

**Health Benefits of Coal-Smoke Exposure Reduction:
intervention studies in China**

**Robert S. Chapman, MD, MPH
College of Public Health Sciences
Chulalongkorn University**

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There is a very large amount of information
on environmental pollution risks.

But there is very little information on health benefits
of environmental pollution reduction.

Medline search on air pollution and risk or hazard
gave 8750 articles.

Search on air pollution and intervention or benefit
gave only 457 articles.

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Why?

Benefits studies can take a long time and be expensive.

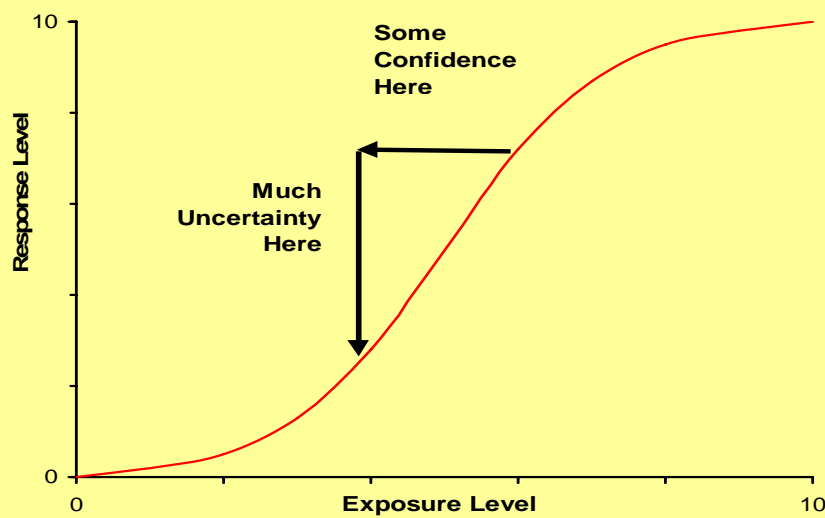
Our attention span may not be long enough to do the necessary follow-up.

Policy makers and scientists don't want to be proven wrong.

But unless effects of pollution reduction are assessed specifically, we cannot know the true degree of benefit.

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Risk assessment can only estimate risk reduction.
It cannot quantify risk reduction.



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Environmental pollution is virtually never the only risk factor for health disorders that are associated with such pollution.

The other risk factors are numerous. They include smoking, socioeconomic situation, co-pollutants, lifestyle, and many others.

In this complex situation, effects of these risk factors can change after environmental pollution reduction.

Net change in risk can be larger or smaller than estimated before pollution reduction. It is hardly ever the same as these pre-reduction estimates.

