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THE TRUTH ABOUT SMOKING AND CANCER

WHAT IS KNOWN AND UNKNOWN

Interview with Dr. John R. Heller, Director, National Cancer Institute
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THE TRUTH ABOUT SMOKING AND CANCER
WHAT IS KNOWN AND UNKNOWN

Millions of Americans continue to smoke—even though many medical authorities agree that a heavy smoker of cigarettes stands 1 chance in 10 of dying of lung cancer. What are the facts about the relationship between smoking and lung cancer? Are cigarettes more suspect than cigars and pipes? Do doctors recommend giving up smoking? What about smoking in moderation?

Q: Dr. Heller, is cancer among smokers a serious problem?
A: Well, let's put it this way: The problem first came to the attention of the medical profession when it was found that we had an increasing number of people who were dying of lung cancer. It was found that many of those dying from lung cancer were also heavy and prolonged smokers—cigarette smokers.

We don't know why people get lung cancer. We do know that men get lung cancer to a much greater extent than women.

Q: If smoking is the cause, why doesn't it show up in women?
A: It is showing up in women. There are several reasons, perhaps, why it is more prevalent in men. There is a sex difference, certainly. Men have a greater risk of lung cancer than do women, whether they smoke or not. That's first. Probably more men than women smoke, although we're speaking of proportional figures here. Men have been smoking longer than women, as a rule—for greater lengths of time. Therefore, our data are more complete on men.

However, data which have been reported recently indicate that, as one adjusts the length of time of smoking, of ages and what not, one finds lung cancer in women in beginning to come closer to that of men.

Q: Does every heavy smoker stand a chance of getting lung cancer?
A: He stands a chance.

Q: If a heavy smoker continues to smoke—what are the chances? We must adjust the length of time of smoking, of ages, and so forth. If a man starts smoking at age 50, what are the chances of his getting lung cancer in 25 years?
A: His chances of acquiring lung cancer are 1 in 10.

Q: How many cases of lung cancer are there in this country?
A: Of reported lung cancer, there are about 35,000 deaths a year.

Q: Out of how many deaths from all causes?
A: The figure is about 1.6 million, I believe. Lung cancer is not a great factor but, when added up, year after year, the chances of one dying from this—if he is a man, if he is above 45, if he is a heavy smoker—his chances of dying from that particular condition are as good as his chances of being hit by an automobile.

Q: This person you just described is in 10 of these?
A: His chances of acquiring lung cancer are in 10.

Q: Is lung cancer always fatal?
A: Almost invariably fatal. Figures found very early. The rate of survivors from lung cancer is less than 5 per cent. In other words, all of those who were diagnosed and surgically undertaken, less than 5 per cent survived for a period of 5 years.

Q: If only 25,000 people die yearly of lung cancer, how can one's chances be 1 in 10 if he is a heavy smoker? Aren't there enough heavy smokers so that 1 in 10 would produce far more than 25,000?
A: His chances of dying of lung cancer from the time he starts smoking until he dies are 1 in 10.

Q: How does that compute with deaths from all cancer?
A: There are about 250,000 deaths a year in this country from all cancer. It's about one tenth of the cancer deaths.

Q: So you could escape lung cancer and still have nine other chances of dying from some other form of cancer?
A: Cancer cause 13 per cent of all the deaths in this country.

Q: Then lung cancer causes about 1 per cent?
A: Yes, slightly more than 1 per cent of all the deaths.

Q: Is the proportion of deaths caused by all types of cancer increasing and the proportion of deaths caused by lung cancer increasing?
A: Yes. In other words, as we are surviving typhoid and gastroenteritis, malaria and so forth, we are living longer. We must die of something. We're most likely to die of heart disease—cardiovascular disease. But if we don't die of that, the next chance is cancer, and the next, I believe, is accidents.

The chances of any particular individual dying of any given disease—unless he has been exposed to an infectious disease or something on that order—cannot be mathematically computed, and it doesn't mean that he needs to worry about it particularly. A person who is a heavy smoker looks at these figures and says, "Well, I enjoy smoking. My chances of dying of lung cancer are pretty remote. I'm not going to worry about it." And maybe he goes on and lives to the age of 85 or 90 and dies of heart disease.

