



SURFACE MASTERS

The Ugly Truth About Toilets

The first indication that there might be something scientifically legitimate to it. It seems to have first been brought to light by University of Arizona environmental microbiologist Charles Gerba when he published a scientific article in 1975 describing bacterial and viral aerosols due to toilet flushing [\(2\)](#). He conducted tests by placing pieces of gauze in different locations around the bathroom and measuring the bacterial and viral levels on them after a toilet flush, and his results are more than just a little disturbing.

First is the confirmation of the existence of the aerosol effect, even though it is largely unrecognized. "Droplets are going all over the place—it's like the Fourth of July," said Gerba. "One way to see this is to put a dye in the toilet, flush it, and then hold a piece of paper over it" [\(8\)](#). Indeed, Gerba's studies have shown that the water droplets in an invisible cloud travel six to eight feet out and up, so the areas of the bathroom not directly adjacent the toilet are still contaminated. Walls are obviously affected, and in public or communal bathrooms, the partitions between stalls are definitely coated in the spray mist from the toilet [\(1\)](#). Also, toilet paper will be cleanest when it is enclosed in a plastic or metal casing; after all, it's subject to the same droplets splattering on it, and its proximity to the toilet bowl makes contamination potential obvious. The ceiling is also still contaminated and is in fact a potential problem site because it is often overlooked in the cleaning process. Bacteria cling to ceilings and thrive in the humid environment there; if the situation is left untreated for months or years (as is often the case), odors remain in restrooms that seem to have been to be otherwise thoroughly cleaned [\(1\)](#).



The bacterial mist has also been shown to stay in the air for at least two hours after each flush, thus maximizing its chance to float around and spread [\(2\)](#). "The greatest aerosol dispersal occurs not during the initial moments of the flush, but rather once most of the water has already left the bowl," according to Philip Tierno, MD, director of clinical microbiology and diagnostic immunology at New York University Medical Center and Mt. Sinai Medical Center. He therefore advises leaving immediately after flushing to not have the microscopic, airborne mist land on you [\(4\)](#). Worse still is the possibility of getting these airborne particles in the lungs by inhaling them, from which one could easily contract a cough or cold [\(6\)](#).

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Obviously, the idea of toilet water being unknowingly distributed around the bathroom is less than appealing, but a study of this sort calls for looking in detail at precisely what microscopic organisms we're dealing with here, even if we don't really want to know. Put rather graphically, it can be summed up as the F3 force: Fecal Fountain Factor, compounded by the favorable temperatures for bacterial propagation in room temperature toilet water [\(3\)](#).

Using a more scientific viewpoint, streptococcus, staphylococcus, E. coli and shigella bacteria, hepatitis A virus and the common cold virus are all common inhabitants of public bathrooms, but just because they're all over the place doesn't mean we necessarily get sick. After all, humans carry disease-causing organisms on our bodies all the times, but with healthy immune systems, the quantities in which these organisms exist is not enough to affect us, particularly with a good hand-washing after every restroom visit [\(4\)](#). This begs the question, however, of the number of people who actually wash their hands after going to the toilet, and more importantly, the number who wash their



hands effectively. Simply rinsing one's hands under running water for a few seconds without soap, as some people do, is not effective at all. The way to ensure maximum standards of hygiene is to lather your palms, the back of your hands, in between fingers, and under fingernails for 20-30 seconds with soap and hot water; the friction will kill off the bathroom bacteria [\(6\)](#).

Toilet seats have actually been determined to be the least infected place in the bathroom because the environment is too dry to support a large bacterial population [\(7\)](#). In accordance with that theory, the underside of the seat has a higher than average microbial population. The place in a restroom with the highest concentration of microbial colonies in restrooms is, surprisingly, the sink, due in part to accumulations of water where these organisms breed freely after landing their aerial journey. While toilets are obviously not sterile environments, they tend to not be as bad as people think because they receive more attention and are cleaned more often. "If an alien came from space and studied the bacterial counts, he probably would conclude he should wash his hands in your toilet and crap in your sink," Gerba said [\(2\)](#).

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The alien would almost certainly not put your toothbrush in his mouth because, with its traditional, uncovered spot in the bathroom, it is one of the hotspots for fecal bacteria and germs spewed into the air by the aerosol effect [\(5\)](#). Understandably, the toothbrush with toilet water droplets on it is one of the most retold horror stories to emerge from Gerba's report.

There are also greater implications from the study of the aerosol effect than simple grossness factor. Most obviously, bathrooms should be cleaned even more meticulously than before, with emphasis not just on and around the toilet, but equal emphasis on all areas of the bathroom because all areas are equally affected by the spray. Using the right cleaners is important because all-purpose cleaning solutions are not necessarily antibacterial, whereas most cleaners made specifically for restrooms are referred to as disinfectants or germicidal cleaners [\(1\)](#). Given that the sink area teems with bacteria, one must now be more careful about washing hands properly after walking into the bathroom for any non toilet-related purposes like washing your face and brushing teeth. Using a hair dryer can potentially be problematic in regard to bacteria counts because the effect would be largely the same as hot-air hand dryers, which actually increase the bacteria on hands by 162 percent, as opposed to paper towels, which decrease them by 29 percent [\(7\)](#). If you're still not convinced that bacteria exist in any significant quantities on your hands, consider that kitchen sink actually harbors the most fecal matter in the average home, carried there by unwashed hands after using the bathroom [\(5\)](#). A tablespoon of bleach in a cup of warm water on the offending sink will fix the situation... for the day.

To limit the scope of the aerosol effect, the simplest method is to close the lid on the toilet every time before flushing [\(5\)](#). This would also provide the peace of mind that while you are washing your hands for 30 seconds, microscopic, bacteria-laden water droplet will not be descending upon your person.

Unfortunately, most public toilets, including the ones in Bryn Mawr's dorms, don't even have lids for that option. Besides, given the large number of people who have used the toilet before you, it probably wouldn't make much difference.

After washing your hands, use a paper towel to turn off the faucet and to open the door to leave, in order to avoid being recontaminated [\(4\)](#). And today, get a new toothbrush and always, always keep it in the medicine cabinet or some other enclosed place after use [\(2\)](#).

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References

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- (2) [A Straight Dope Classic](#) - Cecil's been asked.
- (3) [Car Talk's mailbag](#) - People are talking back.
- (4) [WebMD](#) - What can you catch from restrooms?
- (5) [Harvard Gazette book review](#) - *Overkill*, by Kimberly Thompson
- (6) [When in doubt, Ask Men](#) - What can you catch from (men's) restrooms?
- (7) [Sean Blair: Writer. Researcher. Editor.](#) - Killer offices.
- (8) [The Atlantic Monthly](#) - Something in the water.



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