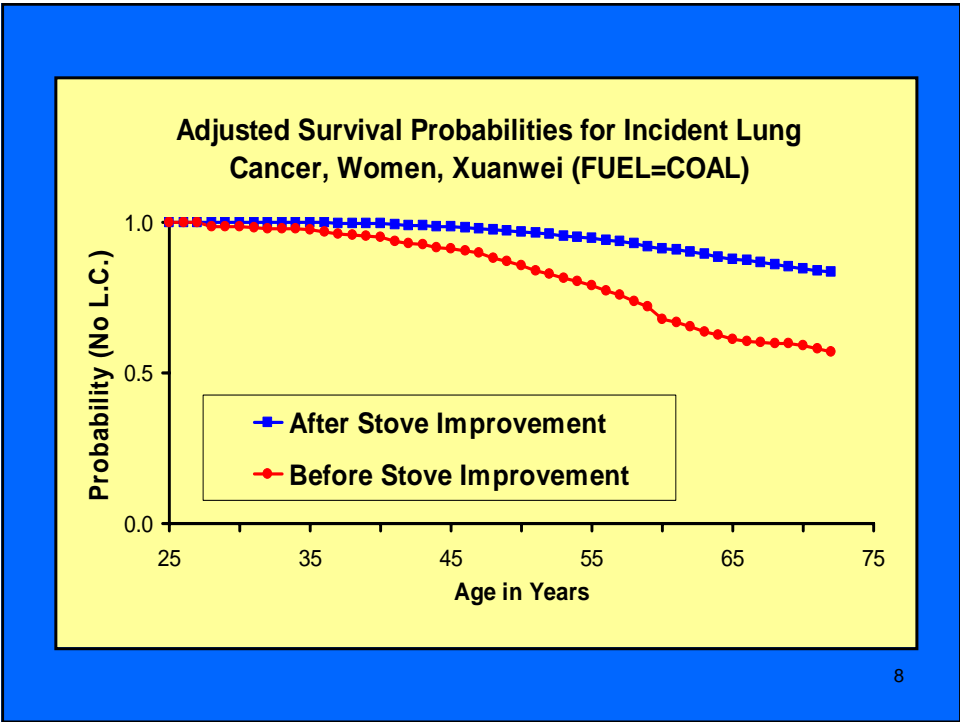
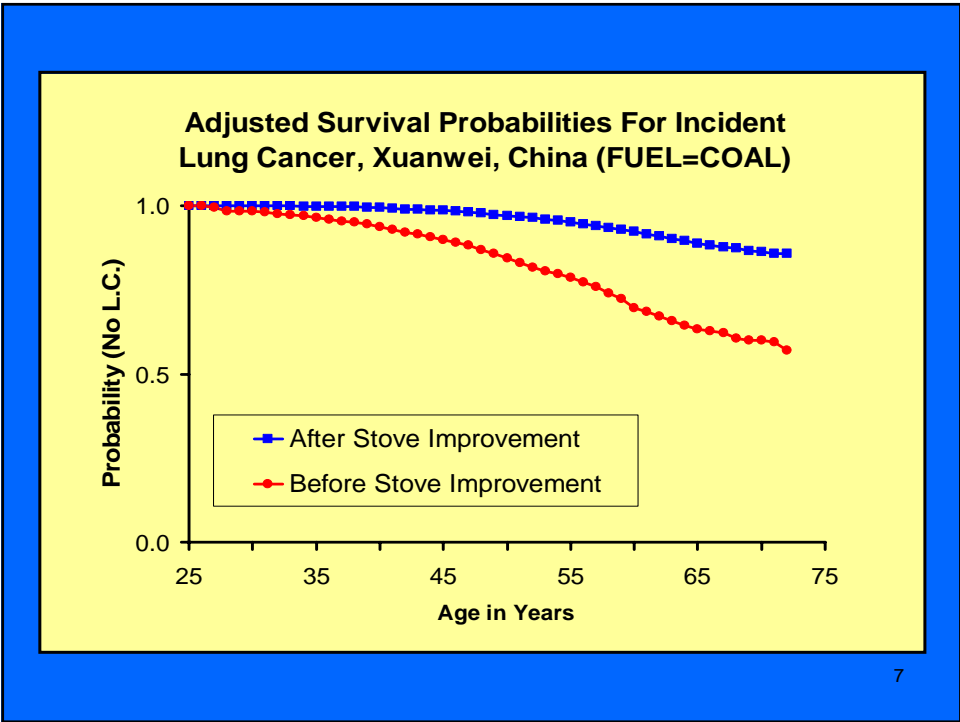
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