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## BOOMS IN MIDST OF RECESSION

**LATEST FINDINGS:**

# DOES SMOKING SHORTEN LIFE?

EXCLUSIVE INTERVIEW with

**Dr. E. C. Hammond**  
of American Cancer Society

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SPARTANBURG  
SEP 24 1954

# DOES SMOKING SHORTEN LIFE?

Millions of people, in recent days, have been asking questions like these:

Is smoking really dangerous to health? Does the American Cancer Society's study prove that cigarettes tend to shorten life?

To get the latest on the subject, *U. S. News & World Report* interviewed Dr. E. Cuyler Hammond, who headed the Cancer Society's study group and reported findings

to the American Medical Association at San Francisco last week.

Dr. Hammond, who is director of statistical research for the American Cancer Society and also professor of biometrics at Yale University, has been conducting one of the most extensive research projects in medical history—involving health histories of 187,766 smokers and nonsmokers.

**Q** *In the simplest terms, Dr. Hammond, how many years may a heavy smoker shorten his life? Is he cutting off one year or five years from the normal span?*

**A** We don't know that because we have only had this restricted age group in the study so far. In addition, these findings are very, very new, and I haven't had time to study them with as much care as I want to from that standpoint. I can tell you this: The death rates among regular cigarette smokers are about the same as the death rates among nonsmokers—people who never smoke—who are five years older.

**Q** *So that you might be adding five years to your life by not smoking?*

**A** Something like that. You might say that smoking ages a man around five years.

**Q** *Do you feel that the sample that was taken is adequate to support the conclusions drawn?*

**A** I think it is adequate to support all the conclusions we've drawn from it.

**Q** *Do you think the sample could have been larger, or should have been?*

**A** Of course the larger the better, but this was the largest ever tried by a long way. And we are continuing the study, as you know.

**Q** *But, from a statistical standpoint, it would seem to you to be conclusive?*

**A** We have given the probabilities for each statement we have made. Statistical tests of the data have indicated that it is extraordinarily unlikely or virtually impossible that the most important of these findings could have occurred by chance alone. Or, as statisticians say, "it is statistically significant to a very high degree."

**Q** *What, in everyday language, would you say these findings suggest?*

**A** I think these findings very strongly suggest that smoking increases the death rate, at least among white males between the ages of 50 and 69, which is the group we've studied.

**Q** *Does that mean the smoking they did prior to the time they were 50 is responsible, or that the smoking that they do between 50 and 69 is responsible?*

**A** That we do not know. Two diseases are primarily concerned—one is cancer and the other is heart disease. If I had to make a guess on it, I would guess that the cancer is a long-term effect. That is, it takes many years of smoking to produce the result. On the other hand, I would be more inclined to say that the effect on the heart disease was more acute—that is, recent smoking would be more important for this disease. But that is only a guess, we don't really know that.

**Q** *You mean that you can get a quick reaction on the constriction of blood vessels?*

**A** Oh, in a matter of minutes at most. There's a lot of experimental evidence on that.

**Q** *Is there any evidence as to what effect on the human system smoking done prior to 50 might have had, in making more susceptible to cancer the person who did the heavy smoking between 50 and 69?*

**A** The reason I made that estimate about cancer was that, when you expose an experimental animal to chemical substances which could produce cancer, you usually have to expose them for a period of anywhere from a half to two thirds the normal lifetime of the animal before the cancer appears. Now that is very

## "Smoking Ages a Man Around Five Years" . . . Cigarettes Affect Heart Disease and Cancer . . . How Death Rates Go Up

nearly the only evidence on the subject. Evidence from animal experimentation of that kind might or might not apply to man. If it does apply, somebody would have to smoke heavily for a great many years before whatever the harmful ingredient is in cigarettes could be effective.

**Q** *What if you stopped smoking at 50, if you had smoked from 20 to 50—would that be helpful?*

**A** My guess is that it might be helpful, but again there is no proof one way or the other. The statistical evidence we have does not bear on that subject, mainly because there are so very few men who smoked cigarettes heavily in their youth and then gave it up entirely, except those who gave it up because they had some serious disease and their doctor told them they had to stop smoking. Naturally they are going to die sooner.

**Q** *Were you surprised by the fact that so much of the data indicates that diseases of the heart are related to smoking?*

**A** No, I was not. Before the studies began I was just as suspicious of that as anything else.

**Q** *But has it been generally accepted heretofore that diseases of the heart are related to smoking?*

**A** Oh, there is a great deal of experimental evidence that smoking has an effect upon the heart. This work has been done by a number of different investigators and is well summarized in a paper by Dr. J. H. Weatherby. Twenty or 30 people have checked the heart rate, the blood pressure and the effect of smoking on the small blood vessels. Smoking a few cigarettes causes a rise in blood pressure, a rise in heart rate and a constriction of the small vessels.

**Q** *What I mean is, how widely accepted has that theory been prior to your study?*

**A** Well, I've heard few people express any doubts about it.

**Q** *But the public has been thinking only in terms of cancer—*

**A** I think that is fair to say. It is very dangerous to say what medical opinion is because different doctors have different opinions, but it is my impression that the great majority of doctors for many years have told heart patients that they've got to stop smoking. That has been the general opinion for a very long time.

