

Review of Brad Spellberg, *Rising Plague: The Global Threat from Deadly Bacteria and Our Dwindling Arsenal to Fight Them*¹

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In *Rising Plague*, Brad Spellberg sets out to accomplish two goals: to show us how urgent the problem of antibiotic resistance has become, and to offer specific policy proposals for stimulating the discovery and development of new antibiotics. Dr. Spellberg makes it clear at the outset that we can never expect to rid the world of parasitic pathogens; we can only try to control the damage they inflict on us by devising new ways to defend ourselves.

In the first half of the book, Spellberg traces the speed with which resistant microbes have spread after the introduction of each new antibiotic. Within a decade of our widespread use of penicillin in the 1940s and methicillin in the 1960s, resistant versions of the bacteria they initially destroyed were common enough to render these antibiotics virtually useless in many hospitals. Spellberg explains that widespread antibiotic resistance first occurs in hospitals because this is where antibiotic use is most concentrated, and because hospitals are filled with already sick patients whose compromised immune system makes them both victims and vectors for parasites.

As resistance to penicillin and methicillin has spread out of hospitals and into communities, tuberculosis and *staph* infections have re-emerged as major public health threats. More recently, Spellberg argues, many of the normally benign bacteria that reside in our gut (which can become harmful if they infect other parts of our body) have evolved resistance to multiple antibiotics. An example is *e. coli*, which is the most common cause of urinary tract infections in women. According to Spellberg, the problem of drug-resistant *e. coli* is so bad that “it is possible that tens of thousands of women per year will have to be hospitalized to receive intravenous antibiotics just to treat urinary tract infections” (74). More importantly, as we become colonized by bacteria that are resistant to various antibiotics, these antibiotics become useless against more serious infections, since genes that confer resistance to antibiotics can quickly jump from one bacterial species to another (99).

One of the few contestable claims Spellberg makes is that “Physician misuse of antibiotics does *not* cause microbial resistance” (97). Of course, Spellberg may be right that physician misuse of antibiotics is not the *only* cause of resistance, or even the principal cause, but many consider it an important contributing cause.² Yet Spellberg insists that “microbes do not need our help in creating antibiotic resistance,” and that all humans can do “is affect the rate of spread of preexisting bacterial resistance by applying selective pressure via exposure to the thousands of metric tons of antibiotics we have used in patients and livestock over the last half century” (103). The argument seems to be that since pathogenic bacteria had already evolved mechanisms to resist antibiotics long before humans began using them, all we are doing by misusing antibiotics is encouraging these preexisting genes to spread.

However, Spellberg himself doesn’t seem to fully believe this, and I suspect that he is overstating his case in part because he wants to dispel the erroneous view that microbial resistance develops simply because of bad doctors and dirty hospitals. In fact, when discussing the speed with which bacteria can develop resistance to antibiotics, Spellberg points out that bacteria “can undergo as many as 500,000 generations during one human generation, and can even create new weapons and defense mechanisms within [a few] generations” (102). If this is right, then it seems pretty clear that physician (and patient) misuse can not only encourage the spread of pre-existing resistance genes, it can also place selective pressure on bacteria to evolve novel forms of resistance via genetic mutation and transposition. Nevertheless, Spellberg’s contention that physician misuse does not cause resistance in no way undermines his argument that we need to develop new antibiotics.

In the second half of the book, especially chapters five through seven, Dr. Spellberg discusses why antibiotic development has lagged behind other disease-fighting drugs, and explores how we might use incentives to encourage development. These are the most important chapters of the

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2. Levy (2002), chapter five.

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book for those interested in policy, and they are written much more concisely than some of the previous chapters, which are interspersed with anecdotes about anonymous patients.