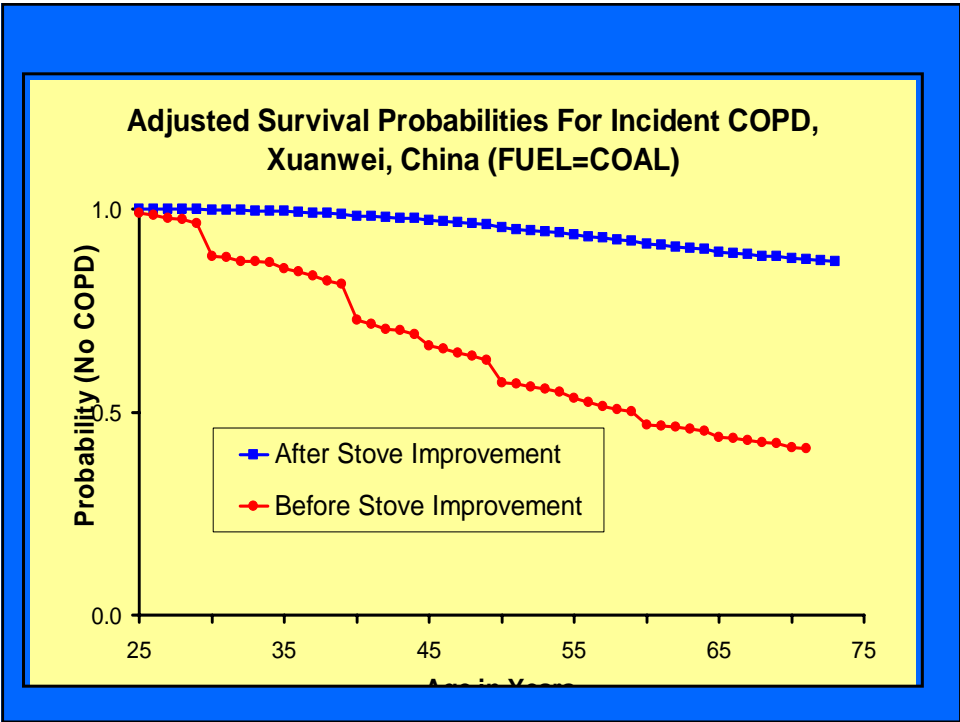
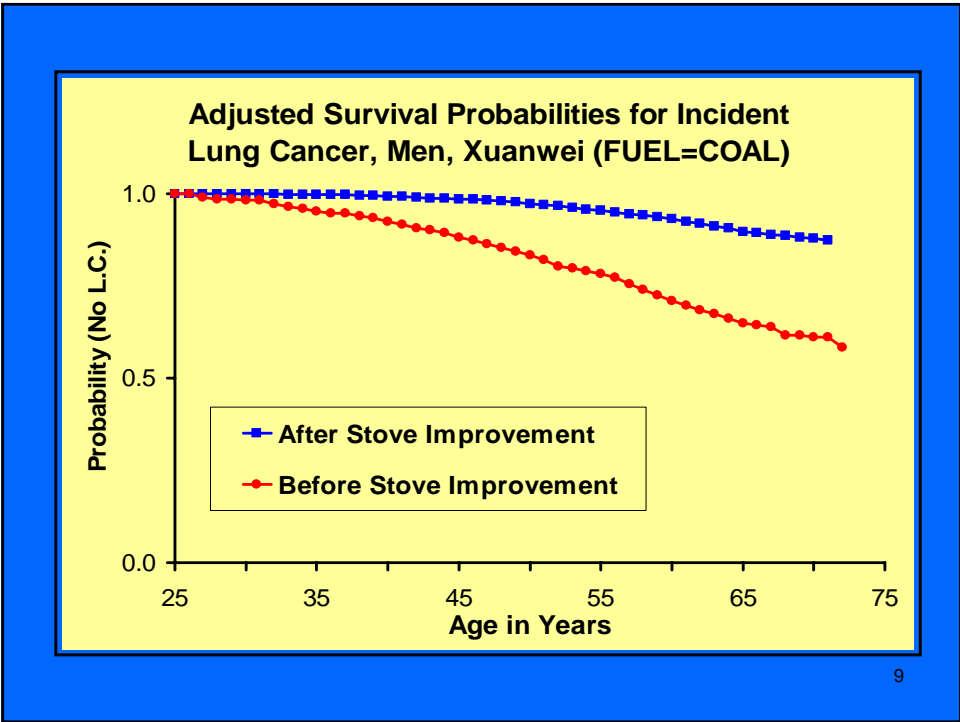
The situation in Xuanwei County, Yunnan Province, China, illustrates this point.

