

NTP Presentation
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Dec. 2-3, 1998

Good afternoon. I am Dr. Stephen Sears, a research and development scientist at R.J. Reynolds Tobacco Company. I appreciate this chance to tell you why the epidemiological data concerning environmental tobacco smoke simply does not support classifying ETS as a known – or even a reasonably anticipated – cause of cancer in humans.

Since I have only five minutes to speak, it is impossible for me to detail the many problems inherent in the dozens of ETS studies to date. Instead, I will limit my remarks to just a few of the broader issues demonstrating that the epidemiology concerning ETS and lung cancer is inconsistent, inconclusive and inadequate to draw any definitive conclusions.

Twelve years ago, IARC noted that the evidence concerning ETS was consistent with either an increased risk or an absence of risk. This is like Siskal and Ebert advising us about a movie when one gives a "thumbs up" and the other a "thumbs down." No evidence has appeared since then to credibly challenge IARC's conclusion.

If anything, the weight of the evidence increasingly shows that ETS does not elevate the risk of lung cancer in nonsmokers. Or – if it does – it does so at a level that is too small to be reliably measured by epidemiology.

As this chart shows, 47 lung cancer studies (of females married to smoking spouses) have been conducted in the past 17 years.

- More than 80% of the studies report relative risks lower than 2.0.
- More than 50% report risks less than 1.3.
- And more than 20% report risks of 1.0 or lower.

I would like to point out that IARC has cautioned that "relative risks of less than 2.0 may readily reflect some unperceived bias or confounding factor."

Moreover -- as my next chart shows -- the four largest studies to date clearly illustrate the inconsistency that plagues the entire body of data:

- One study reports a significantly decreased risk.

- One is precisely neutral.
- One is significantly elevated.
- And the most recent, the IARC study, does not reach statistical significance.

This next chart of relative risk comparisons highlights a few more inconsistencies:

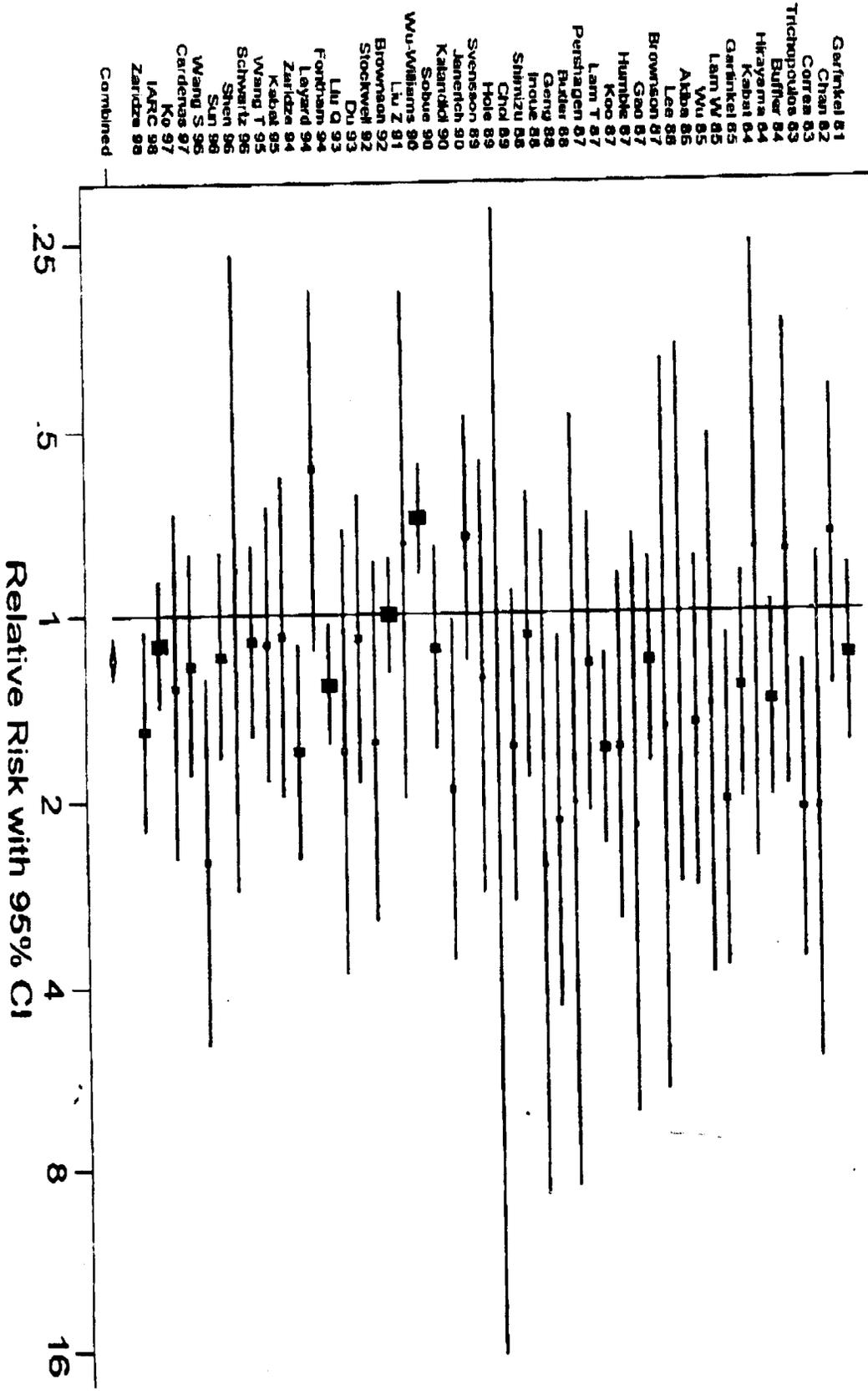
- First, there is an inconsistency in risk as a function of study size. The four largest studies yield a relative risk of 0.99; while the smaller studies yield an RR of 1.29.
- Second, epidemiologists universally agree that age is one of the most critical factors in cancer studies. Simply put, the older you are, the more likely you are to get cancer. Yet 15 of the ETS lung cancer studies did not adjust for age. A meta-analysis of these 15 studies yields a significant RR of 1.50. But when you combine the 32 studies that were age-adjusted, the relative risk drops to 1.10.
- Next. The studies that provide dose-response data are not representative of the evidence as a whole. Those with a dose-response yield a significant RR of 1.24. But the studies that do not report a dose-response yield a nonsignificant risk of 1.02. This is strong evidence of publication bias.
- Here is another discrepancy: The studies conducted before 1990 yield a significant RR of 1.37. But the studies since then yield a nonsignificant risk of 1.08. We believe this is primarily the result of a decrease in publication bias, coupled with better study designs and greater control of confounders.
- In fact, if you combine the studies that did not adjust for major risk factors, you get an RR of 1.43. But the studies that did try to control for some confounders, such as diet and exercise, yield a dramatically lowered relative risk of 1.10.