Q: What would be the advice of the Public Health Service?
A: The job of the Public Health Service is to present the facts, its best judgment or interpretation of the facts, to the health profession and the public generally. We don't, of course, generally act as a physician in giving medical care or advice to individual patients.

Q: Have you noticed that the British Government has issued a warning about the dangers of lung cancer from cigarettes?
A: Yes, we have read that in the newspapers.

Q: What is the U. S. Government's position on that?
A: You will see a story in the Public Health Service report (Continued on next page).
Service issued a statement to the effect that there is increasing and consistent evidence that heavy and prolonged cigarette smoking is one of the causative factors in lung cancer.

Q: Why do you put your finger right on smoking at the stage of lung cancer?

A: I wouldn't say we put our finger "right on smoking." We simply say the signs are pointing increasingly to smoking as one of the factors involved in lung cancer. It's one of the common denominators we find around the world. It's been the British experience, Scandinavian experience, Austrian experience—the experience of anybody, I think, where evidence we can rely upon. On the other hand, we know that heavy cigarette smoking certainly is not the only factor in lung cancer. Nonsmokers get lung cancer, too.

Q: Were tests carried out in all those other countries?

A: Yes.

Q: What you are saying now is a new viewpoint for the Public Health Service, isn't it?

A: Well, it brings our position up to date.

Q: Is because of some recent evaluation you've received?

A: We believe that the increasing and consistent material which has come to our attention warrants this viewpoint.

Q: Is that based on your own studies, as well as on others?

A: The studies throughout the world that we have access to.

Q: How recent is this conclusion? Six months ago would you have made the same statement?

A: Well, we didn't say that it had been arrived at gradually.

Q: How does the incidence of lung cancer in the United States compare with the incidence in some of these other countries that made studies?

A: The rate has been increasing in this country. It is not as great as the incidence of lung cancer in Great Britain, in Austria, or in Scandinavia.

Q: Do these people smoke more than we do?

A: They do in Austria, I'm told. In Great Britain it's very difficult because their smoking habits are slightly different. Their total cigarette consumption is less than ours, but they smoke a cigarette right down to the bare nub in Britain. They smoke different types of cigarettes in other countries.

Q: But there is some common factor in there?

A: There's some common factor, apparently.

ROLE OF TAR IN SMOKE—

Q: Haven't there been some reports that substances in the tobacco smoke had been isolated which are known to be cancer-causing chemicals?

A: Oh, yes, some tar.

Q: What specific things in the tar themselves?

A: There have been some investigators who contend that it is substances called aromatic amines but, as far as my knowledge goes, the exact chemical structure or the exact material of which one can point a finger with suspicion and say it is this and nothing else has not been identified.

Q: Has the paper been suspect?

A: Yes, the cigarette paper has been suspect. Many investigators have concluded that it is something in the burned paper. Others contend that it is arsenic impregnated in the paper; some that it is a substance called 3, 4-benzopyrene, which is known to be carcinogenic to animals. But I would say it is up by saying that the medical group involved and interested in this problem is not convinced that the agent is in the paper.

Q: But they do feel that there is a criminal in tobacco?

A: Yes.

Q: Then why is there a distinction made between cigarettes, apparently, and pipes and cigar smoking?

A: It would appear—we know from our epidemiological data—that people who smoke cigarettes exclusively are at a much greater risk of acquiring lung cancer than those who smoke pipes and cigars.

CIGARETTES VS. CIGARS—

Q: Why is there that difference? Why are cigarettes more risky than cigars—if you smoke a lot of cigarettes?

A: There have been two or three views expressed. One is that, first of all, cigarettes have something in them, either inherent in the manufacturing of the cigarette, or the arsenic originally that was said to be in the paper, or arsenic that was incorporated in the spray used on the tobacco, which ought to obtain the same result.

Q: Those are the things we know there are chemical changes resulting from the higher burning point in cigarette than in a cigar. For example, it has been stated that the critical temperature is about 800 degrees Fahrenheit at the end of a cigarette, and in anything less than that probably one has much less risk of acquiring cancer.

