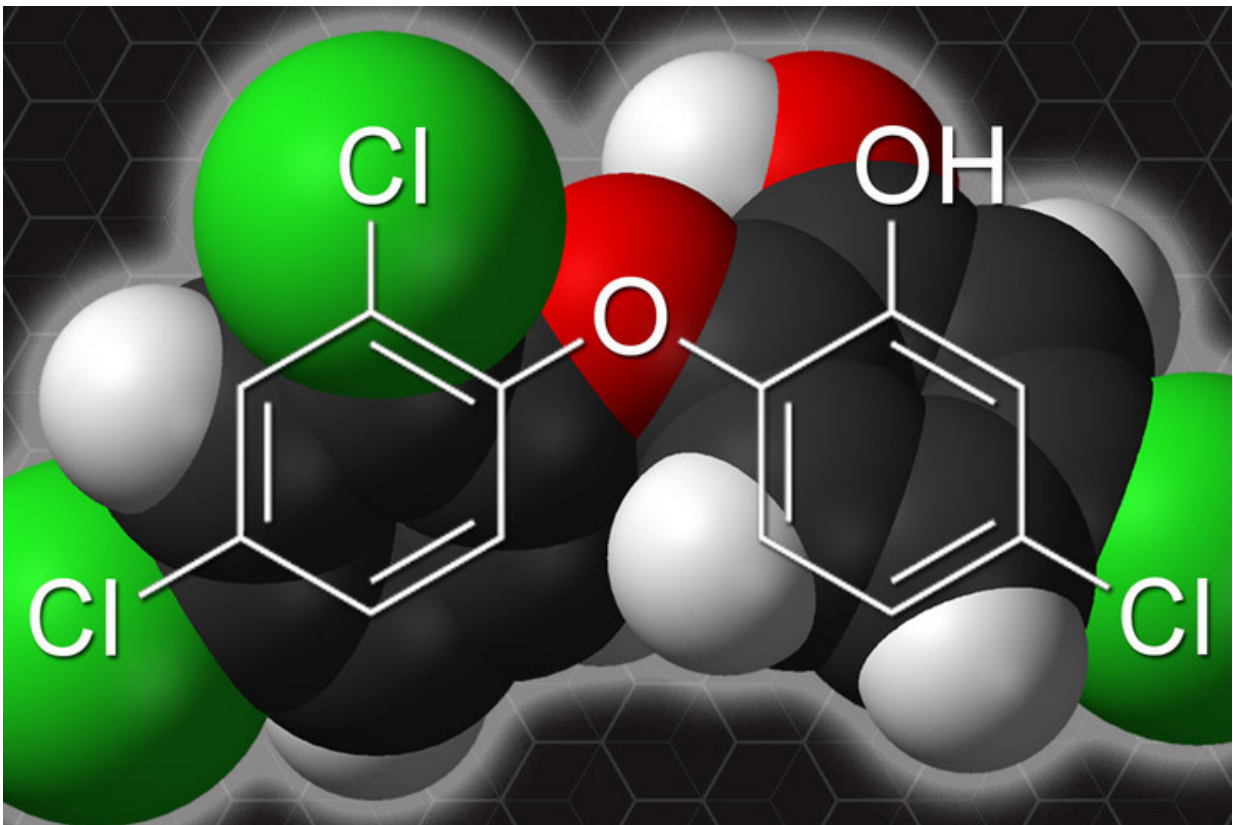


Researcher helps stem the spread of superbugs

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An artistic rendition of the chemical makeup of triclosan. Credit: Penn State Harrisburg

Katherine Baker feels vindicated. She and other microbiologists have been warning for years that anti-bacterial soaps containing triclosan are

bad for the environment, harmful for health, and do nothing to prevent disease.

In September 2016, the U.S. Food and Drug Administration (FDA) banned the use of triclosan and a related product, triclocarban, from consumer soaps and wash products. But, triclosan also is incorporated in cosmetics, kitchen utensils, clothing and even bowling balls—22,000 consumer products in all. The FDA rules do not yet affect these products.

Associate professor of environmental microbiology in Penn State Harrisburg's School of Science Engineering and Technology, Baker and her students have shown through their [research](#) that anti-bacterial soaps contribute to the spread of superbugs—organisms which no longer respond to [antibiotics](#). Triclosan also affects hormones, and can disrupt the endocrine cycle.

"For the past decade, microbiologists have been speaking about entering a post-antibiotic era," Baker said. "People will start dying again of diseases they died of before antibiotics. We took this amazing discovery and abused it, and now it won't work ... Now we have strains of bacteria that you have to hit with a two-by-four."

MRSA, a staph infection that has become resistant to antibiotics, killed more people last year than AIDS, she said. Tens of thousands of people die every year from antibiotic resistant infections, and common diseases like [urinary tract infections](#) and pneumonia are becoming harder and harder to treat, according to the Centers for Disease Control and Prevention (CDC).

For her research, Baker used the "[gray water](#)" that comes from household sinks and washing machines. The gray water contained triclosan from detergents and soaps, and is often used for irrigation. She

sprayed it on soil, then studied the microorganisms in the soil. Within three months, many of the microbes had developed a resistance to tetracycline, a commonly used antibiotic.

Baker makes a priority of involving students in her research, and many have followed up on her research and initiated their own. Former students are professors themselves now, and one works for the National Institutes of Health. All have either presented research papers nationally or internationally, or been published. Baker relishes her roles as teacher and scientist. "My job is to do good research and to train students to do projects they can own," she said.

Moving into the future

The FDA and CDC are not the only organizations that are paying attention to the problem of [antibiotic resistance](#). The UN General Assembly recently passed a declaration asking countries to come up with a two-year plan to protect the potency of antibiotics.

Baker applauds the measure, although she said it should have happened 15 years ago.

But, it's not just anti-bacterial soaps causing the problem. The overuse of antibiotics for minor illnesses and the wholesale feeding of antibiotics to livestock is a huge problem, she said. Farmers feed antibiotics to their livestock to make them fatter faster.

"Antibiotics should be used discriminately," she said.

Baker believes it's not too late to reverse the trend. She points to Denmark, which has prohibited routine feeding of antibiotics to animals and restricted prescriptions. Scientists there have already noticed a decrease in antibiotic resistant bacteria.

Baker's passion for her work is apparent. The shelves in her office are lined with stuffed animals in the shapes of microbes—toys that she will soon pass on to her first grandchild. Most microbes are good for us, Baker said. As a matter of fact, we'd die without them. Bacteria outnumber our own cells in our bodies.

"I can think of nothing more fascinating in the world than microorganisms," she said. "If all the people in the world died, life would go on. But if microbes died, there would be no more life. They're the coolest creatures on the face of the earth."

Still, changing attitudes is tough, she said. It's hard to wean people away from the idea that anti-bacterial soaps are good, especially when many advertisements promote them. Baker said even she has not yet succeeded in convincing well-educated friends to forego them.

"We're so terrified of germs," she said. "There is this idea that if you use this magic thing, you won't get sick. Washing with plain soap—rubbing and rinsing long enough to sing 'Twinkle, Twinkle, Little Star' or your ABCs—is as effective in preventing disease."

Provided by Pennsylvania State University

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