What do these and the many other inconsistencies in the data tell us? They tell us -- in no uncertain terms -- that there is too much noise in the epidemiological data for anyone to reliably discern any increased risk of lung cancer from exposure to ETS.

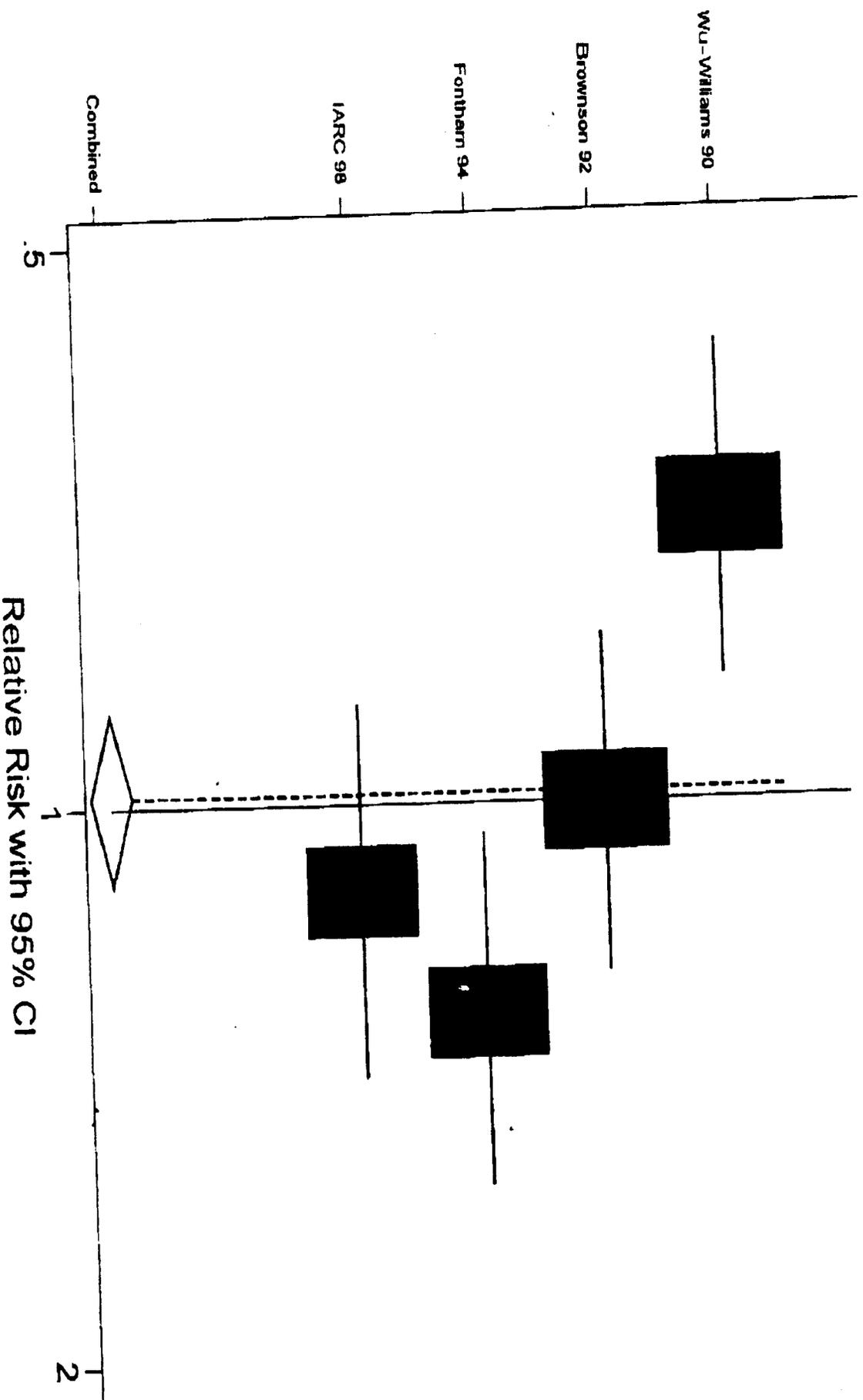
In conclusion -- the epidemiological evidence, taken as whole, is far too inconsistent, inconclusive and inadequate to support classifying ETS as a known cause -- or even a reasonably anticipated cause -- of cancer in humans.

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Worldwide Studies of Lung Cancer and Spousal ETS Exposure



Four Largest Studies of Lung Cancer and Spousal ETS Exposure



Inconsistencies in the Epidemiological Data

