

DECIDE FOR YOURSELF.

PASSIVE REPORTING ON PASSIVE SMOKE

by Jacob Sullum

LAST FEBRUARY THE ADMINISTRATOR OF THE Environmental Protection Agency told a House subcommittee that Congress should ban smoking in places of business. Testifying in favor of the Smoke-Free Environment Act, which would forbid smoking in buildings open to the public, Carol Browner relied heavily on the EPA report that declared environmental tobacco smoke (ETS) to be "a known human lung carcinogen."

Since it was released in January 1993, this 510-page document has become a favorite prop of the anti-smoking movement. It has helped justify smoking bans in government agencies—including the Department of Defense—in cities such as Los Angeles and San Francisco, and in states such as Maryland and Washington. Because the EPA's preliminary conclusions about ETS were first published in 1990, the report had an impact even before it appeared in its final form. "Hundreds of local ordinances have been passed or introduced in virtually every area of the country since 1991," Browner testified. "In the year since publication of the EPA report...we have seen a rapid acceleration of measures to protect non-smokers in a variety of settings." And in March, the U.S. Occupational Safety and Health Administration (OSHA) proposed a ban on smoking in indoor workplaces, including bars and restaurants.

In light of the legislation and policy changes it has generated, the EPA's *Respiratory Health Effects of Passive Smoking: Lung Cancer and*

Other Disorders may be the most influential report ever issued by the agency. As one might expect, it has received extensive coverage from major newspapers. Between May 1990 and February 1994, the *New York Times*, *Los Angeles Times*, *The Wall Street Journal* and *The Washington Post* ran more than 100 news stories about ETS, of which about 45 focused on the EPA report. Yet almost without exception, the coverage has been one-sided, credulous and superficial. Even before the EPA released its report, journalists were quick to accept the claim that secondhand smoke kills. And despite serious questions about the report's assertion that ETS causes lung cancer and the process by which the EPA reached that conclusion, leading U.S. newspapers have treated this assertion as scientific fact. In so doing, not only have they exaggerated what is known about the effects of ETS, but they have missed an important story about the corruption of science by the political crusade against smoking.

To uncover the facts would not have required a lot of digging. They were repeatedly outlined by representatives of the tobacco industry for anyone who would listen. Indeed, that was a big part of the problem. "The tobacco industry has established a reputation for disseminating misinformation," says Michael Fumento, one of the few journalists who took a critical look at the science behind the EPA's report. "At the very least, [the industry] has been known to put a twist on material that isn't warranted. In a

sense, it was the boy who didn't cry wolf—the guy who year after year saw a wolf and claimed there was no wolf there. When he says, 'Look, there's no wolf there,' the media are not going to be quick to believe that."

In fact, most reporters were so disinclined to believe the tobacco industry that they simply assumed there was a wolf, without attempting to verify its existence. On January 6, 1993, *Los Angeles Times* writer Rudy Abramson reported: "The most bitter resistance to the EPA's move to link secondary smoke and lung cancer has been waged by Philip Morris Co., a leading cigarette manufacturer, and by the Tobacco Institute, the industry's chief lobbying organization. Some 30 years after the landmark surgeon general's report on smoking and health, the industry continues to argue that there is no scientific proof of a link between cancer and smoking."

The message of this juxtaposition is clear: Since the tobacco industry has refused to acknowledge that smoking causes lung cancer, people should not give credence to their claims about ETS and lung cancer. This argument, which showed up repeatedly in coverage of the EPA report, seeks to simultaneously discredit criticism of the agency's position and bolster the case against ETS. It implies not only that the tobacco industry is lying, but that the evidence of a link between ETS and lung cancer is just as strong as the evidence of a link between smoking and lung cancer. This analogy is very misleading.

James Enstrom, a professor of epidemiology at UCLA, notes that thousands of studies have examined the link between smoking and lung cancer. Virtually all of them have found positive associations, statistically significant in the vast majority of cases.

This is an important point. In any study that tries to measure the association between a suspected risk factor and disease rates, there is always the possibility that an observed difference between the exposed group and the control group occurred simply by chance and had nothing to do with the risk factor. Researchers do statistical tests to account for this possibility. By convention, epidemiologists call a result significant if the possibility that it occurred by chance is five percent or less. The associations

between smoking and lung cancer are sizable as well as statistically significant. Recent studies indicate that the average male smoker is 20 times more likely to develop lung cancer than a male non-smoker, while the risk ratio for women is about 10 to one. The figures are even higher for heavy smokers.