**Q** *What has been the average person's reaction when a doctor has told his patient to stop smoking—hasn't it been one of skepticism?*

**A** No, I don't think so.



—American Cancer Society

**DRS. HORN AND HAMMOND—AND THE EVIDENCE**

They teamed up and found "a definite association between smoking habits and death rates"

**Q** *Is this latest statistical finding of yours the most conspicuous piece of proof we've had on the relationship between smoking and a heart condition?*

**A** Statistically, this is the only direct proof I know of. The idea that smoking is dangerous to somebody who has had a heart attack, I think, has been widely accepted by the medical profession. But there was no previous statistical proof of it.

**Q** *So that your findings are important and significant evidence in relation to heart conditions as much as they are significant evidence in relation to cancer?*

**A** Oh, the heart findings are at least as interesting as the cancer findings.

**Q** *What is your theory as to that?*

**A** Because many more deaths are involved—well over half the total number of deaths were related to coronary heart disease. Let me say it this way: The relative effect was not as great in heart as in cancer—that is, the chances of somebody dying of a coronary attack was increased 95 per cent by heavy cigarette smoking. The chances of dying of cancer were increased by 156 per cent.

(Continued on next page)

# IS SMOKING A HAZARD TO HEALTH?

## FOR ALL CIGARETTE SMOKERS:

The death rate runs this much higher than for nonsmokers...

**DEATH FROM All Causes** 63% ABOVE NONSMOKERS

**DEATH FROM Heart Disease** 82% ABOVE NONSMOKERS

**DEATH FROM Cancer (all)** 106% ABOVE NONSMOKERS

**DEATH FROM Lung Cancer** 200% OR MORE ABOVE NONSMOKERS

## FOR HEAVY CIGARETTE SMOKERS:

(pack a day or more)

The death rate runs this much higher than for nonsmokers...

**DEATH FROM All Causes** 75% ABOVE NONSMOKERS

**DEATH FROM Heart Disease** 95% ABOVE NONSMOKERS

**DEATH FROM Cancer (all)** 156% ABOVE NONSMOKERS

**DEATH FROM Lung Cancer** 400% OR MORE ABOVE NONSMOKERS

Source: American Cancer Society

**Q** But they are both pretty big so far as the layman is concerned—

**A** Yes, they certainly are.

**Q** So that actually your findings say, do they not, that a greater number of people actually die as a result of cigarette smoking in its association with heart conditions than the number of people who die in the association of cancer to cigarette smoking?

**A** Oh, yes.

**Q** Therefore, in order to provide some corrective or some means of eliminating the deleterious substance from cigarette smoking, it would mean that far more lives would be saved if we could find the secret of that substance in so far as heart conditions are concerned than would be the case with respect to cancer?

**A** I think that is almost certainly true, yes. Probably removing all the nicotine would be more important than anything else.

**Q** Could cigarettes give pleasure to the person who does the smoking if the nicotine were removed completely?

**A** I have grave doubts myself, but I think that

would have to be tried and seen. It would be like taking caffeine out of coffee.

**Q** Necessity is the mother of invention—they might find a way to do it, though—

**A** Oh, yes! Well, I hope they do. I am not against cigarette smoking if it can be made safe. I hope the tobacco companies can find a solution.

**Q** Then nicotine is probably the dangerous substance?

**A** For heart there is a great deal of evidence that it is nicotine. Now, we can't rule out the possibility that it's carbon monoxide, but it certainly appears that it's nicotine. There are two effects—the increasing heart rate and increasing blood pressure, and the constriction of small blood vessels—which are due, as far as we can make out, entirely to nicotine.

**Q** What about the tars?

**A** Well, there has been a lot of discussion about the word "tar." People have made the distinction between the word "tar" and the word "nicotine." Actually, when experimental workers talk about "tar," the word merely means a mixture of substances—for example, material that can be collected by the condensation of

After a survey of 4,854 recent deaths, all of them white men aged 50 through 69, the American Cancer Society came up with these statistics:

### FOR COMBINATION SMOKERS:

(cigarettes and cigars, cigarettes and pipes, or all three)

The death rate runs this much higher than for nonsmokers...

DEATH FROM  
All Causes

36% ABOVE  
NONSMOKERS

DEATH FROM  
Heart Disease

56% ABOVE  
NONSMOKERS

DEATH FROM  
Cancer (all)

77% ABOVE  
NONSMOKERS

### FOR SMOKERS OF PIPES OR CIGARS OR BOTH:

The death rate runs this much higher than for nonsmokers...

DEATH FROM  
All Causes

6% ABOVE  
NONSMOKERS

DEATH FROM  
Heart Disease

SAME AS NONSMOKERS

DEATH FROM  
Cancer (all)

32% ABOVE  
NONSMOKERS

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cigarette smoke. It's not a scientific term. It doesn't identify any particular substance—it simply means a mixture of substances.

**Q** Does it make any difference whether a person inhales or not?

**A** We did not ask that question of the men we studied because many people inhale unknowingly and could not have answered the question correctly. Therefore, we had no direct statistical information on that. It would be my guess that inhaling is more dangerous than not inhaling.

**Q** You spoke of carbon monoxide generated by cigarette smoking. Does that suggest that the other places where the human being inhales carbon monoxide might be worth looking into?

**A** The subject has been studied very intensively by the Public Health Service and other groups. Precautions are taken in factories to avoid carbon-monoxide poisoning. Long tunnels are well ventilated to avoid the danger.

**Q** What about carbon-monoxide exhaust from automobiles?

**A** That is very dangerous in any closed space. Some

people are killed by that as they run their car in the garage.

**Q** Is there anything in your studies that suggests that perhaps in other than closed spaces there may be dangers from carbon-monoxide exhaust?

