studies have been reduced to the dictum A statistical study cannot prove a cause-and-effect relationship between two factors.

b. Pathological Data

¶ It has been observed that cigarette smokers' lungs show profound cellular changes which are proportional to cigarette consumption, that fluorescent constituents of cigarette smoke are absorbed into respiratory tract cells (although fluorescence and carcinogenicity are not synonymous), that cigarette smoke and some of its constituents cause ciliary paralysis, and that cigarette smoke collects in the lungs at cilia-free areas and at areas with paralyzed cilia.

16013

52134 0103

Contradictory evidence indicates that the above-described cellular changes can be caused by respiratory diseases and other illnesses, that these changes occur to a degree in infants, in nonsmokers, in the windpipes of smokers (although cancer of the windpipe is rare), and in residents of areas of extreme air pollution, and that ciliary paralysis can be caused by air pollutants like industrial and automobile exhaust gases. Also it is not known whether such changed cells ever become cancerous.

These findings may be summarized as follows: Since cellular changes in the lungs and ciliary paralysis can be caused by factors other than cigarette smoke, since these changes occur in nonsmokers' lungs and in the cancer-free windpipes of smokers, and since it is not known whether these changed cells become cancerous, cigarette smoke, therefore, is not the only factor to be blamed in lung cancer causation.

c. Biological Data

Cigarette smoke condensate is carcinogenic to mouse skin. Much is made of the fact that the dosage level used exceeds that of the human exposure. Other investigators, using nominal dosage levels, did not obtain positive results. Some interpret this as an indication that cigarette smoke is not carcinogenic. It should be noted, however, that many attempts were made to induce cancer in animals with coal tar prior to the first success with unrealistic dosages.

Inhalation studies with cigarette smoke have yielded an increased incidence of adenomas in adenoma-susceptible mouse strains. No human-type carcinomas have been produced although the previously mentioned cellular changes and bronchitic conditions have.

These findings are interpreted by some as an indication that cigarette smoke is not carcinogenic to human lung tissue. Two facts offset such thinking. First, mice are not men, hence carcinomas should not be expected in a host

52134 0104

10014

resistant to the induction of carcinoma of the lung and whose usual lung cancer is the adenoma. Secondly, the ratio, lung cancer deaths:total cigarette smokers in the United States, is approximately 1:1700, hence an inhalation experiment would require about 1700 mice for the production of one lung carcinoma, assuming the response of mouse and human lung tissue was the same. The biological findings are often dismissed with the statements Mice are not men and Mouse skin is not human lung tissue.

52134 0105

d. Chemical Data

Cigarette smoke contains at least 17 compounds carcinogenic to mouse skin. Cigarette smoke also contains promoting (or cocarcinogenic) agents. These findings, at first impugned, are now accepted but dismissed as unimportant because none of the compounds has been shown in vivo to be carcinogenic or cocarcinogenic to human lung tissue. It is unlikely that such experiments will ever be carried out.

e. The Evidence to Date

Obviously, the amount of evidence accumulated to indict cigarette smoke as a health hazard is overwhelming. The evidence challenging this indictment is scant. Attempts to shift the blame to other factors, e.g., air pollutants, necessitates acceptance of data similar to those denied in the cigarette smoke case.

II. Interpretation of the Evidence

After reviewing this evidence, governmental health agencies and medical societies through^{out} the world have concluded that a cause-and-effect relationship exists between cigarette smoke and lung cancer. It is predicted that the recently appointed Surgeon General's Advisory Committee on Smoking and Health will reach the same conclusion.

16015

It has been repeatedly stated that some scientists discount the cigarette smoke-lung cancer theory. This is true. But it should be noted that many of those quoted in this regard are on record with contrasting views, e.g., Berkson, the statistician, has ~~xx~~ stated "...the definitive important finding of these statistical studies is not that there is an association between smoking and lung cancer, but that there is an

association between smoking and deaths from all causes generally.....", and Kotin, member of the Scientific Advisory Board, TIRC, stated "The statement...to the effect that 'The sum total of scientific evidence establishes beyond reasonable doubt that cigarette smoke is a causal factor in the rapidly increasing incidence of human epidermoid cancer of the lung' represents a view with which we concur."

52134 0106

III. The Tobacco Industry's Contribution

To investigate the tobacco smoke-health situation the Tobacco Industry has given about five million dollars to TIRC since 1954 for research. According to Little, its Scientific Director, the purpose of TIRC is "...to encourage and support qualified research scientists in their efforts to learn more about these complex problems [cancer and heart disease]." Through December 1961, TIRC grantees published 197 papers; 36 on the chemistry of tobacco and its smoke, 47 on cancer research, 13 on human lung studies, 78 on heart and circulation studies, 4 on gastrointestinal tract studies, 5 on psycho-physiological studies, and 14 miscellaneous studies (lung cancer reviews, tobacco-health textbook).

I believe that much of this research, particularly that on the chemical, biochemical and biological study of tobacco and its smoke, could have and should have been carried out in the research departments of the tobacco companies. The members of this Company's Research Department are as qualified, as objective, and as interested in learning "... more about these complex problems....." as scientists not employed by a tobacco manufacturer. Any findings made by us could ^{not} have any more adverse effect on the Tobacco Industry than those reported by TIRC grantees.

This Company is studying in detail the composition of cigarette smoke, but much data remain unpublished because they are concerned with carcinogenic or cocarcinogenic compounds or with patentable material. This raises an

10016

interesting question about the former ~~tar~~ compounds. If a ~~tar~~ company plead "Not guilty" or "Not proven" to the charge that cigarette smoke (or one of its constituents) is an ~~etiological~~ factor in the causation of lung cancer or some other disease, can the company justifiably take the position that publication of data pertaining to cigarette smoke composition or properties should be withheld because such data might affect adversely the company's economic status when the company has already implied in its plea that no such etiologic effect exists?

52134 0107

It is not my intent to suggest that this Company accept the cigarette smoke-health data at face value, but I do suggest that ~~this company~~ ^{we} actively participate in cigarette smoke-health studies.

B. RECOMMENDATIONS

After consideration of the evidence available on the cigarette smoke-health problem and the Company's obligation to its customers, stockholders, and employees, it is recommended that:

1. Facilities, animals, and personnel (where necessary) be acquired as soon as possible to study biologically cigarette smoke, tobacco, and tobacco additives. Data from such studies may be invaluable if governmental restrictions are imposed as a result of the conclusions of the Surgeon General's Advisory Committee on Smoking and Health.
2. ~~Data~~ Data ~~already~~ available on cigarette smoke constituents with adverse physiological effects be published.
3. Data on analytical procedures concerning such constituents be published.
4. The Company's supervisory personnel be provided with reports like the Royal College of Physicians' ~~tar~~ Smoking and Health and the Annual Report of the Scientific Director (TRC) just as they were provided with Science Looks at Smoking (Northrup), Tobacco and Health pamphlets, and

16017

"favorable" articles from Life.

5. This Company's management recognize that many members of its Research Department are intensely concerned about the cigarette smoke-health *and related* problem^s and eager to participate in ^{their} ~~the~~ study and solution.

Usual + Nelson
+ Markman

+ G. Gray? No