Kills 99.9% of Germs -- Under Some Lab Conditions

Hand Sanitizers’ Bug-Destroying Claims Don't Always Correspond to Real-World Practices; Not All Pests Covered by Tests

By CARL BIALIK
A decade of pesky germs, from SARS to avian flu to H1N1, has given rise to dozens of products bragging about their microbe-killing properties. Everything from hand-sanitizing liquids to products like computer keyboards, shopping carts and tissues tout that they kill 99.9%, or 99.99%, of common bacteria and fungi.

But some of these numbers look like the test scores in a class with a very generous grading curve. They often don't include all pesky germs, and are based on laboratory tests that don't represent the imperfections of real-world use. Human subjects, or countertops, in labs are cleaned first, then covered on the surface with a target bug. That is a far cry from a typical kitchen or a pair of grimy hands.

Advertising near-total effectiveness is common; AT&T Wireless's television ads touting its network coverage of 97% of the U.S. is just the latest example. But it is especially common for health products. Naturally, companies make the claims because they sell products.

"The 99.99% message is more powerful among consumers than 'antibacterial' or 'germ kill' alone," Maria Lovera, senior brand manager of skin care for Playtex Products Inc., maker of Wet Ones antibacterial wipes, wrote in an email.

In a study soon to be published, University of New Mexico biochemist Laurence Cole found that in two of three brands' home-pregnancy tests, fewer than two-thirds of pregnancies among women who had missed their periods were detected.

Often, such products do work, but they discount the likelihood of human error. Marketers who claim birth-control methods are 99% effective sometimes are relying on perfect usage.

James Trussell, director of the Office of Population Research at Princeton University, has compared pregnancy rates in clinical trials of contraceptives with those reported by users of the same contraceptives in federal surveys. For some methods, the typical user's pregnancy risk is 10 times higher, or more, over a year of use than that of the average user in a controlled study.

Hand sanitizers also tend to whitewash actual human usage from their laboratory testing.

"It's the optimal environment for the hand sanitizer to work," says Jason Tetro, a microbiologist at the University of Ottawa. "This differs greatly from the real-world setting."

Mr. Tetro showed the difference by testing three hand-sanitizer products for CBC News last month among eighth graders in Hamilton, Ontario. Three popular sanitizers killed between 46% and 60% of microbes on the students' hands, far short of 99.99%. Bugs that aren't killed by sanitizers aren't necessarily more dangerous than those that are. But the more that remain, the greater the chance of infection, doctors say.

The companies whose products were evaluated responded that those lab tests are what health regulators require. "Real-world application is completely subject to interpretation," says Jay Beckman, head of sales for MGS Soapopular Inc., the U.S. distributor of Soapopular, one of the products tested. "Nothing is guaranteed."

Like hand sanitizers, soap can be effective, but factoring in human nature can stand in the way. In one study in...
Late 1990s, Navy recruits were directed by their commanding officers to wash at least five times a day. That and other measures helped reduce outpatient visits for respiratory illness by 45%. After two years, compliance was so spotty that researchers didn’t have enough people participating to analyze the potential benefits of soap.

Without commanding officers to direct them, civilians can be even more problematic hand cleaners, says Allison Aiello, epidemiologist at the University of Michigan’s school of public health. She notes that few hand washers follow a rule of thumb, endorsed by the Centers for Disease Control and Prevention, to keep scrubbing for the time it takes to sing "Happy Birthday" twice (about 20 to 25 seconds).

To cite a 99.9% fatality rate, manufacturers don’t have to kill 99.9% of all known bugs. Regulations don’t require them to disclose which bugs they exterminate, just that the products are effective against a representative sample of microbes. For instance, many products can’t kill clostridium difficile, a gastrointestinal scourge, or the hepatitis A virus, which inflames the liver. Yet by killing other, more common bugs, they can claim 99.9% effectiveness.

Rules governing claims of efficacy depend on different agencies. In the U.S., the Environmental Protection Agency oversees claims about products intended for inanimate objects, while the Food and Drug Administration regulates skin products, including hand sanitizers.

To claim that other microbe-unfriendly products such as household cleaners and clothing kill 99.9% of germs, companies are permitted to show such deadliness less than 99.9% of the time, according to the EPA’s rules. The standard test is run on 60 slides inoculated with a specific bug, and 59 of them treated with the product must exhibit the claimed rate of germ death. The 60th can fail to allow for a mistake on the part of testers, according to Jean Schoeni, director of research at TRAC Microbiology, which conducts EPA testing. "It’s a very fussy, particular test," Dr. Schoeni says. Furthermore, if fewer than 59 slides show the high kill rate, manufacturers get a do-over.

If trained lab testers sometimes need a redo, aren’t consumers wielding a spray bottle likely to fall short of optimal sanitizing technique? "It’s highly likely," Dr. Schoeni says. She notes that some products need to sit on surfaces for 10 minutes to attain desired kill rates, yet many home cleaners are likely to wipe them off long before that.

Advertisers, in turn, say that U.S. regulation is, in some ways, too restrictive of the claims they can make. For instance, Paul Ford, chief executive of Agion, which supplies companies with silver technology to kill bugs, says the company’s products are too slow-acting to achieve the kill rates the EPA requires in a designated amount of time to make advertising claims. "These technologies require from an hour up to 24 hours to work."

And some makers of germ killers wish they could say their products kill the swine-flu virus -- a claim that some can reasonably make. The FDA bars companies from making claims for over-the-counter products about killing viruses, and has recently issued five warning letters to companies "for false/misleading H1N1 claims," according to an FDA spokesman. H1N1 is, manufacturers say, rather fragile and easy to kill. But because of the FDA rule, many don't test the efficacy of their products on the virus, says Doug Anderson, president of ATS Labs, which studies germ-killing products.

Dr. Larry Weiss, chief scientist and founder of hand-sanitizer maker CleanWell, markets his products with a 99.99% germ-mortality rate, in part because his competitors do.

But he worries that the limiting factor in hand hygiene isn’t the numerical claim, but instead noncompliance. "The public has become distracted by a series of numbers when there are more important considerations when it comes to hygiene behavior," he says.

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