**A** I doubt if there is any danger in open spaces.

**Q** What do you think a heavy smoker should do under all these circumstances? Is it wise to cut down on his smoking, or give it up altogether?

**A** Well, I can tell you what I've done—I've switched to a pipe.

**Q** That would be your own apprehension, but when you are giving advice to others, what kind of advice would you give—based on the study?

**A** If somebody asked my advice, I'd suggest that he didn't smoke.

**Q** At all, or not heavily?

**A** I would say it would be better for him not to smoke at all, but smoking heavily is worse.

**Q** A pipe is less dangerous than a cigarette?

**A** There is no doubt but that pipe and cigar smoking are less dangerous than cigarettes.

(Continued on next page)

... "We have no statistical evidence on women smokers"

**Q** Well, women don't smoke pipes and cigars—

**A** Some do—at least in Denmark.

**Q** Is there any way of knowing whether the effects upon women smokers are the same as upon male smokers?

**A** We have no statistical evidence on the subject.

**Q** Is there anything in previous statistical evidence as to the death rate from lung cancer being the same among women as among men?

**A** The death rates from lung cancer are considerably less among women than among men.

**Q** What about the deaths from heart disease among women compared to men? Are they less or more?

**A** The death rates from diseases of the coronary arteries are lower among women than among men.

**Q** And you would have to get a brand-new set of statistics in order to know about women in relation to smoking?

**A** Yes. Our study had to do only with men in certain age groups.

**Q** One lady who is a heavy smoker said to me this morning, "Well, I think that when you get to be between the ages of 50 and 69, you're due to die anyway"—

**A** Well, if she wants to take that attitude, of course that's one thing. I've heard several people make that comment. But if that's their attitude, I think we might as well stop wasting money on medical research altogether.

**Q** Some people won't agree, of course—

**A** Yes, some people want to live. I've heard many young people say, "By the time I get to be 50, it doesn't matter." But I don't hear many people around 50 saying that—or at 60 and at 70.

WHAT FILTERS MIGHT DO—

**Q** Do you have any evidence that shows that persons who use a filter-tip cigarette are perhaps less susceptible to adverse effects from smoking than others?

**A** We have no information on that.

**Q** What is your guess as to that?

**A** I hate to make a guess on it.

**Q** Well, does the filter actually exclude the nicotine?

**A** I believe that a filter could be made which would exclude all the nicotine and all the tar. But I am not sure whether anybody would want to smoke a cigarette if absolutely all of these materials were removed from the smoke. The problem is to get a filter that lets through the good taste part—what we want to smoke for—and cuts down the danger.

**Q** Why would a pipe be less dangerous than a cigarette? You get nicotine out of that, too, don't you?

**A** All that I know is that the death rates were a lot lower. Beyond that I can only guess. What happens is that there's a lot of condensation in the pipe stem. You know, almost all pipes have condensers in them, and,

even if they don't, the smoke condenses in the stem. Another thing is that I'm certainly under the strong impression that relatively few regular pipe smokers inhale, whereas a great many cigarette smokers do. Another thing is that there's a different type of tobacco used for pipe smoking than for cigarettes and a different additive.

**Q** What about cigars in the same way? This may revive cigar smoking—

**A** I think it well could.

**Q** Why, though, wouldn't the cigar be just as harmful? You have the actual tobacco in your mouth there—

**A** Because there were relatively a small number of pipe and cigar smokers in the sample, we do not have as much information on these two types of smoking as we have on cigarette smoking.

The figures give the impression that pipe and cigar smoking may be related to some types of cancer. We hope to have more reliable information on this within a year or two, but until that time I would not want to make any definite statements on pipe and cigar smoking.

**Q** Don't some people get cancer of the mouth from cigars?

**A** I would think that is quite possible. But, then, cancer of the mouth is a much rarer disease than lung cancer among smokers and nonsmokers alike.

**Q** Is there anything in your study to show whether people inhale or do not inhale cigars?

**A** We have no information in our study concerning inhalation.

**Q** What about chewing tobacco used by some farmers and workers? Is that touched upon in your studies?

**A** No, we did not study it.

**Q** Is there any evidence on that subject?

**A** There was a study made some time ago. A report was published by one of the hospitals in New York on the subject that seemed to show that chewing tobacco did have a bad effect and did have a relationship with cancer of the mouth. I want to make it clear, however, that that was not my work. So far as our study is concerned, we have no data on it.

**Q** What other diseases beside cancer and heart disease did your statistical studies show had a relationship to heavy smoking?

**A** There's not enough evidence to make any statement concerning other diseases, either positive or negative—not even a real hint.

22,000 VOLUNTEERS—

**Q** Who did all this work?

**A** Twenty-two thousand volunteer researchers of the American Cancer Society collected the smoking histories and have twice traced and reported on the status of men. They did a magnificent job. The study could not have been done without the hard work of

## ... Cancer deaths "2.5 times as high" for heavy smokers

personnel in the divisions of the Society and the co-operation of health departments and doctors who provided us with information on causes of death. Dr. Daniel Horn and I analyzed the data, with Laurence Garfinkel and Mrs. Constance Percy.

**Q** *But what you did was to separate those who didn't smoke from those who did smoke. Is that right?*

**A** That's correct.

**Q** *And you found that the results among those who did smoke showed a heavier death rate from cancer and heart diseases than occurred among the people who didn't smoke?*

**A** That is correct.

As we stated very carefully in the paper before the American Medical Association, we have very little detailed information on sites of cancer other than the lung cancer. We have an analysis for a combination of all sites other than lung cancer, but we don't have a detailed analysis by sites.

