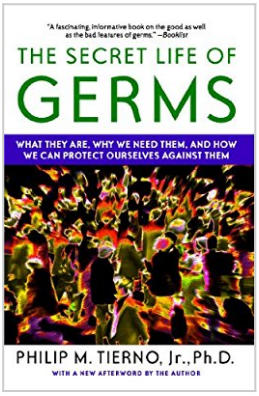

The Secret Life of Germs: What They Are, Why We Need Them, and How We Can Protect Ourselves Against Them

By Philip M. Tierno Jr. Ph.D.

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They're on everything we touch, eat, and breathe in -- on every inch of skin. And despite the advances of science, germs are challenging medicine in ways that were unimaginable ten years ago. No wonder the world is up in arms -- and using antibacterial soaps.
From the common cold, E. coli, and Lyme disease to encephalitis, mad cow disease, and flesh-eating bacteria, Tierno takes readers on a historical survey of the microscopic world. Rebuffing scare tactics behind recent "germ events" Tierno explains how the recycling of matter is the key to life. Yes, he'll tell you why it's a good idea to clean children's toys, why those fluffy towels may not be so clean, and why you never want to buy a second-hand mattress, but he also reveals that there is a lot we can do to prevent germ-induced suffering. You'll never look at anything the same way again.

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- Sales Rank: #409637 in Books
- Published on: 2004-01-06
- Released on: 2004-01-06
- Original language: English
- Number of items: 1
- Dimensions: 8.44" h x .90" w x 5.50" l, .65 pounds
- Binding: Paperback
- 320 pages

Editorial Review

Review
Booklist A fascinating, informative book on the good as well as the bad features of germs.

Publishers Weekly Field samplings from...pay phones, taxicabs, public restrooms...will startle readers, but the author is not an alarmist: His aim is disease prevention, and his method is education.

About the Author
Philip M. Tierno, Jr., Ph.D., helped solve the mystery behind toxic shock syndrome. He is Director of Clinical Microbiology and Immunology at New York University Medical Center and is a member of the faculty at NYU School of Medicine. He has appeared on such shows as *20/20, Oprah, Dateline,* and *PrimeTime.* Dr. Tierno lives in a suburb of New York.

Chapter One: Seeds of Disease, Seeds of Life

Our Greatest Fear

Think of Howard Hughes, and what comes to mind? Is it a picture of a handsome, vital man, heir to a great fortune, whose exploits as an aviator, a movie producer, a husband of starlets, a wily businessman, and a Nixon campaign contributor have filled scores of articles, books, and movies about him? Or does another image predominate, the lonely figure of an aging, unkempt, drug-addicted recluse, ensconced at vast expense in a Las Vegas hotel suite that he obsessively tries to keep operating-room clean, fretting endlessly that some germ will infect his system and kill him?

The picture of the germ-phobic old man that Howard Hughes became lingers in the public imagination because, when it comes to germs, we all have a little bit of Howard Hughes in us. We're all infected with the psychic fear that at any moment, in any setting, invisible agents may as easily give us an incurable, lethal disease as they would a common cold. Or perhaps they will poison our food, or attack our children as they play with their friends and pets. We know that nasty germs could be anywhere, and so we feel helpless to predict when they'll strike or to prevent the harm they can do to us, those we love, and our communities.

There is just cause for alarm. Except for the very earliest stages of human history, infectious diseases have been, and remain, the number-one killer worldwide. Thanks to advanced medical care and public sanitation, infectious diseases run a close third to heart disease, the number-one killer, and cancers, the number-two killer, in the United States and other developed countries. But that calculation may need to be revised. As we'll see, the latest scientific evidence implicates infectious germs as a trigger for many cases of heart disease and many kinds of cancer.

Once upon a time, not too long ago, we thought we had defeated germs. In the middle of the twentieth century, the development of "wonder drugs" promised to end the scourge of infectious disease forever. Beginning with penicillin, scientists and medical researchers soon stocked our pharmacies with a wide range of antibiotics and vaccines. It seemed to be the culmination of one of the great themes in the saga of human history, the long struggle to understand the underlying causes of disease. As we'll see, over the millennia people in many different cultures achieved profound insights into the nature and progress of disease -- the

ancient Chinese, for example, invented a dangerous but effective method of inoculating against smallpox -- but the means to put all the pieces of the puzzle together were lacking. Superstition, greed, egotism, and inadequate technology all played roles in keeping us ignorant. Not until the Renaissance period in Western Europe did a critical mass of knowledge become available to scientists and physicians working in a new atmosphere of free inquiry.

These circumstances enabled an Italian physician named Girolamo Fracastoro to theorize that diseases were transmitted by tiny agents, too small to be seen by the naked eye, which he called "seminaria," that is, "seeds" of disease. Fracastoro published his book on contagious diseases, the first statement of the modern germ theory of disease, in 1546. Just over a hundred years later Antoni van Leeuwenhoek in Holland and Robert Hooke in England used the new optical technology of the microscope to demonstrate that "seminaria" actually existed. But Fracastoro's theory would not be proved in full until the late nineteenth century, when the Frenchman Louis Pasteur, the German Robert Koch, and others finally established reliable procedures for identifying specific disease-causing germs, mapping their transmission from host to host, and developing vaccines to combat them.