Q: It may be a function of the packing of the tobacco in the cigarettes as contrasted with cigars and pipes. It may be the curing of the tobacco—the incorporation of certain chemicals inherent in the manufacture of the glyc erin, of the arsenic paper. Others contend that it is a substance called 3, 4-benzopyrene, or arsenic impregnated in the paper; some that it is a new substance called 3, 4-benzopyrene, which is known to be carcinogenic to animals. But I would say it is up by saying that the medical group involved and interested in this problem is not convinced that the agent is in the paper.

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Interview

... "Several of my associates stopped smoking, how now?"

Q And when you remove the nicotine there isn't the same reaction.
A Not the same reaction.
Q Does nicotine stunt your growth the way we used to believe.
A I've always heard that, but I don't know any reason why it would stunt your growth.
Q If you had a perfect filter you really wouldn't be smoking, would you?
A I'd have to think very hard to come to a conclusion, that's correct. With a perfect filter no smoke would get through—just hot air.
Q But you know, for the—as a matter of fact, our student nurses and with pipes and cigars, but particularly in detecting lung cancer early—so is to have an examination by a physician at least once a year and preferably every six months when you are above 45.
Q Should this include an X ray, like the tuberculosis X ray examination?
A It might, but that would be up to the physician.

WHAT IS "EXCESSIVE"?

Q What do you regard as excessive?
A One to two packs a day or more.
Q What do you regard as moderate?
A Certainly less than a pack a day.
Q What if you smoke moderately?
A You have less risk of acquiring lung cancer.

IS THERE A RISK?

Q Is there a risk that we have heard at all about that moderate smoking is less of a risk than a heavy smoker, and that a man who smokes a pipe or cigar is less of a risk than a cigarette smoker.
A Yes.
Q Several of my associates in the National Cancer Institute in the study of this problem stopped smoking as long as 25 years ago. Some have not.
Q Would you recommend, Doctor, that any smoker should stop smoking?
A I would say this: I believe the weight of the evidence, from the data we have at hand, is that a man who has been a heavy and prolonged smoker is at a much greater risk of acquiring lung cancer than a man who does not smoke.
Q No, a rule it would be pointless. It could be that a rugged blood vessel possibly would result in hemorrhage, or cancer adjoining a large nerve might cause pressure that would cause the individual to cough frequently, or some other such weakened tissue in the lung would be so small, that it would be unnoticeable. Unhappily, there's no easy way to pick it up early enough for it to be really cleaned as a good risk, this is an area in which prevention is important.

PREVENTING CANCER

Q Prevention calls for what?
A Prevention calls for staying away from these things that we have reasons to believe are cancer-causing or are tied up with the brain.
Q Or is it individually?
A It may be, but I think that head and back index that a moderate smoker is less of a risk than a heavy smoker, and that a man who smokes a pipe or cigar is less of a risk than a cigarette smoker.

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Q Would you recommend, Doctor, that any smoker should stop smoking?
A I would say this: I believe the weight of the evidence, from the data we have at hand, is that a man who has been a heavy and prolonged smoker is at a much greater risk of acquiring lung cancer than a man who does not smoke.
Q Nobody has ever contended that smoking is good for one from a health point of view. But, if a person gets pleasure out of it and desires to smoke, knowing the facts, then, in the final analysis that's his determination.
Q Would you say, "Smoke what you like, but do it in moderation."
A If a patient said to me, "Doctor, I just can't stop smoking."
Q Would you say, "Switch to a pipe?
A Switch to a pipe if you can.

SHIFT IN SMOKING HABITS

Q Smoking has been going on quite a time. Do you think there's any chance of a change?
A In any experience I've had in my own immediate circle of friends. A third to half of them have stopped smoking, but that is an unusual sample. Among young people, smoking is into context, less than half of them are taking up smoking.
Q Now, I don't know whether that is generally true throughout the country, I think the figures show that approximately 73 per cent of all men smoke and about 35 per cent of women smoke.
Q And the yet overall cigarette consumption is on the increase, isn't it? Yes.
Q Have you given any consideration to writing off this generation against excessive smoking to the younger generation and people who have not yet started smoking?
A There have been a number of ideas expressed, as you can probably appreciate. There are those who feel that a proper control of the products that put the facts from an authoritative source before the public. The advice to those who are now smoking, if they wish to continue to smoke it should be in moderation, and advice young people of the risk and suggest that they do not start smoking.