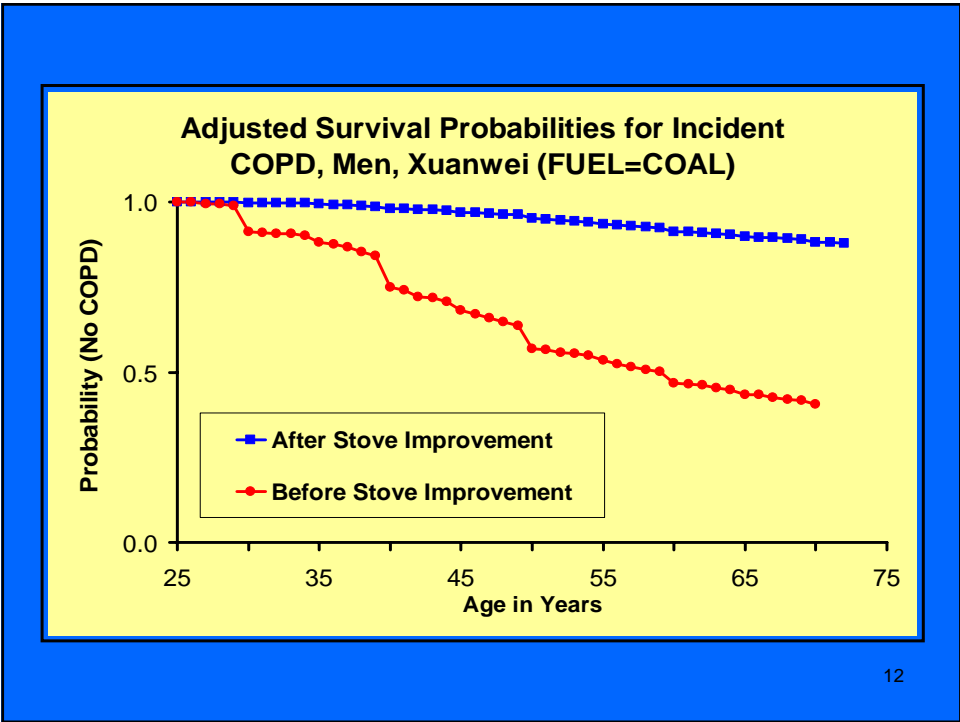
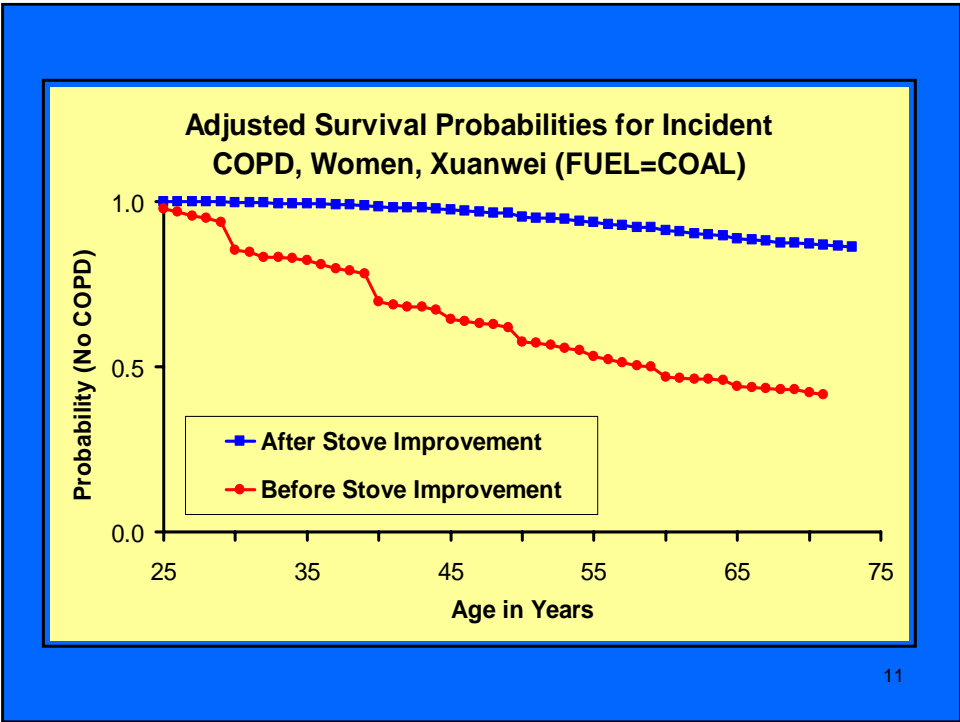
In Xuanwei, unvented indoor coal burning is strongly associated with increased risk of lung cancer and chronic obstructive pulmonary disease (COPD).