**Q** *That's another field of research and analysis which lies ahead, then?*

**A** It will require a longer time to follow up these subjects.

The total death rate from cancer, all sites combined, was about two and one-half times as high in people who smoked cigarettes heavily as in people who had never smoked. By "heavily," I mean a pack or more a day. We split out the lung-cancer death cases, and we found that the lung-cancer group accounted for 167 out of a total of 844 cancer deaths. Everything else lumped together accounted for the rest. But there weren't enough cases of any one particular site to be able to tell what sites were involved with any surety. In another year, we'll know.

**Q** *You mean the type of cancer?*

**A** Yes. We certainly tried to imply in the paper, when we said "cause and effect," that in our opinion it is proven beyond any reasonable doubt for lung cancer. Now we are not sure what other sites are involved. Some are, but we are not quite sure which ones.

**Q** *How about stomach?*

**A** We're not dead certain.

### 187,766 SUBJECTS—

**Q** *Your statistical findings must have taken into account a large number of people—approximately how many?*

**A** 187,766.

**Q** *How many of those people didn't smoke at all?*

**A** The total number who said that they had never smoked was 32,381. Now, let me tell you our definition of "never smoked." The definition was that they had never smoked more than five or 10 cigars in their lives or a few pipefuls of tobacco or had never smoked more than a pack or two of cigarettes in their whole lives. Almost everybody has taken a puff once.

That was our definition—people who had never done more than try it a few times.

**Q** *Then how many smoked occasionally?*

**A** 11,710—that's the lifetime history—taking a cigar maybe once a week at a poker game, and that sort of thing.

**Q** *That's in addition to the 32,381?*

**A** That's right.

**Q** *So you've got about 44,000. Now, what is the other 143,000?*

**A** Now, that will require a little explanation. We had a smoking questionnaire. The first question was, "Have you ever smoked at any time during your life—yes or no?" Then, if they said "Yes," that they have smoked, for each type of smoking we asked them their present smoking habits—that is, for cigarettes, whether or not they are currently smoking, and in what amount. Then we asked them about the past history of their cigarette smoking—how long they had smoked cigarettes and any particular amount and for any particular length of time.

We asked the same questions with regard to cigar smoking and pipe smoking. When we made an analysis, we first classified the men according to their lifetime history, irrespective of what they were doing at the time they were questioned.

The groups we classified were: "Never smoked," and "Smoked but occasionally only."

All the rest of them were put in a group "smoked regularly." By "regularly" we mean every day, during an appreciable period of time. Then we classified these by cigars only, pipe only, cigars and pipe, cigarettes only, cigarettes and cigars, cigarettes and pipes, and all three types, cigarettes, cigars and pipes—in other words, by each of the combinations of regular smoking.

Now I will give you the number of cases we had in each.

### 63,764 CIGARETTE SMOKERS—

**Q** *Well, I think it would be interesting to find out how many just smoked cigarettes alone regularly—*

**A** Lifetime history of the number of people who smoked cigarettes only and have never smoked any other type regularly was 63,764. That is the over-all figure for all age groups combined. Considering all the men between the age of 50 and 70, of the total of 187,766, there were 63,764—or about 34 per cent—who had smoked cigarettes regularly at some time during their lives and had never smoked cigars or pipes regularly.

But let me tell you something about that. The percentage of people who had that type of history varied tremendously in the different age groups. Let me read you the percentage figures in each five-year age group.

*(Continued on next page)*

... "Percentage of cigarette smokers goes down with age"

In age group 50 to 54, the total number of people in the sample was 60,973. Of those, 26,365 had smoked cigarettes regularly and no other type. That is 43.2 per cent in age group 50 to 54. In age group 55 to 59, it was 35.5 per cent. In age group 60 to 64, it was 27.8 per cent, and in age group 65 to 69, it was 20.3 per cent.

It shows something that's a combination of two factors, probably. Since cigarette smokers have a much higher death rate than people who do not smoke, the percentage of cigarette smokers would go down with age.

**Q** Why would it go down with age?

**A** Well, suppose you have 100 people. Half of them take a certain drug "A" and the other half don't. But of those who take drug "A," half die within a year, and of those who don't take it, only 10 die. At the end of the year you are going to have a higher percentage of people left who did not take the drug.

**Q** I see what you mean. But what I was going to ask you is, that among these people who smoked cigarettes only, did you find that they had a higher death rate—whether you take it between the years 50 and 69 or any other period—did they have a higher death rate than persons who smoked cigarettes and cigars and pipes?

**A** Yes, they did.

**Q** Indicating that the less of cigarettes they smoked, and the more of something else, the greater their

chances of longevity? Is that a proper inference from your statistics?

**A** That at least partially accounts for the findings. However, I doubt that it fully accounts for the findings. Smoking habits have been changed.

Let me read you some figures and I think you can draw your own conclusions. Now first I am going to read you figures for each of the four age groups—first, the rate for people who have never smoked, that is, the death rate per 100,000. Then I am going to give you the figure for people who smoked cigarettes only, and then I am going to give it to you for people who smoked cigarettes and/or cigars and pipes—that is, cigarettes plus another type.

In the age group 50 to 54, we had 9,170 people who had never smoked anything at any time. Of those 91 died. Dividing 91 deaths by the total of 9,170 gives a death rate of 992 per 100,000.