SMOKING CIGARETTES, ANYTHING?

Q Smoking any way, but particularly cigarettes.
Q Is there any sort of a trend to that? If the cigarette improves his own chances by stopping smoking?
A Yes, there are data to indicate that one who stops smoking as long as a year, for example, improves his chances. Let me put it this way: He decreases the risk of acquiring lung cancer if he stops smoking.
Q Take a man who has been a heavy smoker for 25 years. If he stops smoking, wouldn't he be beyond redemption by that time?
A I'm not sure at what age the damage is irreparable. The data that Dr. C. Snyder of the American Cancer Society has produced would suggest that, if an individual stops smoking, his longevity increases generally; he's not likely to die regardless of how long he has been smoking. There seems to be a correlation between excessive smoking and earlier death. The death rate in individuals who have been smokers is excessive in comparison with non-smokers. Now, I personally would like to see that worked out much more precisely. I don't know how it means quite yet in reasonable terms.
Q It may well be that the sort of person who is impelled to smoke heavily is the sort who has the body build or the other characteristics that lead him to take unnecessary risks. Maybe he is the sort who is geared up to take a risk and is much more likely to have coronary disease, or maybe he is much less likely to make up his mind that he海上 might be a heavy eater. All of these things have to be woven into the blanket we're working on.
The Public Health Service is, of course, concerned with broad factors which substantially affect the health of the American people. The Service also has a responsibility to bring health facts to the attention of the health professions and the public.

In June, 1956, units of the Public Health Service joined with two private voluntary health organizations to establish a scientific study group to appraise the available data on smoking and health. We have now reviewed the report of this study group and other recent data, including the report of Dr. E. C. Hammond and Dr. Daniel Horn on June 5 to the American Medical Association in New York.

In the light of these studies, it is clear that there is an increasing and consistent body of evidence that excessive cigarette smoking is one of the causative factors in lung cancer. The study group, appraising 18 independent studies, reported that lung cancer occurs much more frequently among cigarette smokers than among nonsmokers, and there is a direct relationship between the incidence of lung cancer and the amount smoked. This finding was reinforced by the more recent report to the AMA by Drs. Hammond and Horn.

The Service also concluded that there is no new evidence to suggest that there is a high degree of statistical association between lung cancer and heavy and prolonged cigarette smoking.

Such evidence, of course, is largely epidemiological in nature. It is suggested that many important statistical public-health advances in the past have been developed upon the basis of statistical or epidemiological information. The study group also reported that, in laboratory studies on animals, at least five independent investigators have produced malignancies by tobacco-smoke condensates. It also reported that biological changes similar to those which take place in the genesis of cancer have been observed in animals. Thus, some laboratory and medical and biological data provide contributory evidence to support the concept that excessive smoking is one of the causative factors in the increasing incidence of lung cancer.

At the same time, it is clear that heavy and prolonged cigarette smoking is not the only cause of lung cancer. Lung cancer occurs among nonsmokers, and the incidence of lung cancer among various population groups does not always coincide with the amount of cigarette smoking.

The precise nature of the factors in heavy and prolonged cigarette smoking which can cause lung cancer is not known. The Public Health Service supports the recommendation of the study group that more research is needed to identify, isolate, and try to eliminate the factors in excessive cigarette smoking which can cause cancer.

The Service also concluded that more research is needed in the role of air pollution and other factors which may also be causes of lung cancer in man.

To help disseminate the facts, the Public Health Service is sending copies of the report to Drs. Hammond and Horn to State health officers, local health agencies, and the American Red Cross. A request has been made that they consider distributing copies to local health officers, medical societies, and other health groups.

While there are naturally different opinions in interpreting the facts, the Public Health Service feels the weight of the evidence is increasingly pointing in one direction: that excessive smoking is one of the causative factors in lung cancer.

