

Smoking and Over-All Mortality

"[I]t is not unreasonable to speculate that the kind of men who become regular cigarette smokers are, to a moderate degree, less inherently able to survive to a ripe old age than non-smokers."

"Smoking and Health: Report of the Advisory Committee to the Surgeon General of the Public Health Service" 1964 (1)

This sentiment, buried in the report released January 11, 1964, is not an unreasonable speculation today. But the mortality statistics that report developed on reported smoker/nonsmoker differences are still being used -- and abused.

For instance, the HEW report to Congress of 1977-78 made the statement, based on only three population studies,

The use of results from flawed population studies to frighten people by attributing large numbers of deaths yearly to smoking may be misleading and is most regrettable.

that "over-all mortality rates for cigarette smokers are about 70 percent higher than those of nonsmokers," and discussion of smoker/nonsmoker mortality differences occupied almost half the report (2).

HEW Secretary Califano took the mortality rate

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implications one step further, saying in January 1978 (and often through the year) that more than 300,000 persons died in 1977 from cancer and heart disease for which "smoking was a major factor" (3).

For a more complete exposition of the so-called "excess deaths" concept, see Appendix. Meantime, here's how most of these sorts of figures were derived. The calculations were based on the population surveys (4-12) on which the first Surgeon General's report (1) relied so heavily.

Government statisticians took data from the seven surveys, conducted in various areas, in various groups of people, over varying periods, and considered for the most part only whether or not the subjects smoked. The statisticians then reanalyzed the data and computed what they called a mortality ratio (smokers vs. nonsmokers) of 1.68.

"A mortality ratio higher than 1 implies [emphasis added] that the group of smokers has a higher over-all death rate than the non-smokers," they said in the 1964 report. Expressed another way, the mortality difference is 68 percent, and the 1977-78 report authors rounded 68 off to "about 70 percent". That's the excess percent of deaths observed over what might have been expected had smokers died at the same rate as nonsmokers.

But, as the authors of the 1964 report pointed out,

mortality difference in the seven surveys varied from 44 percent higher in British doctors (5,6) to 83 percent higher in an American Cancer Society survey conducted by volunteers (11,12). And the 1964 authors also drew attention to the possibility that bias arising from what were high nonresponse rates "might account for a mortality ratio of 1.3". This raises questions about the other biases that might affect the accuracy of the 1.68 figure.

Still with us? Let's get on, then, with some of the "weaknesses" of the surveys from which the 1.7 mortality ratio was computed. Some have been enumerated by the government people themselves (1,2), some pointed out by others.

But first let us consider another not unreasonable speculation by the authors of the first report:

[T]he low death rates for non-smokers [lower than U.S. general death rates] suggest the possibility that the studies recruited unusually healthy groups of non-smokers (1).

Design Weaknesses

American Cancer Society surveys (10-13). "Men in 25 states" was the largest of the seven surveys. The authors of the 1964 report said that this survey and the earlier "men in nine states" survey "suffer from the difficulties that the populations studied are hard to define, that the smokers and non-

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smokers were recruited by a large number of volunteer workers, and that completeness in the reporting of deaths was hard to achieve, since this depends on reports from the volunteers" (1).

What they didn't say was that the larger Cancer Society survey wound up with a male lung cancer death rate twice as high as that of U.S. males nationwide and women's rate three times as high as that of U.S. females. Death rates observed for coronary heart disease and emphysema were 10 to 60 percent higher than male and female national rates (14), all of which leads to the not unreasonable speculation that the volunteers enrolled many who were already ill with these diseases.

If persons with alleged smoking-related ills were overrepresented in the ACS population, so were residents of coastal and urban areas, including the industrialized Northeast; the mountain states and the Northwest tier were excluded entirely. There was an overabundance of better-educated, native-born, Protestant whites and a dearth of blacks (14). And a map of the ACS survey states includes almost all the so-called lung cancer hot spots identified in the National Cancer Institute's new "cancer atlas" (15) (see chapter on Cancer in the Work Place).

One finding from the later ACS survey is surprising and disturbing if one believes that tobacco causes disease:

Men who smoked cigars only -- as well as those who smoked pipes only -- had lower mortality ratios than those who smoked no tobacco at all (1). This finding can not easily be dismissed as a quirk of nature because the British doctors study (5,6) also reported this "incongruity".