Now let us take the people who smoked cigarettes regularly and never smoked cigars or pipes regularly—and I do want to emphasize that this group of "cigarettes only" includes people who smoked cigarettes about a half a pack a day for, say, a year, 20 years ago.

In this same age group—50 to 54—for those who smoked cigarettes regularly at some time during their lives and never smoked either cigars or pipes regularly, the death rate was 1,635 per 100,000 as compared with a death rate of 992 per 100,000 for the nonsmokers.

## U. S.—A Nation of Smokers

The average American, 15 or over—

**IN 1920, smoked 630 cigarettes, or 31½ packages**



**IN 1953, smoked 3,500 cigarettes, or 175 packages**



**INCREASE:**

**456%**

Source: American Cancer Society

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## ... "Association between death rates and cigarette smoking"

For those who smoked cigarettes regularly at some time and also smoked some other type regularly, the rate was 1,513 per 100,000. Now, by and large, the people who have smoked both cigarettes and pipes haven't smoked cigarettes as much as people who have only smoked cigarettes.

Now here are the same figures per 100,000 in age group 55 to 59. For "never smoked," 1,729. For "cigarettes only" it was 2,773. For cigarettes and pipes or cigars or all three, it was 2,206.

Now we are taking the death rates in the age group 60 to 64. Never smoked, 2,145. Cigarettes only, 4,322. Cigarettes and other, 3,533.

Now, in the age group 65 to 69, for "never smoked," the death rate was 4,470. For "cigarettes only," it was 5,790. For "cigarettes and other," it was 5,073.

**Q** Now those that you have read are people who died in that group per 100,000?

**A** Yes, it's death rate per 100,000.

Now I'm going to give you some totally different figures and these will be numbers and not rates.

I am reading from the chart which is labeled: "Effect of smoking one pack of cigarettes or more a day."

Of people in our sample who smoked one pack of cigarettes or more a day, a total of 745 died. If they had died at exactly the same rate as people who never smoked, then only 426 would have died. In other words, there were an additional 319 deaths in that

group which can be attributed to heavy cigarette smoking.

The best summary statement I have is what I said to the American Medical Association.

Having found a high association between death rates and regular cigarette smoking, we were interested to know the degree to which the two most important diseases were involved.

We computed the number of deaths in each category of smoking which would have occurred if the men who smoked that amount had died at exactly the same rate as people who never smoked. We call those "expected" deaths—that is, how many deaths you would have expected to occur out of this many men, if the men had never smoked.

We summarized the results of this comparison from men who were currently smoking a pack or more of cigarettes a day at the time they were questioned. As shown on our chart, only 426 men would have died out of this group, if they had been subject to exactly the same death rate as men who never smoked. Actually, 745 men died who were smoking one pack or more of cigarettes a day at the time they were questioned. This was 319 more deaths than expected, or an additional 75 per cent.

The thing we wanted to do was to see the excess by diseases. Now, out of the 745 deaths among men who

*(Continued on next page)*

### DEATH RATES – Smokers and Nonsmokers

Among heavy cigarette smokers – men aged 50 through 69 – covered by the American Cancer Society survey:

THE EXPECTED NUMBER of deaths was 426



THE ACTUAL NUMBER of deaths was 745



SO actual deaths exceeded expected deaths by 319

#### QUESTION:

Did smoking contribute to the causes of these

**319**  
deaths?

\*If they had died at the same rate as men who never smoked.

Source: American Cancer Society

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## . . . Smokers: "163 extra deaths from coronary diseases"

smoked a pack of cigarettes or more a day, 334 died of diseases of the coronary arteries. Only 171 would have died of this cause if their rates had been exactly the same as the men who never smoked. In other words, there were 163 extra deaths from coronary diseases as a result of smoking one pack or more of cigarettes a day.

Again, of the 745 total deaths which occurred in this group, 161 of the men died of cancer. Only 63 would have died of cancer if their cancer death rates had been the same as it is for men who have never smoked. This is an excess of 98, which is 2.55 times as high as men who never smoked.

Of course, some of the men died of causes other than cancer and diseases of the coronary arteries. For simplicity, I have not shown this on our chart. In the report, however, we have given the full figures. I have merely given a brief summary statement here.

**Q** *Would that affect the validity of your sample?*

**A** No.

**Q** *Among the people who didn't smoke, there were deaths from both cancer and heart diseases, weren't there?*

**A** Oh, yes.

**Q** *And were those deaths—that is, the people in your sample who didn't smoke—were the percentages of those who died from cancer and who died from heart disease comparable to what is supposed to be the normal death rate from cancer and normal death rate from heart diseases these days?*

**A** The death rates were a little lower than reported national figures for a comparable period of time. Death rates, as ordinarily reported by custom, are death rates per 100,000 people per year. Now this follow-up period covered by the sample was more than a year, so these figures are not strictly comparable to ordinary death rates.

### WHY DEATH RATES VARY—

**Q** *Were they higher or lower?*

**A** They are lower than comparable figures for several reasons. The covered period is somewhat over 18 months. We covered two summers and one winter. The death rates in the summer are lower than they are in the winter. Besides that, we didn't question any people who were on their death bed at the time the study started. Therefore, the rates are a little lower in the first part of the sample—the over-all is lower. So what we did was to make a separate analysis for each of three six-month periods but the relationships are the same. We were afraid that that factor might possibly introduce a bias, so we checked on it.