The Service notes that the study group found that more study is needed to determine the meaning and significance of any statistical association between smoking and lung cancer. It requested additional data. The Service is continuing biological or clinical evidence to date to indicate that smoking per se is one of the causative factors in heart disease. Although the report by Drs. Hammond and Horn has since provided additional data on this subject, the Service feels that more statistical and biological data is needed to establish a definite position on this matter.

U.S. NEWS & WORLD REPORT, July 26, 1957

TOBACCO INDUSTRY REPLY

Following is full text of a statement by Dr. Clarence Cook Little, chairman of the Tobacco Industry Research Advisory Board to the Tobacco Industry Research Committee, issued in Washington, D.C., July 12, 1957:

The statement issued today by the Surgeon General adds nothing new to what has been known about the cause of lung cancer. It reflects the opinions of some statisticians and relatively few experimental scientists who have actively charged that cigarette smoking is a cause of lung cancer.

No new evidence has been produced since the Scientific Advisory Board of the Tobacco Industry Research Committee last met on this question on May 1, 1957. At that time, I said that, although anyone has the right to an opinion on lung cancer causation, "the Scientific Advisory Board questions the existence of sufficient definitive evidence to establish a simple cause-and-effect explanation of the complex problem of lung cancer."

This is most definitely our position today.

The Surgeon General's own statement makes clear that lung cancer occurs among nonsmokers and the incidence of lung cancer among various population groups does not always coincide with the amount of cigarette smoking.

The Public Health Service also supports the recommendation that more research is needed into the role of air pollution and other factors which may also be causes of lung cancer in man.

The Scientific Advisory Board intends to continue expansion of its program of making grants-in-aid to qualified scientists who propose to explore those areas of human health where the basic research problems appear most compelling and the prospect of results most promising.
..."Of course, we don't know what causes cancer"

A We propose that the study should go on as long as we can, because it is a complex question, which cannot be answered theoretically, as long as many of these original people are alive.

Let me put it another way: Do you have any estimate of how long it will be before you do have some results from this study that we might feel confident enough of to report?

A There has been a tentative timetable set. By next spring we hope to have some preliminary data.

Q Do you have any results so that you are sure it's going to run along the lines of the Cancer Society study?

A No, I don't say that. Merely, when you dip into the stream of information coming in, the samples tend to indicate that it was something in the same order of magnitude of happenings that the Cancer Society studied.

AIM IN CANCER RESEARCH—

Q What about your research studies—actual scientific studies—on the subject? Have they been carried forward?

A We have undertaken some of the same sorts of studies that the late Dr. Evans Graham, Dr. Ernest L. Wynder and others have undertaken, although we have supplemented— and are still supporting—many projects of this kind under our grants program. However, many years ago some of our investigators started studies subjecting mice to smoke. But these were somewhat unrewarding.

There is not much point in some of our scientists attempting to duplicate unecessarily something that has been pretty well done by someone else. We feel that our skills and resources probably can best be utilized by studies in the field, studies someone else would find very difficult to undertake.

Q Our scientists are working in the laboratory attempting to find out some of the morphologic changes that occur in the lung structure when exposed to things like tars from smoke and imitants of other kinds.

Q Have you found anything?

A Neither in mice nor in human nature as yet. You are probably aware of the work that Drs. Graham and Wynder and others have done in painting the condensates of tobacco tar on the back of animals over a continued period. They have found that skin cancers will occur in a certain percentage of these animals.

Q How high a percentage?

A They'll go as high, I believe, as about 40 per cent.

Q Aren't they using mice that are especially susceptible to cancer, and when you use ordinary mice you don't get the same results?

A That is true. There have been differences observed, utilizing the same technique that Drs. Wynder and Graham set forth, but at least five investigators in this country have duplicated the Wynder and Graham results, using their same technique.

Q If you use mice that are especially susceptible, how can you jump to any conclusions that smoke is causing the cancer?

A Cancers are used.

Q Just because it is caused on the back of a mouse doesn't mean that the smoke would cause it in a human lung, does it?

