

In countries where cooking can kill, researchers promote safer stoves

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A Bangladeshi woman stokes a flame under a traditional stove. Indoor air pollution from stoves like this have contributed to millions of deaths in the developing world.

(Phys.org) -- Traditional cookstoves are to blame for much of the pollution that leads to millions of deaths in the developing world. Safer stoves are available, but few people buy them. Stanford researchers say that's because the newer models aren't designed to give people what they really want.

Preparing a meal in some of the world's poorest [rural areas](#) can turn an ordinary activity into a deadly chore. Animal dung and crop scraps often fuel the indoor fires used for cooking. And before any food fills a hungry belly, thick black smoke fills a family's lungs.

[Pneumonia](#) and other acute respiratory infections kill about 1 million people a year in [low-income countries](#), making them the top cause of death in the [developing world](#) and the greatest threat to children's lives. Makeshift [stoves](#) belch much of the [polluted air](#) leading to those illnesses. About 75 percent of [South Asians](#) and nearly half the world's population use open-fire stoves inside their homes.

"The smoke is asphyxiating," said Grant Miller, an associate professor of medicine at Stanford working on ways to get people to buy – and use – cleaner, safer stoves. "It burns your eyes and you can't stop coughing."

Governments and humanitarian organizations have urged people to trade their traditional stoves for safer models, many of which have chimneys that funnel smoke out of a home. But the switch from dangerous stoves has been slow to come, even though most people using them know they're harmful.

Miller and his colleagues are studying what's behind the reluctance and what can be done about it. They suspect much of the problem rests with the widespread approach to clean cookstove conversion, which focuses on educating people about the appliances' health hazards and offering new models at a low cost.

Their most recent findings, published in the *Proceedings of the National Academy of Sciences*, boil down to this: Clean and modern [cookstoves](#) don't have features people want. And until they're redesigned, people are unlikely to bother with them.

"People don't think of cookstoves as health technologies," said Miller, a Stanford Health Policy faculty member at the university's Freeman Spogli Institute for International Studies. Miller is the senior author of the *PNAS* paper, which appears online June 11.

"They don't think respiratory [illness](#) is the biggest health problem that they have," he said. "And when you ask them what they want from a stove, they talk about saving time and having better fuel efficiency. They're not talking about smoke emissions."

In the first of two studies, Miller – joined by Yale researchers and Lynn Hildemann, a Stanford engineering professor affiliated with the university's Woods Institute for the Environment – surveyed about 2,500 women who cook for their families in rural Bangladesh.

Nearly all of the women use traditional stoves, and 94 percent of them said they know the smoke from their stoves can make them sick. But 76 percent said the smoke is less harmful than polluted water, and 66 percent said it wasn't as dangerous as rotten food.

"People know their cookstoves are bad, but they don't think cookstoves are the most important problem they face," Miller said. "They'd rather spend their money fixing those things and getting their kids into a good school than buying a new cookstove."

When asked what features are most important in a stove, the women talked about things that could save fuel costs, cooking time and the hassle that goes into collecting fuel.

"A very small percent said reducing pollution was important," Miller said.

The researchers then tried to assess more directly how Bangladeshis value new stoves. They offered 2,200 customers across 42 rural villages the opportunity to buy one of two models – one boasted improved fuel efficiency; the other had a chimney to reduce exposure to indoor smoke.

At the market prices of \$5.80 for an efficient stove and \$10.90 for the

chimney stove, less than a third of customers ordered either model. And when the stoves were delivered a few weeks after the orders were taken, a very small number of families actually went through with the purchase of either model. Large randomized discounts increased customer interest in fuel-efficient stoves but did little to raise purchase rates of chimney stoves.

"A big implication is that the health education and social marketing approaches aren't going to work," Miller said. "You need to get inside the heads of the users and figure out what they really want and value – even if unrelated to smoke and health – and then give it to them."

The lead author of the *PNAS* paper was Ahmed Mushfiq Mobarak, an economist at Yale. It was co-authored by Yale researchers Puneet Dwivedi and Robert Bailis. Their work was supported by the Freeman Spogli Institute's Walter H. Shorenstein Asia-Pacific Research Center, the Stanford Woods Institute for the Environment and the International Growth Centre.

Provided by Stanford University

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