By contrast, the EPA report was based on 30 epidemiological studies that looked for a link between ETS and lung cancer, mainly by comparing disease rates among non-smoking women living with smokers to disease rates among women living with non-smokers. Most of the studies found positive associations, but they were statistically significant in only six studies. (Nine found that living with a smoker was associated with a *reduced* risk of lung cancer, but these results were not statistically significant.) And all of the positive associations were weak by epidemiological standards, typically yielding risk ratios of less than three to one. The EPA estimated that a woman who lives with a smoker is 1.19 times as likely to develop lung cancer as a woman who lives with a non-smoker. "Comparing that to a 10 to one ratio, you can see it's minute," Enstrom says. "It's at least one order of magnitude different from the active smoking data."

With risk ratios this small, it's difficult to rule out confounding variables, such as diet and other sources of pollution, that might account for an observed association. "At least 20 confounding factors have been identified as important to the development of lung cancer," wrote Gary L. Huber, a professor of medicine at the University of Texas Health Science Center, and two colleagues in the July 1991 issue of *Consumers' Research*. "No reported study comes anywhere close to controlling, or even mentioning, half of these."

Enstrom is not optimistic that future research will clarify the issue. "You're talking about ratios that are so close to 1.0 that it's really beyond the realm of epidemiology," he says. "You could do more studies, and you could probably arrive at more precise ratios, but as to whether those ratios would mean anything, I doubt it...You're basically down in a noise-level situation, and whether you can really see a true signal above the noise is doubtful."

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These errors in stories about the EPA report reflect a general tendency in coverage of the ETS controversy to exaggerate evidence and minimize criticism. An example is a May 29, 1990 *New York Times* story by Lawrence K. Altman. Under the headline, "The Evidence Mounts on Passive Smoking," Altman described a growing scientific consensus that ETS is a health hazard. He quoted one scientist who said "the links between passive smoking and health problems are now as solid as any finding in epidemiology," and another who claimed "there's no question" that ETS causes heart disease. Both assertions are controversial, to say the least, but Altman did not offer specific rebuttals from anyone. In the 44-paragraph article, he devoted only three paragraphs to skeptics, both identified with the tobacco industry.

And Altman himself exaggerated what the evidence tells us. In the second paragraph, he asserted that "the studies show" ETS "causes death not only by lung cancer, but even more by heart attack." Thus, he declared at the outset of the story that the case was closed on ETS. "The EPA reviewed 24 epidemiological studies of passive smoking and lung cancer, 11 more than in the Surgeon General's Report in 1986," he wrote, describing an early version of the risk assessment. "The newer studies confirm [the results] in the first 13 studies." The reader is not likely to guess from this summary that the vast majority of these studies failed to find a significant link between ETS and lung cancer.

Altman is not alone in failing to discuss statistical significance. Consider Jane E. Brody's January 8, 1992 *New York Times* story about a study directed by Elizabeth Fontham of Louisiana State University Medical Center. The headline read: "New Study Strongly Links Passive Smoking and Cancer," Brody reported. "The study, the largest of its kind, found a 30 percent higher risk of lung cancer if that woman's husband smoked, a risk that

rose with the number of cigarettes and years of exposure." Brody failed to note that this overall association was not statistically significant (that is, the probability that the result occurred purely by chance was greater than five percent). Although Fontham *et al* reported statistically significant associations for a few subgroups, the risk ratios were all under 2.5, so it is wrong to say that the study "strongly links passive smoking and cancer."

Another common error involves confusing correlation with causation. In 1991, for example, the U.S. Centers for Disease Control (CDC) did a survey that, among other things, asked parents to assess their children's health. The CDC reported that 4.1 percent of the children who lived in households with smokers were said to be in "fair" or "poor" health, compared to 2.4 percent of the children who lived in households without smokers. From this information it is impossible to conclude anything about the effects of ETS, since the study did not control for variables that might account for the difference in reported health. Poverty is the most obvious example. Research shows that people with lower incomes are both more likely to smoke and more likely to be in poor health.

Yet on June 19, 1991, the *New York Times*, *The Wall Street Journal*, *Los Angeles Times* and *The Washington Post* all ran stories under headlines asserting that the study had found that smoking in the home harms children. Only the *New York Times* and *The Washington Post* noted that the study did not control for income, and only the *Post* made the importance of this fact clear.

The errors that appear in these and other stories about ETS are not random, of course. They consistently weigh in favor of the view that ETS is a serious health hazard. Reporters are receptive to that view for a number of reasons. Even if they don't personally disapprove of

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smoking, they are well aware of its dangers. If a lot of tobacco smoke hurts smokers, it seems plausible that a little would hurt non-smokers, though not as much.