The U.S. veterans survey (7,16). Just as nonrepresentative of the total U.S. population as the ACS's predominantly middle and upper socioeconomic subjects, the veterans were mostly white-collar, skilled workers who served in World War I. Their smoking habits, unfortunately, were recorded only when they first returned their questionnaires (in two waves, in 1954 and 1957). Reporting on later data from the same population (17), the HEW 1977-78 report to Congress noted as a weakness "the lack of information about more recent changes in smoking habits" (2).

One of the strange findings: Veterans who had smoked cigarettes and other products for 25 to 35 years had lower mortality ratios than those smoking only 15 to 24 years (1).

British doctors survey (5,6,18). An obvious drawback in this survey is that its subjects were highly selected, British professional men who shouldn't be considered comparable to any general U.S. population. More importantly, the survey actually showed that quitting smoking did not reduce mortality -- the exact opposite finding from that claimed by many who have cited

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it as proof that cigarettes shorten lives.

When a risk factor has been associated in a population with increased incidence of a disease (or death), removal of that risk factor should result in a drop in that disease (or death) in that population. A 50 percent reduction in cigarette smoking between 1951 and 1965 did not change the over-all death rates in those years in the British doctors (19)! And there went the remove-the-risk-factor-and-reduce-the-risk theory--at least as far as the British doctors were concerned.

Another problem with the physicians survey was referred to briefly before, that of "nonresponse bias". Only two-thirds of the doctors who were sent questionnaires replied (1). In other words, one in every three British doctors contacted either was not interested enough to return his questionnaire (or had some reason not to) or else gave answers that were rejected as incomplete.

There is no way of knowing if those who do not participate in a survey of this sort are similar to those who do. The authors of the British doctors survey wrote later that a sample of their nonrespondents indicated they differed in several respects from a sample of respondents, and the authors felt "sure that the doctors who chose to answer were not representative of the total" (18). That such nonresponse can seriously bias this sort of investigation and lead to a "spate of doubts" has been expressed eloquently by one of the authors

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of the same survey of British doctors (20).

It is not surprising that the authors of the 1964 report properly warned that "none of the populations was designed, in particular, to be representative of the U.S. male population". Or that they continued: "Any answer to the question 'to what general population of men can the results be applied?' must involve an element of unverifiable judgment... The seven studies differ considerably in size. They vary also in the extent to which they are free from methodologic weakness" (1).

Almost a decade later a Canadian researcher commented on the methodological problems in the surveys before an American Statistical Association meeting. He included a complaint that "few if any of the many studies reporting a link between smoking and disease have ever been published in a principal statistical journal where the methods of sampling and data analysis would have received adequate review" (14). In view of the many critical defects in these surveys, he suggested that researchers should reevaluate their past reliance on them.

Association vs. Cause

Long forgotten in any claims of high mortality ratios and/or excess deaths in smokers is the careful caveat written

into the first Surgeon General's report by its authors.

They said:

Statistical methods cannot establish proof of a causal relationship in an association. The causal significance of an association is a matter of judgment that goes beyond any statement of statistical probability (1).

Many who have opposed smoking appear to infer causality from association in all causes of death (including accidents and suicides) which have reported smoker/nonsmoker mortality ratios larger than that magic number 1. That national abstention from smoking would automatically prolong the lives of those who had smoked is a most unreasonable speculation.

And that's exactly what a well-respected government health statistician told an American Cancer Society meeting recently:

[M]ost of the large-scale studies on smoking and health have tended to investigate the role of smoking independent of other behavioral variables, such as alcohol consumption and other lifestyle factors, occupational and environmental hazards and certain psychological factors. These variables are known to be related to health status... Thus it may well be that the elimination of smoking without any changes in the other factors will have only a partial impact on health status (emphasis added)(21).

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Conclusion: Then and Now

The past reliance on population surveys to indict tobacco in disease causation is open to severe criticism because of the many inherent weaknesses in these studies. Even outspoken opponents of smoking have recognized this:

"As mentioned previously, the smokers and non-smokers in these studies may differ with respect to other variables that might influence the death rate."

"Smoking and Health: Report of the Advisory Committee to the Surgeon General of the Public Health Service" 1964 (1)

"Blanket assumptions that every disease associated with smoking is caused by smoking create a credibility gap..."

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