**Q** *In other words, your conclusion is that among people who don't smoke, your figures show relatively the same death rate as would be recorded in the general death rates?*

**A** Oh, no—in the general death rates, remember, most people do smoke.

**Q** *What I meant was that the general death rate from cancer in the United States is supposed to be statistically some figure—and I am now trying to find out whether your sample corresponded with what was generally known to be the death rate from cancer—*

**A** No, these are a bit lower.

**Q** *Your figures are a bit lower?*

**A** Yes, for this reason: Of those people who are going to die of cancer tomorrow, most of them are dying today—if you know what I mean. We didn't question people who were dying. Therefore, the death rates during the first few months of this study were way lower than the general-population death rate. They then picked up, and in the latter part of the study they are not far from the same.

**Q** *The point I was trying to make was whether someone would say, "Well, you found out in your study of 187,000 people that more people died of cancer than is normally found. You just concentrated on a group and found more of them who died. But that many people don't usually die of cancer." So they might attack your findings. Your point is that, if anything, your estimates were lower?*

**A** Oh, yes, they're lower.

**Q** *So that there can be no question about the fact that in the population, for every 100,000, comparable figures are given for people who die of cancer?*

**A** The percentage of cancer in the total deaths was just about the same as the national figures—not exactly. Death rates for cancer vary in different sections of the United States.

**Q** *And it varies with the seasons, too?*

**A** Death rates vary with the seasons, and, as I said a moment ago, we had two summers and only one winter covering the period of our study. We were aware of and worried about that as a possible cause of difficulty. Therefore, we made an analysis of the material for the first six months, the second six months, and the third six months. The results in relation to smoking are essentially the same in all of them.

For some peculiar reason, we found a somewhat higher relationship with smoking in winter than in summer.

### WATCHING FOR CANCER—

**Q** *Is there any simple test to find out whether a person has lung cancer?*

**A** There is no simple test, no. It can often, though not always, be found by X ray. Or there are various diagnostic techniques. That's a rather complicated subject.

**Q** *Are there symptoms, things that people should watch out for?*

(Continued on page 64)

... "Smoking simply adds one extra strain to the heart"

**A** Primarily, a severe cough. By the time there is pain in the chest, it is usually pretty far advanced.

**Q** *Would a heavy cough in itself be a symptom?*

**A** It can be a symptom, but not necessarily a symptom.

**Q** *People who have smoked for a long time will begin to wonder about this now—*

**A** Yes, and there's one remark I'd like to make concerning this whole affair. I have said a "cause-and-effect relationship." I want to make myself very clear on that. What I'm saying is that, in my opinion, cigarette smoking causes an increase in death rates from these two diseases. That does not say what the mechanism is. I am certainly not saying that it's the only cause of these diseases. Far from it!

If I had to guess the mechanism on heart disease, I'd say that it's probably something like this: If a man has, shall we say, a difficulty with his heart, he may live perfectly well for many, many years if he doesn't overexert himself. But if a man is on the point of a coronary attack, and he runs upstairs, it may kill him. See what I mean? My best guess on this is that in heart disease the smoking simply adds one extra strain to the heart. It reduces the efficiency of the mechanism

and at the same time puts an additional pressure on the mechanism.

**Q** *How would you use your theory with respect to cancer on that?*

**A** I think the mechanism there is totally different. It's a different matter altogether.

**Q** *It's an irritation of the tissues?*

**A** I think the word "irritation" is always being used, and it practically amounts to the same thing as saying, "I don't know." It's like saying it's "tar" in tobacco that causes cancer—and the specific agent in the tar is unknown.

**Q** *You don't know what the causes of the cancer are and so you can't tell—is that it?*

**A** Yes. I think that's just a word—to say "irritation."

**Q** *Going back to lung cancer, you spoke of a cough. Do you mean a chronic cough?*

**A** Yes.

**Q** *You don't mean a heavy cough that somebody gets once in a while? Or is that the first serious sign?*

**A** It could be. I suggest that you ask a physician about the best way to diagnose lung cancer. I am a biologist and statistician, not a physician.

**SUMMARY AND CONCLUSIONS OF REPORT TO CANCER SOCIETY**

*Following is the full text of the summary and conclusions of the report on the effects of smoking made by Drs. E. C. Hammond and Daniel Horn of the American Cancer Society to the convention of the American Medical Association on June 21, 1954, in San Francisco:*

**1.** It was found that men with a history of regular cigarette smoking have a considerably higher death rate than men who have never smoked or men who have smoked only cigars or pipes. A total of 3,002 deaths occurred among men with a history of regular cigarette smoking. If they had died at the same rate as men who never smoked, then only 1,980 would have died. In other words, 1,022 additional deaths (52 per cent more than expected) occurred among men with a history of regular cigarette smoking. This finding was based upon a study of 187,766 white men between the ages of 50 and 69.

**2.** Death rates increase with amount of cigarette smoking. A total of 745 deaths occurred among men who were currently smoking a pack or more of cigarettes a day at the time they were questioned. Only 426 of them would have died if their death rates had been the same as for men who never smoked. That is to say, an additional 319 deaths (75 per cent more than expected) occurred among men who were smoking a pack or more of cigarettes a day at the start of the study.

**3.** Diseases of the coronary arteries were indicated as the primary cause of death of 2,147 men, 45.6 per cent of those for which death-certificate information

was available. The findings in respect to cigarette smoking were about the same as just described for the over-all death rate—except that the relationship was much more pronounced. Approximately 56 per cent of the total effect of regular cigarette smoking on the over-all death rate may be attributed to the effect of cigarette smoking on deaths primarily caused by diseases of the coronary arteries.

