Principles of Public Health Microbiology

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Dedication

To John and Wilma

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Preface

People are naturally interested in the things that can harm them. We are far more interested in learning about a dangerous animal, like a cobra, than an ordinary kingsnake, even though the latter is of more benefit to us. We are more interested in toxins that kill in small amounts than we are in vitamins that we require in small amounts. And we are more interested in *Staphylococcus aureus*, the pathogen, than in *Staphylococcus epidermidis*, the helpful commensal microbe. Much is known about infectious disease, although it is far better to avoid it.

Of course, avoidance is not always possible. For example, there was an unfortunate incident at our department's annual Christmas party. It was held on a Wednesday, and on Thursday and Friday we had a number of people out sick. Even though colds and flu are frequent in the campus community, a cluster like this one seemed unusual. One professor, rather pale and heading home to recuperate, suggested that it was food poisoning and even suggested what she thought was the culprit.

A quick survey of the department found that, of 20 attendees, 8 had become ill with gastrointestinal symptoms (vomiting and/or diarrhea). No one suggested that anything tasted "funny." Comments from the sufferers suggested that the contaminant was in one of three items: the pasta salad, the spinach salad, or the vegetable dip. I calculated the odds ratio (covered in this text) and found that the odds ratio for spinach salad was 1.5. With such a small sample size, this number was hardly significant. The odds ratio for the pasta salad was 3.8, which certainly looked suspicious. The odds ratio for the vegetable dip was 12. This was far too great to ignore.

So what was the source? An epidemiological approach can only point you in the right direction; it does not provide substantive proof of causation. However, I did not eat either the dip or the pasta salad, and I was fine. It was one of those items. The real lesson (at least for this book) is that foodborne illness can strike any group, even an educated bunch of Health Sciences faculty. While we will never know what the ultimate source of contamination was in this case, it is certain that there was a breakdown in the food preparation, and any breakdown should be avoidable if we just analyze it, understand it, and engineer our way around it.

Some people take a fatalistic approach to illness. People have been getting sick from all manner of sources for a long, long time. And, of course, no one died from our office party. They were sick for a while, and everyone is better now. But that is too parochial a vision. Our faculty is a group of otherwise strong, healthy people, but they will not always be. Everyone gets old and prone to illness, and there are many, many other people who, through no fault of their own, are at risk for major illness from microorganisms from which the rest of us would easily recover.

The measure of a great society is the care it takes with the most vulnerable members of that society. We care about these things because we, as a society, wish to reduce suffering and sadness. Industrialized societies have been quite successful at reducing infectious disease, and we have a happier and healthier society for it. The mechanisms that we have put in place have been successful in avoiding a huge amount of illness. Knowing how this was accomplished, and knowing the problems that still remain, are requisite for knowing what to preserve and what to concentrate on next.

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Additionally, I would like to acknowledge the reviewer of this text, Michael Pentella, PhD, D(ABMM), who is a professor in the College of Public Health at the University of Iowa, Iowa City.

About the Author

Robert S. Burlage, PhD, is a professor in the Health Sciences Department at the College of Health Sciences, University of Wisconsin–Milwaukee. He received his doctoral degree from the University of Tennessee and performed post-doctoral work at Oak Ridge National Laboratory in Tennessee. He continued there until 2001, working on bioremediation of hazardous wastes, including detection of specific chemical species using bacterial bioreporter systems.

His current research involves gene expression of bacterial pathogens in natural settings, such as rivers. He has received one U.S. patent and has coedited another text, *Techniques in Microbial Ecology*. He served as chairman of the Health Sciences Department from 2007 to 2010 and as graduate coordinator from 2001 to 2007.

He is the graduate coordinator of the Zilber School of Public Health at UWM. He was instrumental in starting the school and was the principal developer of the Environmental and Occupational Health doctoral program at the school. Dr. Burlage continues to serve on their executive committee.