Since most journalists do not have backgrounds in statistics or epidemiology, they rely on other people to assess the issue. The most conspicuous sources for stories about ETS work for the tobacco industry, the government and anti-smoking groups. Reporters don't trust the tobacco companies. But in contrast to the skepticism they bring to the pronouncements of other government agencies and special-interest groups, they do tend to trust public health authorities such as the EPA and anti-smoking organizations such as the American Cancer Society. The governing assumption seems to be that the tobacco companies are trying to maintain profits, while the government and anti-smoking groups are interested in promoting public health and getting out of the facts.

But sometimes these two missions conflict. Public health officials may be inclined to shade the truth a bit if it helps to discourage smoking by making it less acceptable. In her testimony last February, EPA Administrator Browner said the main benefit of the Smoke-Free Environment Act would be its impact on smokers. "The reduction in smoker mortality due to smokers who quit, cut back or do not start is estimated to range from about 33,000 to 99,000 lives per year," she said. And six former surgeons general, the *New York Times* reported, "echoed the theme that this simple measure could do more for the public health than any other bill in years." So, just as the tobacco companies have an interest in minimizing the dangers of ETS, the government and the anti-smoking groups have an interest in maximizing them.

When reporters choose sides on the basis of trust, they fail to make independent assessments of the arguments of both sides. So readers of stories about ETS might wish to keep in mind the following points:

1. **The Importance of Statistical Significance.** When researchers do not come up with statistically significant results, they tend to underplay this fact, for obvious reasons. Stories should be examined to see whether they disclose, as a good report should, whether a result is statistically significant. Epidemiological studies include "confidence intervals" that indicate there is a 95 percent probability that the true risk ratio lies between two numbers. If the lower number is 1.0 or less, the result is not significant, even if the authors of the paper play it up in the abstract.

2. **When researchers don't get significant results overall, they sometimes slice up the data into subgroups, seeing if they can find a significant association at certain levels of exposure, for certain kinds of cancer and so on. But the more such comparisons they do, the less likely it is that any association they find will be meaningful, since there is a five-percent chance of being wrong each time. Furthermore, the subgroup data for ETS and lung cancer are often contradictory. One study will find a significant result for adenocarcinoma lung cancer but not for other types of cancer, or for spousal smoking but not for childhood exposure, while another study will find the opposite.**

3. **The Pitfalls of Correlation versus Causation.** Even a statistically significant association between A and B does not prove that A causes B. A and B could both be associated with another factor or set of factors. An article in the July 28, 1993 *Journal of the American Medical Association* reported that, allowing for differences in smoking rates, restaurant workers are 50 percent more likely to get lung cancer than people in other occupations. The study controlled for smoking but not for a wide range of other factors

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SECONDHAND SMOKE: CONSIDER THE FACTS, THEN DECIDE.

In January 1993, the EPA issued its report declaring that secondhand smoke is harmful to non-smokers.

Since that time, this report, accepted in large part without question, has caused considerable concern among smokers and non-smokers alike. And while these concerns grew, the flaws in the EPA's use of science remained largely unpublicized.

Finally, these flaws are being publicly discussed.

In this meticulously researched article in the current issue of *Forbes MediaCritic*, Jacob Sullum, Managing Editor of *Reason* magazine explains why the public never got the full story about the EPA report. He also details exactly how the EPA disregarded established methods of statistical analysis to arrive at a politically motivated conclusion about secondhand smoke.

Since the EPA's report has been the basis for a flurry of smoking restrictions, we believe that smokers and non-smokers need to have both sides of the story in order to make up their own minds. After all, recent polls show that most Americans prefer accommodation and common courtesy to more smoking regulations and outright bans.

For a full copy of this article and more information, please call 1 800 852-5325.



PHILIP MORRIS U.S.A.

IN ANY CONTROVERSY, FACTS MUST MATTER.

Faced with evidence that was weak, inconsistent and ambiguous, the EPA finessed some important points and gave the data a vigorous massage to arrive at the conclusion that ETS causes lung cancer. To begin with, the EPA used an unconventional definition of statistical significance. In previous risk assessments the EPA had always used the traditional standard. But in the case of ETS, the agency abandoned the usual definition of statistical significance and called a result significant if the probability that it occurred by chance was 10 percent or less—a change that in effect doubles the odds of being wrong.

Even according to the broader definition, only one of the 11 U.S. studies that the report analyzes found a statistically significant link between ETS and lung cancer. And according to the usual definition, none of them did.

In order to bolster the evidence, the EPA departed from its usual risk-assessment procedure by combining the results from these 11 studies in a "meta-analysis." This technique is appropriate only when the underlying studies are comparable in method and structure.