**4.** Cancer was indicated as the primary cause of death of 844 men, 18 per cent of those for which death-certificate examination was available. Cancer deaths were definitely associated with regular cigarette smoking, the effect being particularly marked in the older age groups. About 26 per cent of the total effect of cigarette smoking on the over-all death rate may be attributed to the effect of cigarette smoking on deaths from cancer.

**5.** The findings suggest that there may also be a relationship between cigar and pipe smoking and cancer death rates. At least another year of follow-up will be required before this relationship can be properly evaluated.

**6.** Of the 844 cancer deaths, 167 were indicated on the death certificates as being due to lung cancer. This is too small a group on which to have definite conclusions as to the degree of the relationship with cigarette smoking. A sufficiently large number of microscopically proven cases should be available for analysis in about two years. All that can be said at this time is

## ... "Possible that some other diseases may be involved"

that the lung-cancer death rate was much higher among men with a history of regular cigarette smoking than among men who never smoked regularly.

7. Regular cigarette smokers had a higher death rate from cancer of sites other than lung cancer than did men who never smoked. This was most marked in the two older age groups (60-64, and 65-69).

8. The findings just summarized prove that there is a definite association between smoking habits and death rates, at least in white men between the ages of

50 and 69. Most of the over-all association is accounted for by an association between regular cigarette smoking and death rates from cancer and from diseases of the coronary arteries, although it is possible that some other diseases may also be involved. For reasons discussed in the text, the authors are of the opinion that the association found between regular cigarette smoking and diseases of the coronary arteries and between regular cigarette smoking and cancer reflect cause-and-effect relationships.

## Cancer Society's Medical Director Asks:

# "WHY WORRY?"

In the midst of the discussion of smoking in relation to heart disease and cancer deaths, words of reassurance come from Dr. Charles S. Cameron, medical and scientific director of the American Cancer Society. He gives his views in two statements and an interview with *U. S. News & World Report*.

Dr. Clarence Cook Little, scientific director of the Tobacco Industry Research Committee, moreover, reminds smokers that the research is not yet complete.

In what follows, you get full texts of all this—statements by Drs. Cameron and Little, and the interview with Dr. Cameron.

## "INWARD SERENITY" VS. "CALCULATED RISK"

Following is the full text of a statement issued on June 21 in San Francisco, during the convention of the American Medical Association, by Dr. Charles S. Cameron, medical and scientific director of the American Cancer Society:

The disclosure of the American Cancer Society's survey of the effects of smoking on health will excite varying reactions. A few fatalists will say, "So what? Eat, drink, smoke and be merry. You have to go sometime." The strongly moralistic and the messianic, whose chief objective in life is to change other people's lives, will say, "See—I told you so." The neurotic and emotionally unstable will, at best, be disquieted and, at worst, panicked.

The solid citizens will examine the figures carefully, will give cool thought to the matter and will, I assume, conclude that, at the moment, the hazards of smoking do not appear to differ significantly in degree from lots of other calculated risks to which modern man exposes himself, and that smoking is one more item in the long list to which the phrase, "too much of a good thing," is applied.

It does not seem necessary to direct any special attention to any of these reactions with the exception of that of fear. I am made acutely unhappy by the realization that publication of the results of an American Cancer Society investigation will disturb many sensitive persons and probably most of those who combine addiction to smoking with a preoccupation with their health.

There are many such persons, and they deserve whatever assurance the facts will permit.

Based on whole populations or large segments thereof, the smoking picture is admittedly grim. But the question which most smokers will ask is, "What does smoking do to my chances?" The answer is something like this: Since we all die sooner or later, it is useless to be worried about the inevitable. Our concern is not with the fact of death, but with whether it is sooner or later. A modest, say five or 10-year, shortening of the expected life span holds no terror for many—who are willing to shuck off this mortal coil a few years ahead of schedule as the price for a care-free, full-blooded, uninhibited (some would say undisciplined) life of the classical *bon vivant*.

Philosophy aside, on the basis of the American Cancer Society's study, it can be said that a man of

50 who has never smoked has about 1 chance in 100 of dying within a year and a half. His neighbor of the same age, who has smoked regularly at some time or other during his life, has about half again as much chance of dying within 18 months—about 1½ in 100. Their friend, also aged 50, who currently smokes a pack or more of cigarettes daily, has about one chance in 50 of death within the 18-month period.

These different odds will seem impressive enough to some to motivate them to break a certain habit of a lifetime. To others, the same odds will not appear worth the trouble.

Personally, I believe that a life of outward productivity and inward serenity is more important than how long life is, and therefore I could not try to convert anyone from what he believes contributes to his productivity and his happiness. That is a decision which only each individual, in possession of the facts, can make for himself.

## CAN CIGARETTES BE MADE SAFE?

On June 23, Dr. Cameron was interviewed by U. S. News & World Report over long-distance telephone between Washington and San Francisco. The interview as recorded follows:

**Q** Dr. Cameron, the New York Times on June 12 says you were asked whether you saw anything in the Hammond-Horn report that conflicted with the suggestion that lung cancer was not the result of smoking, but that heavy smoking was symptomatic of some underlying reaction, perhaps hormonal, that might lead to cancer. It was stated that you had thought rather highly of this suggestion, but asserted that "these data tend to weaken that explanation." Can you clarify this for us?