A No, you are quite right. That's been one of the criticisms, of course, that mice aren't men, and certainly one cannot extrapolate from mice to men. However, there has been more or less of a truism, or a rule of thumb, set forth that any compound which can cause a laboratory animal to be incarcerated as cancer causing in an animal is looked at with considerable interest and becomes an object of investigation, and at least indirect measurement as probably present in smoke. It is an indirect measurement in smoke at all, so elusive is this substance.

Q Do you have any conclusions that you feel confident enough of to report?

A Probably there is something in that premise. Why are some individuals cancer-prone and others not? First of all, we don't know what causes cancer. We simply believe it is a combination of things; whether the particular combination of atmospheric pollution, cigarette smoking, a person's sex—all of these things happen to come together and it triggers the others; whether certain individuals are more resistant to certain cells or have something in time triggers them. We just don't know these things.

There are those who are convinced that individuals with certain body builds are more much likely to acquire cancer. We know, for instance, that an obese person has a slightly greater risk of acquiring any sort of cancer than a man who isn't quite so obese.

Q What if you knew? It wouldn't do you any good, would it?

A You could be examined every three or six months.

Q Wouldn't you create a nation of people with phobias?

A One certainly might be confronted with that, but, if it is approached in a common-sense fashion, I don't think that it will happen. There are those who are convinced that individuals with certain body builds are more much likely to acquire cancer. We know, for instance, that an obese person has a slightly greater risk of acquiring any sort of cancer than a man who isn't quite so obese.

Q Are you getting closer to finding the causes of cancer?

A I think we are, but I don't know whether it is right around the corner or many corners away from us.

THEORY ABOUT VIRUSES—

Q Is it possible that a virus or organism might be a factor?

A We do not know whether viruses can cause human cancer. We do know that viruses cause certain cancers in animals—leukemia and certain other tumours. There are many investigators in the cancer field who are convinced that many human cancers have a viral origin. That thesis has been demonstrated conclusively, and whether or not it is true is simply in the future.

Q Is there anything to indicate any connection between alcohol and cancer?

A Not enough for one to speak with any degree of assurance. The Harvard Public Health group in New York noticed some correlation between alcohol and the occurrence of cancer of the urinary bladder. There have been some studies on alcohol in the occurrence of oral cancer, but not enough that anyone feels certain about it.

Q Doctor, you say that you don't know what the cause of cancer is, but you seem to imply at the same time that you feel almost 100 per cent sure that there is some type of cause-and-effect relationship between heavy cigarette smoking and lung cancer.

A When we speak of a "cause" of cancer, we don't know what happens in that cell to cause it to cease being a normal cell and become an abnormal cell, and begin to break off, grow, and become a cancer. We have picked out just what it is today, but some day you'll find it and it will be there in that relationship, I think it is.

Q When we speak of a "cause" of cancer, we don't know what happens in that cell to cause it to cease being a normal cell and become an abnormal cell, and begin to break off, grow, and become a cancer. When you say you don't know what it is, do you mean that you feel confident enough of to report?

A When we speak of a "cause" of cancer, we don't know what happens in that cell to cause it to cease being a normal cell and become an abnormal cell, and begin to break off, grow, and become a cancer. When you say you don't know what it is, do you mean that you feel confident enough of to report?

Q I don't know when it will come. I believe it will come.

Q Soon?

A I wouldn't stick my neck out that much. I believe it's coming. I think I a lot of good work has been done in many areas and many aspects of cancer research.

A Chemical in Tobacco—Can It Cause Cancer?

What follows is one more phase in the dispute over cigarette smoking and cancer.

A news story by the United Press, distributed on July 15, said:

U.S. Surgeon General Leroy E. Burney said Government scientists have found a chemical agent in cigarette smoke which they suspect may cause lung cancer.

Burney, in an interview with United Press, identified the substance as benzpyrene. He said it is formed when the aromatic oils in tobacco are burned at a high temperature to crack the aromatic oils. Pipe tobacco and cigar smoke at much lower temperature, he said.