Enstrom says using meta-analysis for studies such as those examined by the EPA "is not a particularly meaningful exercise," since the studies are apt to differ in the way they define smokers, the types of lung cancer they include, the confounding variables they take into account and so on. "It's just fraught with dangers." In any event, the result of the EPA's meta-analysis is significant only under the weak definition adopted especially for these data. By the conventional standard, the meta-analysis does not support the claim that ETS causes lung cancer. Furthermore, had the EPA included in its meta-analysis a large U.S. study published in 1992, the result might not have been significant even by the revised standard.

The contrivances employed by the EPA, which a July 31, 1992 *Science* article described as "fancy statistical footwork," indicate that the agency was determined to reach the conclusion that ETS kills non-smokers.

The EPA finessed some key points to conclude that passive smoke causes lung cancer.

That impression is supported by the fact that the EPA put together a "policy guide" for reducing workplace exposure to ETS well before it had officially decided that ETS was a hazard. The first draft of the guide was released in June 1990, three-and-a-half years before the EPA released the final version of its risk assessment. William Reilly, then administrator of the EPA, told *The Wall Street Journal* in January 1993 that he delayed release of the policy guide in its final form because he didn't want it to "look like we're trying to torque the science."

Reilly had reason to be concerned about that perception. In March 1992, an expert panel that he convened had issued a report called *Safeguarding the Future: Credible Science, Credible Decisions*. Among other things, the panel concluded that "EPA science is of uneven quality, and the agency's policies and regulations are frequently perceived as lacking a strong scientific foundation." It cautioned that "science should never be adjusted to fit policy, either consciously or unconsciously."

Despite these and other warning signs, the coverage by the major newspapers was generally unskeptical of the agency's conclusions and dismissive of the tobacco industry's criticism. The typical story opened with the government's claims, elaborated on them for several paragraphs, quoted anti-smoking activists who agreed with the EPA and described the tobacco industry's response in a paragraph or two. The tobacco industry's comments usually amounted to little more than denial, and no independent sources were provided to back them up. News consumers were left with the impression that, aside from industry representatives, no one had doubts about the EPA's position on the health effects of ETS.

But as Michael Fumento showed in his January 28, 1993 story for *Investor's Business Daily*, this was clearly not true. "Some scientists and policy analysts who say they couldn't

care less about tobacco company profits or even the rights of smokers are worrying aloud that the EPA report is paving the way for justifying new health-based government regulations and programs without any real science behind them," he wrote. The story quoted a series of credible sources, including epidemiologists and statisticians, who questioned the quality of the evidence linking ETS to lung cancer and took the EPA to task for manipulating the data to make its case. Fumento cited a 1992 article from *Toxicologic Pathology* in which Alvan Feinstein, an epidemiologist at Yale University, reported a comment by a leading public-health researcher: "Yes, it's rotten science, but it's in a worthy cause. It will help us get rid of cigarettes and become a smoke-free society."

It's difficult to understand why virtually no one followed Fumento's lead, especially since similar questions about the report were raised that summer in congressional hearings and in a tobacco industry lawsuit challenging the EPA's findings. During the year after Fumento's piece appeared, only one story in a major newspaper dealt with the issues he raised in a less than perfunctory way. In a July 28, 1993 article about the tobacco industry's lawsuit, *Wall Street Journal* reporter Jerry E. Bishop made it clear that questions about statistical significance and confounding variables are legitimate and not easily dismissed. Although he did not quote any critics of the report who were not affiliated with the tobacco industry, he at least showed that statisticians disagree about the quality of the EPA's work.

By contrast, a June 23, 1993 story by *Journal* reporter Eben Shapiro unfairly and erroneously attacked one of the industry's major claims: that the EPA excluded from its meta-analysis a large U.S. study, published in the November 1992 issue of the *American Journal of Public Health*, that would have changed the report's conclusions. Shapiro wrote that the study, which was included in a tobacco industry press package about the law-

Reporters don't trust the tobacco companies. But they do trust the EPA.

suit, "actually appears to support the EPA's decision. The report...concludes that there is 'a small but consistent elevation in the risk of lung cancer in non-smokers due to passive smoking.'" Thus Shapiro implied that the results of the study supported the claim that ETS causes lung cancer. But the sentence from which he quoted actually says that "our study and others conducted during the past decade suggest a small but consistent elevation in the risk of lung cancer." (Emphasis added.) In fact, the study itself did not find a statistically significant association between ETS and lung cancer. That is why the tobacco companies argued that it would have undermined the EPA's case. Shapiro also smugly quoted the researchers' opinion that "the proliferation of federal, state and local regulations that restrict smoking in public places and work sites is well-founded." This editorial comment does not change the data.