Installation of chimneys (stove improvement) was followed by substantial reduction in indoor air pollution levels, and by sharply reduced risk of lung cancer, COPD, and mortality.

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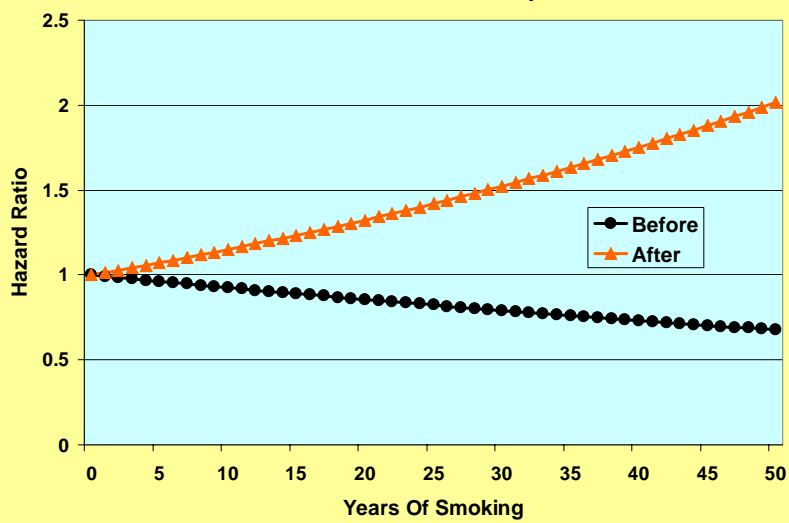
After the exposure of major interest has changed, what happens to other risk factors?

It is essential to address this question, in order to measure the net change in risk that follows pollution reduction.

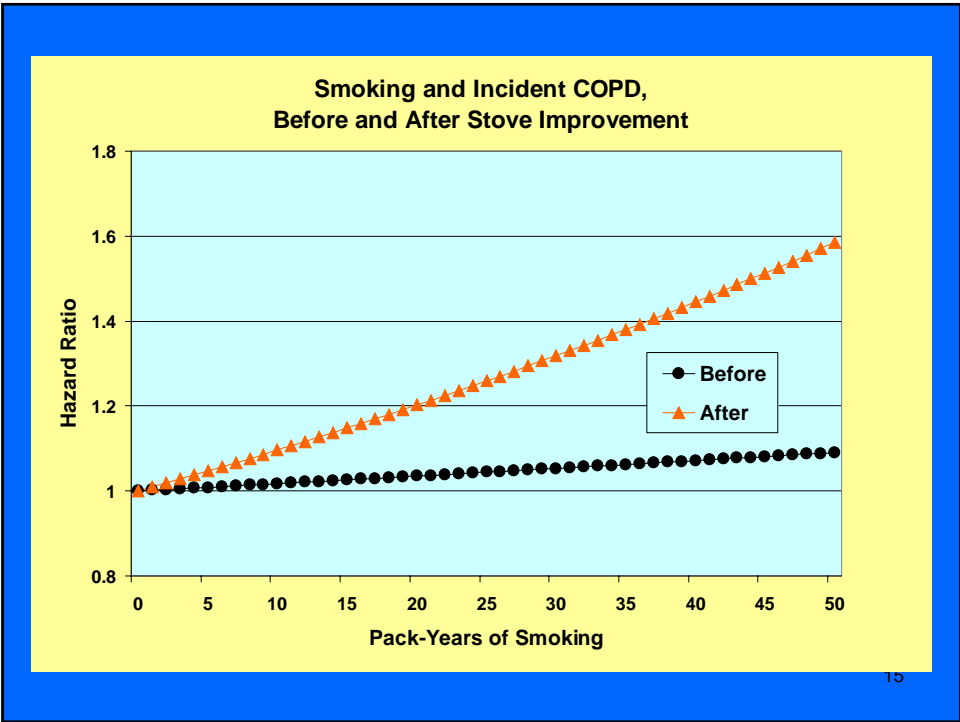
In Xuanwei, In men, the effect of smoking was stronger AFTER stove improvement than BEFORE it.