Spellberg begins chapter five with a puzzle. As antibiotic resistance increases, demand for newer antibiotics naturally follows suit, which should give pharmaceutical firms a profit incentive to develop new drugs. Yet there has been a sharp decline in antibiotic development since the 1970s (Nathan, 2004). Why is this true? Spellberg offers at least three convincing answers: first, in contrast to drugs that treat chronic disease like high cholesterol and allergies, antibiotics are typically used for a short duration, which may translate to less money spent per user over time. Second, unlike most other drugs, antibiotics become less effective over time because the more they are used, the more resistance they create in the pathogens they are designed to destroy. Third, new and increasingly sophisticated antibiotics require more basic science research (which is not patentable, and hence not profitable), and more translational research (which “translates” basic science into patentable discoveries) than previous antibiotics required.

These considerations suggest that research associated with microbial resistance is a public good³, that pharmaceutical firms lack the incentive to carry out much of this research (especially research that cannot be patented), and that governments might play a role in facilitating this research. Indeed, Spellberg’s most important contributions are his recommendations for how to stimulate new drug development without getting government directly involved in research and development.

Many economists and scientists have suggested that we simply increase the NIH budget to fund basic science research relating to antibiotic resistance, or that we extend patents on antibiotics in order to make it cost-effective for pharmaceutical firms to undertake the costly research and development associated with producing new drugs. Dr. Spellberg supports this view, but suggests that we should target the incentives more carefully. For example, instead of granting patent extensions to all antibiotics, we might want to award a temporary patent extension (ranging from six months to two years) to firms producing “priority antibiotics.” The idea is to have the FDA determine which antibiotics are currently needed to counteract resistant strains of deadly bacteria, and to grant temporary monopoly power to firms which produce these antibiotics. Of course, since monopolies increase the short term price of commodities, many consumers would object to extending patents on all antibiotics. But most of us probably would agree to extend patents for drugs that treat serious public health threats, such as drug-resistant tuberculosis, even if it temporarily increases the price of such drugs.

3. A good is “public” in the economic sense when nobody can be excluded from enjoying its benefits. Markets often fail to produce public goods because individuals lack the incentive to produce a collectively beneficial outcome when they lack the ability to charge beneficiaries of the outcome.

There are two problems with this proposal. First, the FDA employees tasked with determining which drugs and which research qualify as “priority” might be susceptible to rent-seeking lobbyists who seek the additional revenue associated with having their drugs classified as “priority” when they are actually only moderately useful. Second, since widespread resistance to antibiotics can emerge within a few years of their introduction, extending a patent by a few months or even a few years might make very little difference to the antibiotic’s profitability. This is especially true when antibiotics are prescribed by doctors to patients who don’t really need them, and when they are unnecessarily fed to farm animals in order to promote growth and stave off infections in the crowded (and cruel) conditions of modern factory farms (Gorbach, 2001). These practices foster resistance, and undermine the efficacy of antibiotics.

Although Spellberg doesn’t address the first problem of perverse bureaucratic incentives, it might be mitigated by familiar rules like barring FDA regulators from accepting employment from the pharmaceutical companies whose research they regulate. Spellberg proposes that the second problem can be overcome through an ingenious mechanism called a “transferable patent extension.” The idea is to give regulatory authorities the ability to grant a temporary patent extension to manufacturers of priority antibiotics, but to allow manufacturers to transfer the patent extension to a drug of their choice. Transferable patents could encourage drug companies to undertake costly research and clinical trials on a drug for which they don’t anticipate much profit, because transferable patents allow firms to charge monopoly prices on more profitable drugs that they already produce.

A hidden cost of transferable patents—a cost that Spellberg does not consider—would be borne by consumers of existing drugs to which pharmaceutical firms transfer their patents. For example, if I have rheumatoid arthritis and cannot afford the expensive patented drug that reduces its symptoms, I pay the (non-monetary) cost of a firm’s choice to develop a new priority antibiotic if it transfers its patent extension to its rheumatoid arthritis drug. To justify this apparent unfairness, we would need to be sure that the average benefits to consumers of priority antibiotics were large, and that the misuse of antibiotics by patients and farmers were minimized. One way to accomplish this task is to ban the use of antibiotics in agriculture (Anomaly 2009), and to tax the consumption of antibiotics in order to offset the social cost of resistance and to make patients and doctors think twice before prescribing and consuming them so liberally (Kades, 2005).