The great achievements of Pasteur and Koch set the stage for the twentieth century's discovery of penicillin and all the wonder drugs that have followed to this day, including the latest "cocktails" being administered to patients with HIV, the virus that causes AIDS. Unfortunately, as the AIDS epidemic has made all too clear, we can no longer confidently expect an easy triumph over infectious disease. Even as our wonder drugs and vaccines have allowed us to eliminate scourges such as smallpox, probably the greatest single killer in the history of the human species, we face a frightening array of newly emergent diseases and of old diseases in new guises. Killer germs that once fell easy prey to a few doses of antibiotics, such as those that cause tuberculosis, have reappeared in drug-resistant forms. Some germs defy all known antibiotics. Meanwhile, globalization has unleashed germs that were once confined among isolated population groups -- HIV, Ebola virus, West Nile virus, among others -- and made it possible for them to spread from anywhere to anywhere, just like a computer virus on the Internet, only much more deadly. In the context of global commerce, travel, tourism, and mass migration, there is no longer any such thing as an isolated population group. When it comes to public health, if nowhere else, we must acknowledge that the world's population is truly all one family.

In addition, medical research is continually uncovering new disease roles for germs, from toxic shock syndrome to cancer and heart disease. This is not even to mention the continuing threat of germ warfare or bioterrorism with lethal agents such as anthrax. Less than a thermosful of anthrax germs could kill every warm-blooded creature in, say, Chicago -- people, cats, dogs, horses, and the rest -- leaving the Miracle Mile a desolate province of insects, reptiles, and birds. That is, it could do so if a way could be found to spread it effectively. Fortunately for us, that is no easy task, but, as we'll explore, it is also not necessarily beyond the reach of a committed terrorist group.

Although we must ultimately look to medical science to save us from all these dangers, the medical profession itself has a dirty germ secret that can no longer be ignored. I mean literally dirty. Every year our very best hospitals sicken and even kill an untold number of patients with what are called nosocomial infections. That medical euphemism, "nosocomial," means that it was doctors, nurses, and other staff who made the patients sick, because these caregivers' hands were contaminated with germs. The source of the contamination? The caregivers' failure to wash their hands properly, or wash them at all, after examining another patient, handling a specimen, using medical equipment, or attending to their own personal hygiene.

How is it possible that doctors at elite teaching hospitals don't wash their hands enough? Don't they know any better? Of course they do. And every good hospital now has a hand-washing program in place. Next time you're in a hospital, you might look for some of the signs that remind medical personnel about hand washing.

These signs often feature a picture of two clasped hands and the words "Wash me."

The real importance of the fact that doctors don't always wash their hands as they should is that it indicates the extent to which inadequate personal hygiene cuts across all socioeconomic lines. This is not just a problem of agricultural workers and restaurant staffs. When researchers put cameras in public rest rooms to track people's behavior, the numbers of those who don't wash their hands properly, or don't wash them at all, is staggering, often over ninety percent. The rates are such that we really need a vast public-education campaign on hand washing, equivalent to that we now have on smoking. If we look at the matter honestly, we'll see that the cost to public health from not washing our hands is enormous.

Why so few people wash their hands appropriately is baffling. One part of the answer may well be the complacency about infections that the ready availability of antibiotics has encouraged until recently. But it is hard not to think that the behavior is mainly fueled by ignorance or selfishness. From the point of view of public health, there is a clear link between not covering one's mouth when one coughs and not fully disclosing one's sexual history to a prospective partner. They are related behaviors, and the threat posed by them gets ever greater, as our world becomes ever more populous and more closely connected.

Our Best Hope

What can we do to protect ourselves, our families, and our communities? Well, we can't rid the world of germs. For one thing, we depend on a great many germs to keep our economy churning along. Germs are vital to numerous agricultural, commercial, and medical processes, from the yeasts that make bread rise, through the microscopic algae used in manufacturing cosmetics, paints, and fertilizers, to the soil bacteria from which antibiotics are extracted.

More to the point, the cycle of life requires the action of germs at every stage. No living creature could survive for long in an entirely germ-free environment. Without germs, animals, including human beings, could not develop mature immune systems or even digest their food (as germs break down food in the intestine, they extract and produce essential nutrients and vitamins). The ecosystem of the human body, if you will, is delicately balanced by germs. Often when we get sick, the problem is that we have disturbed this natural balance and turned our own good and necessary germs against us. We can see that there is a similar balance in the world as a whole, if we consider the role that germs play at the end of life. If there were no germs to decompose them, the dead carcasses of animals and plants would soon cover the earth, choking off all future growth. Recently we have learned to utilize this capacity of germs to break down organic matter to help clean up oil spills and other pollution.

At an even deeper level, we have discovered that germs were the initial building blocks of evolution. They are much more than just the seeds of disease. They are the seeds of life itself. A fossilized germ cell found in a rock in western Australia and dated to 3.5 billion years ago is the old...

Users Review

From reader reviews:

Richard Reid:

This book untitled The Secret Life of Germs: What They Are, Why We Need Them, and How We Can Protect Ourselves Against Them to be one of several books that best seller in this year, that's because when you read this book you can get a lot of benefit in it. You will easily to buy this particular book in the book shop or you can order it via online. The publisher of the book sells the e-book too. It makes you quicker to read this book, since you can read this book in your Smartphone. So there is no reason to you to past this

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