

BOOK REVIEW

Edited by Richard Botzler
botzlerr@sbcglobal.net

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Spillover—Animal Infections and the Next Human Pandemic. By David Quammen. W. W. Norton and Company, Ltd., New York, New York, USA. 2012. 587 pp. ISBN 978-0-393-06680-7. US \$28.95 hardback; \$16.05 paperback.

Review by Renée E. Carleton

Emerging infectious disease reports are appearing more frequently in the news. Fueled by the recent outbreaks due to Ebola virus in 2015 and Zika virus in early 2016, diseases with pandemic potential have gained a great amount of public attention and notoriety. *Spillover—Animal Infections and the Next Human Pandemic*, by David Quammen is, as the name implies, about zoonotic diseases and those human diseases that spilled over from animal origins. It is not a textbook or a technical reference, but soundly written scientific reporting focusing on the “Big Ones,” the diseases with which the public is most familiar. Why then should we read a book written for a general audience? It is the well-researched histories of the emergences, descriptions of the impacts, and personal stories of the people involved, both the victims and scientists whose work led to our understanding of these diseases, that make this book worthwhile reading. Personally, I found the book to be a stark reminder of the human and animal costs associated with emerging diseases.

Each chapter in *Spillover* focuses on a specific disease or similar diseases, where and how it emerged, and the people involved. These include Hendra, Ebola, SARS, hepatitis B, Lyme disease, psittacosis, Q fever, malaria,

Nipah, and, of course, HIV and influenza. Interspersed throughout the chapters, Quammen provides explanations of epidemiologic theory and terminology at a level that is relatively understandable for most non-science-proficient readers but not so dumbed down that those well educated in the biomedical disciplines would be insulted or bored. For example, Quammen introduces the reader to Anderson G. McKendrick's and William O. Kermack's *S-I-R* model and George MacDonald's concept of R_0 in the aptly titled chapter about malaria, “Everything Comes From Somewhere.” There are no derivations of differential equations, just sensible explanations of model components and factors influencing transmission and proliferation. These ideas are reinforced in Quammen's descriptions of past and modern disease outbreaks and associated research breakthroughs. Likewise, his explanation of the differences between DNA and RNA viruses and their subtype designations is solid and easily understandable.

The chapter about AIDS and the causative and related viruses, “The Chimp and the River,” is the most extensive of the book. Quammen thoroughly examines the disease in both historical and epidemiologic context, including a discussion of its possible emergence in 1908. As with the other diseases covered in the book, there are passages about victims and researchers, and well-explained details of viral phylogenies. This is the only chapter, however, in which the author departs from his scientific-reporting style by creating a highly fictional scenario of disease expansion from a hypothetical spillover event. Quammen's main character in this scenario, “The

Voyager,” becomes responsible for spreading HIV variant M widely beyond its beginnings in a remote jungle through sexual contact with a partner of the initial spillover victim (“The Cut Hunter”). While there is a reasonable scientific basis for Quammen’s theory of transmission, his embellishments, which include ivory harvest and murder, are a bit too novelistic.

The final chapter, “It Depends,” addresses the explosive growth of the human population, its expansion into wild places and increased contact with wildlife, and the potential for emergence of the “Next Big One.” Influenza is the likely candidate and focus of this chapter. Quammen dynamically identifies those aspects of our human nature and culture that could present the “ecological circumstance” capable of promoting the next spillover event. Everyone who reads this chapter will surely agree with Quammen’s conclusion that the next pandemic is a matter of fact.

Quammen undertook a highly extensive review of the topic and the diseases he covered. His bibliography encompasses over 26 pages and includes papers by highly respected authors from such journals as *Emerging Infectious Diseases*, *Proceedings of the National Academy of Sciences*, *Science*, *Nature*, and *Philosophical Transactions of the Royal Society of London*. He also referenced several important historical and technical texts. Quammen referred to a few selected popular exposés for some historical content but not for their conclusions. His extensive

travel throughout parts of Africa and Asia, visiting villages and bush meat markets in the Congo, a bamboo rat production farm in China, and monkey-inhabited temples in Bangladesh, contribute greatly to the book’s validity and readability. Quammen furthered his experiences by assisting with the capture of bats and monkeys for field sampling and also conducted personal interviews with such notables as Robert Webster, Beatrice Hahn, Jane Goodall, and Greg Dwyer.

Spillover or excerpts from it should be considered as supplementary reading for introductory epidemiology, virology, and other One Health–related coursework because of its historical accounts, review and reinforcement of epidemiologic theory, and firsthand retelling of field experiences. Veterinarians, medical doctors, and other health science professionals may also find those aspects—as well as the descriptions of recent advances in agent identification and detection, and the ecology associated with these diseases—fascinating. In conclusion, the book contains sound science that can be read for pleasure, but it also should be read as a reminder that the statistics associated with outbreaks represent the lives of people and their own stories.

Reneé E. Carleton, Berry College, Department of Biology, 2277 Martha Berry Highway, Box 430, Mount Berry, Georgia 30149, USA (rcarleton@berry.edu).