In the end, Spellberg succeeds in raising awareness about a social challenge with ethical, economic and political dimensions. For those without much familiarity with antibiotic resistance, the first half of the book provides an accessible overview of the problem. For those interested in the political and economic aspects of the declining investment in antibiotics, the second half of *Rising Plague* offers fresh suggestions for how to spur drug development without the need for extensive government intervention.

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Review of Denis G. Arnold, Ed., *Ethics and the Business of Biomedicine*¹

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After more than a decade of “healthcare organizational ethics,” many working in healthcare ethics are still more competent and comfortable addressing ethical issues related to clinical care than ethical issues related to healthcare business practices. There now exists, however, a growing and increasingly more useful literature on healthcare business ethics for those seeking to deepen their understanding of this field. Denis Arnold, a business ethicist, has edited an important contribution to this literature.

The eleven papers published in this collection were originally prepared for a conference at the University of Tennessee in Knoxville that brought together a number of leading bioethicists and business ethicists to consider the role of the market and of for-profit industry in relationship to just healthcare. The authors are Daniel Callahan, Norman Daniels, Paul Menzel, Tom Beauchamp, Jason Hubbard, Denis Arnold, Carl Elliott, Richard DeGeorge, George Khushf, Daniel Wikler, and the team of Mary Rorty, Patricia Werhane, and Ann Mills.

Similar to some other recent analyses, the pharmaceutical industry receives much attention. Contrary to some other recent analyses, the primary concern regarding market-driven healthcare practices is more focused on the impact on the healthcare care system generally (such as cost, quality, and priorities) than on the impact on the professionalism of physicians. While this collection of papers, like any collection, requires “starting over” every 20–30 pages in terms of the author’s ethical framework and style of analysis and argument, it is more cohesive than most.

One question that is central to a discussion of the appropriate role of for-profit business in healthcare is whether—and, if so, in what ways—healthcare is different from other kinds of businesses. Few ethicists take a systematic or complete objection to the general U.S. commitment to the market as the mechanism for producing and distributing most goods and services, but many ethicists raise

questions about the role of the market in healthcare. Several of the authors address this important question, beginning with Daniel Callahan, whose essay is appropriately placed first in the collection. Callahan notes that “it is a fallacy to conclude that, because the market in general is a beneficent force for societal good, it is therefore equally valid in organizing and running healthcare *systems*. I call that the ‘market fallacy.’” (p. 33) Callahan is not opposed, however, to the use of some market practices in a healthcare system that is not dominated by the market.

In his analysis of the ethics of the pharmaceutical industry, Richard DeGeorge has a different starting point: there are no special rules for healthcare industries that differ from those for other corporations. The same principles of business ethics apply. In taking this approach, DeGeorge differs from most of the other authors in the volume. The result of this different starting point is that he is less critical of some pharmaceutical industry practices, a fact that re-enforces the importance of clarity on this fundamental question for healthcare business ethics.

The pharmaceutical and medical device industries might be considered one context for clarifying healthcare business ethics. Another context is the healthcare provider organization, with which many healthcare ethicists have a more direct connection and which is the context for much of the work in “organizational ethics.” The paper by Rorty, Werhane, and Mills argues that medicine is, in reality, a business: “(1) that it costs money; that it is (2) a process of production (3) that provides a (sometimes costly) service (4) that fills an important social need, and (5) that must be financially sustainable.” (p. 205)

Business threats to ethical healthcare arise not from the fact and recognition that healthcare is a business, but from business practices that are 1) based on values that are inappropriate for healthcare, and 2) from not keeping priorities straight. In healthcare, patient care is the first priority; the

1. New York, NY: Cambridge University Press, 2009. 291 pp. \$29.99. Softbound.

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