Dr. Robert C. Hockett, associate scientific director of the Tobacco Industry Research Committee, replied on the same day, July 15, to the statements attributed to Burney. Excerpts from Dr. Hockett's statement follow:

The question of the presence of benzpyrene in tobacco smoke has been under investigation for a number of years, and it has been widely discounted as a significant factor in connection with lung cancer by scientists familiar with the work.

There is a number of reasons for this. Scientists have not actually succeeded in isolating the substance from tobacco, and since benzpyrene has been identified the substance by means of extremely sensitive, indirect measurements as probably present in smoke. Several chemical processes have been used to isolate benzpyrene from tobacco smoke, but all have failed. Benzpyrene is a substance that may be present in cigarette smoke, it occurs in such minute quantities that it could not even account for such things as an increased incidence of cancer in areas where one would expect to find such a substance. In addition, benzpyrene is present in many other things in the air, and the smoker's exposure would be relatively small.

The substance frequently is produced in minute quantities in the burning of any organic compound and is present in varying degrees in the air. Recent reports in England show that the daily intake of benzpyrene from breathing London air is equivalent in total volume to the intake from smoking about 100 cigarettes a day.

After seeing the press reports, the Surgeon General on July 16 issued the following statement:

There are some scientific studies which indicate that benzpyrene has been identified in cigarette tar. There is no evidence to indicate, however, that benzpyrene by itself is present in sufficient quantities in cigarette smoke to cause human lung cancer. More research is needed on this question and the effects produced by other chemical agents, as well as temperature gradients and various specific materials in the original tobacco.
WHAT BRITONS ARE TOLD ABOUT LUNG CANCER AND TOBACCO

E. C. Hammond and D. Hoar of the American Cancer Society who, in total the statistical evidence from one, or possibly two, decades of inquiry is now very consider-
able. It is further strengthened by the observed differences in the occurrence of the disease for different types of habit.

For example, the exposure to cigarette smoke, which is the predominant cause of lung cancer, has been confirmed by the results of various experiments carried out in laboratories. These experiments have shown that the smoke from cigarettes contains a number of carcinogenic substances, including polycyclic aromatic hydrocarbons, which are known to be capable of causing cancer in laboratory animals.

One of the most important of these substances is 3,4-benzpyrene, which is a constituent of coal tar and is also found in cigarette smoke. It is known that 3,4-benzpyrene is mutagenic, and experiments have shown that it can cause DNA damage and lead to the development of cancer.

There is also evidence that the risk of lung cancer is increased by the duration and intensity of smoking. For example, smokers who have been smoking for more than 30 years are at a higher risk of developing lung cancer than those who have smoked for less than 10 years, and the risk increases with the number of cigarettes smoked per day.

The risk of lung cancer is also increased by other factors, such as age, race, and sex. For example, lung cancer is more common in men than in women, and it is more common in white Americans than in African Americans.

WHAT BRITONS ARE TOLD

In their Journal of the American Medical Association report, Hammond and Hoar note that the risk of lung cancer is increased by the duration and intensity of smoking, and that the risk increases with the number of cigarettes smoked per day.

The risk of lung cancer is also increased by other factors, such as age, race, and sex. For example, lung cancer is more common in men than in women, and it is more common in white Americans than in African Americans.

HOW THE BRITISH GOVERNMENT ACTS

The British government has implemented a number of measures to reduce the risk of lung cancer, including restrictions on smoking in public places, advertising restrictions, and health warnings on cigarette packages.

In addition, the government has funded research into the causes of lung cancer and has supported efforts to find ways to prevent the disease.

SMOKING AND HEALTH

It is in their joint report, "The British Government," that Hammond and Hoar emphasize the importance of smoking as a cause of lung cancer, and they point out that the risk of developing the disease is increased by the duration and intensity of smoking.

The risk of lung cancer is also increased by other factors, such as age, race, and sex. For example, lung cancer is more common in men than in women, and it is more common in white Americans than in African Americans.

TO ALL SMOKERS

There are now the strongest reasons to believe that smoking is the single greatest risk factor for lung cancer, and that the risk increases with the duration and intensity of smoking.