Many other stories raised false doubts about the arguments of the EPA's critics. In the July 22, 1993 *New York Times*, for example, Philip J. Hilt reported that Representatives Thomas J. Bliley, Jr. (R-VA) and Alex McMillan (R-NC) "suggested that the EPA's study of several studies, or 'meta-analysis,' used a lower standard of statistical proof than normally used in assessing danger scientifically." Despite the implication of the word *suggested*, this is not an arguable point, although the report's detractors and supporters disagree about its importance. Hilt also stated that "about 30 studies were reviewed, of which 24 showed that secondhand smoke was a risk"—just the opposite was true. And he had the congressman conceding the very point they were disputing: "The biggest study, the two lawmakers noted, found statistical proof that secondhand smoke caused cancer with certainty only in those people subjected to the most smoke." No study has ever found "statistical proof that secondhand smoke caused cancer with certainty." (In fact, it is impossible for an epidemiological study to provide such proof.)

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that could affect lung cancer rates. Yet coverage in *The Washington Post*, the *New York Times* and *Los Angeles Times* supported the author's conclusion that the higher incidence of lung cancer should be blamed on higher levels of tobacco smoke in restaurants.

The concern about confounding variables is especially important when risk ratios are small. Epidemiologists generally consider an association "weak" when the ratios are between 1.0 and 3.0. In the restaurant study, the risk ratio emphasized by the author was about 1.5. "Anything with a risk ratio of less than 3.0, I don't trust," Fumento says. "It's like measuring the width of a hair with a standard 12-inch ruler. You can't do it. The little markings are too big. So it is with epidemiology. It's a blunt tool."

Weak Words. Readers should be alert to qualifiers and hedging, so should reporters. In the restaurant study, for example, the author wrote: "The epidemiologic evidence suggested that there may be a 50 percent increase in lung cancer risk among food-service workers that is in part attributable to tobacco smoke exposure in the workplace." (Emphasis added.) The 1991 report of the CDC survey of children's health said the results "show an apparent pattern suggesting that, for most children, fair or poor health appears to be associated with various exposures to cigarette smoke." (Emphasis added.) When someone cites a "pattern" or a "trend in the data," it's time to look more closely. In rigorous science, close doesn't count.

Discrepancies. When two versions of a verifiable fact diverge sharply, readers should reserve judgment. For instance, an Associated Press story that appeared in the *New York Times* on June 11, 1992, quoted a physician who appeared at an American Heart Association (AHA) press conference as saying that "thousands of studies have shown that secondary smoke increases the risk of heart and lung disease." The Tobacco Institute, on the other hand, "insisted that fewer than 100 studies had been done on the effects of secondary smoke." In fact, about a dozen studies had found a significant link between ETS and lung cancer or heart dis-

ease. In this case, the reporter misunderstood his source, and a phone call to the AHA would have cleared up the matter. In other cases, it might be necessary to consult an independent authority familiar with the research.

Reporters will soon have an opportunity to do better. In testimony last February, EPA Administrator Carol Browner predicted that the Smoke-Free Environment Act would save the lives of 5,000 to 9,000 non-smokers each year. Dave McDart of the EPA's Indoor Air Division says fewer than 2,200 of these represent lung-cancer cases; the rest are heart-disease deaths. Yet the evidence of a link between ETS and heart disease is even weaker than the evidence of a link between ETS and lung cancer, and the EPA has never done a risk assessment in this area. The agency's full report on the impact of the Smoke-Free Environment Act was scheduled to be released in the spring.

If reporters want to get at the truth, they cannot continue to act as if only one side in this debate has an axe to grind. They need to be just as skeptical about the EPA and the Coalition on Smoking or Health as they are about Philip Morris. "I treat sources like lawyers, like advocates in a court of law," Fumento says. In a court of law the jurors take for granted that each side has an agenda, but that does not stop them from weighing the arguments. Similarly, reporters should not dismiss a statement simply because it comes from the Tobacco Institute.

Writing in *Toxicologic Pathology*, Yale epidemiologist Alvan Feinstein cautioned his fellow scientists against automatically believing everything the "good guys" say and rejecting everything the "bad guys" say. His message applies to journalists as well as scientists: "If public health and epidemiology want to avoid becoming a branch of politics rather than science, the key issues are methods and process, not the 'goodness' of the goals or investigators. In science even more than law, the 'bad guy'...should always have the right to state his case, and a well-stated case has the right to be heard, regardless of who pays for it." *

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