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Smoking And Incident Lung Cancer,
Before And After Stove Improvement



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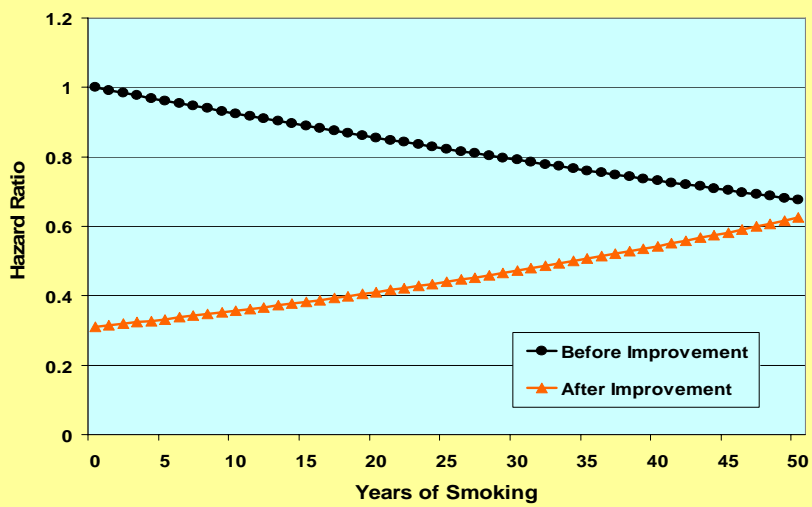
Smoking also had a stronger adverse effect on mortality after stove improvement than before improvement.

What are the implications for overall change in risk?