The risk of lung cancer is also increased by other factors, such as age, race, and sex. For example, lung cancer is more common in men than in women, and it is more common in white Americans than in African Americans.

THE BRITISH GOVERNMENT, acting on the findings made by the Medical Research Council, now is distributing posters through local health authorities that read as follows:

Medical Officer of Health

U.S. NEWS & WORLD REPORT, July 26, 1957

BENEFITS OF BLOOD TRANSFUSIONS

The benefits of blood transfusions were discussed by a panel of experts at the American Association of Blood Banks meeting in Chicago. The panelists emphasized the importance of blood transfusions in saving lives and reducing the risk of death from blood loss.

The panelists also discussed the importance of blood donations and the need for more blood donors to meet the needs of patients requiring blood transfusions.
..."Many factors other than tobacco smoke may produce cancer"

promising these-culture experiments were reported in 1958 by Dr. L. Lasnitzki of the Strangeways Research Laboratory, Cambridge. She showed that small quantities of 3,4-benzopyrene induced lung cancer in mice. The early reports showed that exposure of human fetal lung tissue grown in vitro. If this technique can be suitably applied, it will help materially in the investigations of tobacco smoke.

Many factors other than tobacco smoke are undoubtedly also factors in producing lung cancer in man. At least five industrial hazards have already been recognized, and there is evidence of additional hazards which have not yet been identified. For instance, in the last few years Dr. Lesley Bidstrup of the Department for Research Case of the Institute of Cancer Research, London, has shown an enhanced risk in men engaged in this country in the manufacture of chrome from chrome ore; the extent of the risk for men heavily exposed to asbestos dust has also been demonstrated by Doll.

**Dangers in Polluted Air**

Moreover, studies of atmospheric pollution which suggest an association with lung cancer have been reported. For example, Dr. J. M. Campbell has endeavored to overcome this to bring in the risk among nonsmokers by applying an extract, freed from aromatic hydrocarbons, of a town atmosphere. The material was thought to contain oxidized products of petrol, emitted by internal-combustion engines.

Indirect negative evidence has been submitted by Dr. P. A. B. Ruffle, senior medical officer to the London Transport Executive, who has found that in recent years the doctors, conductors and maintenance men in his employment who may have been exposed to the petrol engines have none of the symptoms of lung cancer, while in the past the rate of lung cancer has been as high as 2.0 per cent per year. There is thus no justification for regarding the risk of developing cancer as greater with cigarette smoking than with smoking of other types.

Some part of the difference may, perhaps, also be attributable to differences in degree of pollution of the air; this would help to explain why there is so much less pollution in the two countries for the last 50 years, and Eastcott therefore suggested that differences in structure and function of the lung, due to the lower level of pollutants in the atmosphere, may account for the differences in the risk among nonsmokers.

Mr. R. L. Cooper suggested in 1953 that the solvent action of tobacco smoke may be effective in some way to remove the 3,4-benzopyrene from the soot deposited in the lung and bring it into intimate contact with the tissues. In this way the product may not remain as a foreign substance—which is not necessarily entirely, or even mainly, 3,4-benzopyrene—is sufficient to produce cancer.

In their endeavor to answer them the Council have set up two further research groups, one at the University of Sheffield, under the direction of Dr. J. P. Pomerantzeff, and another at the Medical Research Council's Laboratory Committee for Cancer Research at the University of Sheffield, under the direction of Dr. J. P. Pomerantzeff. In addition, grants have been made to individual workers in universities, hospitals and elsewhere for personal remuneration.

..."Amount of tar in cigarette smoke can be controlled"

The particular kinds of atmospheric pollution which come under suspicion as causes of lung cancer are exhaust fumes from petrol engines and diesel engines as well as smoke from cigarettes. It has long been known that extracts of soot will produce skin cancer in mice, and it has also been shown that soot particles contain firmly bound, 3,4-benzopyrene, which is not removed by washing, and although it is present in very little, Dr. Kott and Dr. H. L. Folland obtained cancerous skin tumors in mice by application of an extract, freed from aromatic hydrocarbons, of a town atmosphere. The material was thought to contain oxidized products of petrol, emitted by internal-combustion engines.

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