**A** The situation is a little bit complicated. Originally I thought that the association between smoking and cancer, including cancer of the lung, might be an indirect one rather than one of cause and effect; that there might be certain individuals disposed, by the virtue of their glandular make-up, to develop both cancer and addiction to heavy smoking.

Now, it seems to me that this report—with its specific reference to the incidence or rather the approximate quantity of the death rate from cancer of the lung among those in rural areas and those in the city, and other phases—makes it seem much more likely that the relationship is one of cause and effect in respect of cancer of the lung and in respect of coronary artery disease.

But, on theoretical grounds alone, it seems less likely that the relationship is one of cause and effect in respect of cancer of sites other than the lungs. And, therefore, the original, shall we say, hypothesis that the two were mediated by a common factor continues to be very intriguing and I think valid.

**Q** Does this contradict, in your opinion, the state-



—American Cancer Society

DR. CHARLES CAMERON

"The disclosure . . . will excite varying reactions"

ment that was issued on June 17 in which you said that the thesis was not entirely proved?

**A** No, my statement that the thesis was not entirely proved had reference to one thing, and that was cancer of sites other than the lung.

**Q** Do you think that it is within the range of possibility that some way will be discovered that will make cigarettes perfectly safe?

**A** It's entirely possible, yes.

**Q** And another thing that a lot of people are asking: "What about people who inhale versus those who don't inhale?" How would you interpret those studies—do you think they throw any light on that question?

**A** Well, we hardly have information on inhaling. It's a very difficult thing to identify. Some people who say they don't, actually do. Moreover, you can't sit in a smoke-filled room without inhaling. The whole question of quantity in this problem is unknown at the moment. Now then, I think that on theoretical grounds the practice of inhaling is the one which makes the difference between the hazards in cigarette smoking and in pipe and cigar smoking.

## STUDY'S METHODS "GOOD," THEORY "NOT PROVED"

Following is the text of the statement, referred to above, that was issued in New York on June 17 by Dr. Cameron:

The report of Drs. Hammond and Horn and the exhibit summarizing their report are the first published data based on the large-scale survey of smoking prac-

tice among some 187,000 healthy men. The first of its kind ever attempted, it is being carried out with the assistance of 22,000 volunteers in 394 counties scattered throughout the United States, and is now in the 29th month. The correlation of the smoking practices of these many thousands of subjects, recorded while they were alive and in good health, with the causes of their deaths as they occur has provided important information in advance of the time schedule originally estimated. Furthermore, it is information so clearly valid—beyond any question of statistical error—that it appeared to warrant publication at this time.

While the observed correlation between heavy cigarette smoking and the likelihood of death from cancer of the lung and from cardiovascular disease was perhaps not astonishing, the degree of that relationship was. In addition, deaths from forms of cancer other than the lung appear to be associated with heavy cigarette smoking, thus opening up new considerations of the mode of action of the carcinogen, if any, contained in tobacco smoke.

Personally I am not convinced that the Hammond-Horn theory of cause and effect relationship between heavy cigarette smoking and increased susceptibility to death from cancer in general is as yet entirely proved. One cannot at this time exclude the possibility that heavy cigarette smoking and the tendency to cancer are both expressions of a more fundamental cause of a constitutional or hormonal nature.

Whatever interpretation is put on the evidence brought forth by this study, the data themselves and the methodology employed to get them are sound. The results appear to be of first importance in con-

sideration of the changing death rates of the past 25 years. If further validated, they point the way to the means of still further lengthening man's life span.

The American Cancer Society is proud of its accomplishment.

## TOBACCO INDUSTRY GIVES ITS VIEW

*Dr. Clarence Cook Little, scientific director of the Tobacco Industry Research Committee, commented on the American Cancer Society report as follows:*

The preliminary findings of the five-year survey being conducted by the American Cancer Society were shown to me in advance of public release, continuing the co-operative attitude on the part of the Society with the work of the Tobacco Industry Research Committee and its scientific advisory board.

I have the greatest respect for Drs. Hammond and Horn, and am sure that when their completed data are published, they will be of vital interest to scientists.

Discussion and comment on their data, however, would be more useful when all of the work has been completed and fully analyzed and set forth as is established custom in scientific journals.

It is interesting to note that Dr. Charles S. Cameron, medical and scientific director of the American Cancer Society, has issued a simultaneous statement to the effect that he is "not convinced that the Hammond-Horn theory of cause and effect relationship between heavy cigarette smoking and increased susceptibility to death from cancer in general is as yet entirely proved."

I fully subscribe to this statement, as I do to Dr. Cameron's further assertion that "one cannot at this time exclude the possibility that heavy cigarette smoking and the tendency to cancer are both expressions of a more fundamental cause of a constitutional or hormonal nature."

The present dramatic situation emphasizes the need for greatly extended, amplified and diversified basic research on the relation of various habits of the different types of human beings to their health and well-being throughout their life cycle.

The origin, nature and development of cancer and of cardiovascular disease are complex problems, offering the greatest existing challenge to creative scientific thought and to further experimentation wisely conceived, patiently executed, and fearlessly and impartially interpreted in our search for the truth.

The Tobacco Industry Research Committee has unqualifiedly given to its board of scientific advisers and to the present director of research complete freedom of thought and action. This freedom will be jealously guarded by the industry and by the scientists concerned in the hope and belief that human welfare can thus be best and most rapidly advanced.



—American Cancer Society  
SMOKERS AND NONSMOKERS ON FILE

"The data themselves and the methodology...are sound"