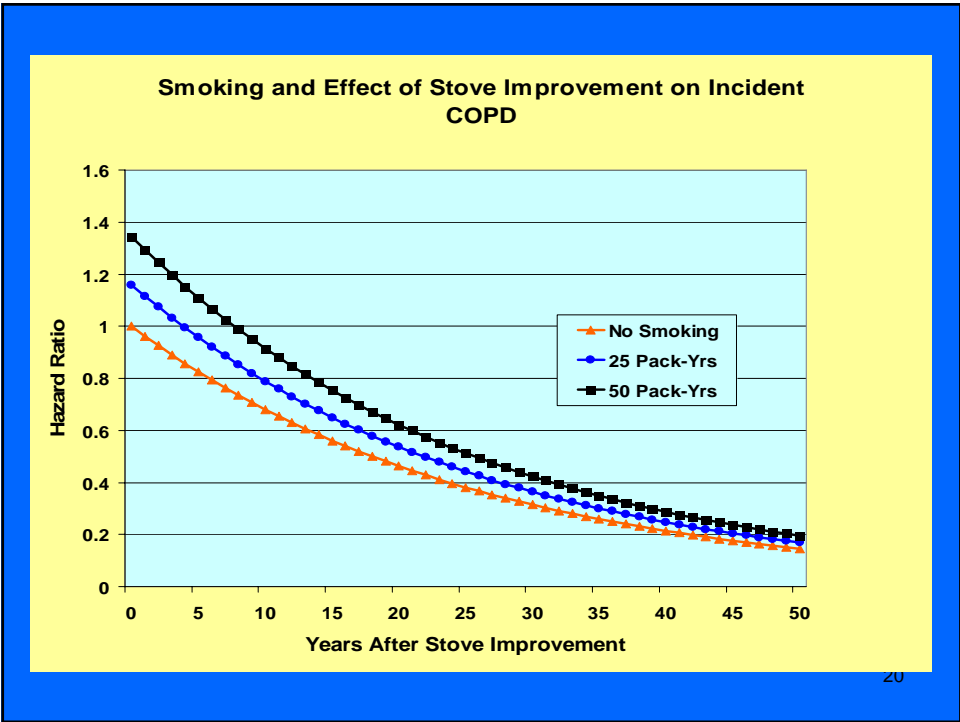
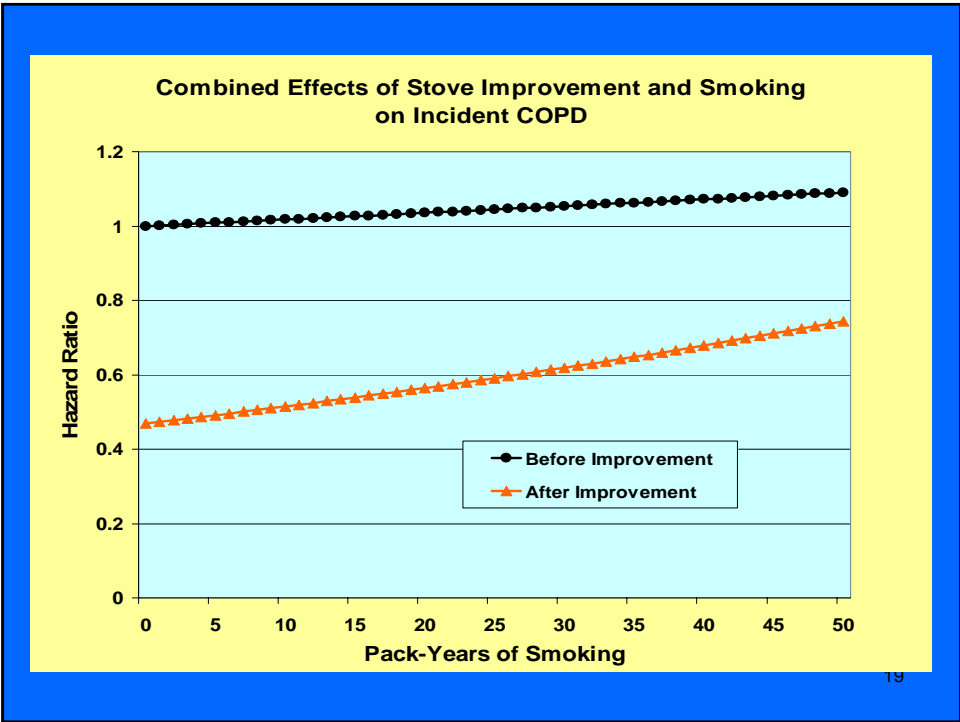
That is, what are the combined effects of stove improvement and smoking on risk?

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Combined Effects of Stove Improvement and Smoking on Incident Lung Cancer



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In Xuanwei, the effect of one major risk factor, smoking, got stronger after the effect of another major risk factor, indoor air pollution, got weaker.

In epidemiologic language, stove improvement was an important effect modifier for smoking.

The difference from most previous studies is that we are assessing effect modification before vs. after exposure change, rather than in different groups at the same time.

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Lessons

It is essential do do research targeted specifically to characterizing health benefits. We should not rely only on "risk factor studies."

Internationally important research venues can be found in many different kinds of locations.

The situation is very complex. Risk factors affect each other. Their effects are not constant, and they do not act in isolation. Addition or removal of one risk factor may change the potency of other risk factors.

We must consider multiple risk factors if we want to characterize the overall change in risk that follows change in only one risk factor.

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