

# Antibiotic Commonsense

"An investment in knowledge always pays the best interest." Benjamin Franklin



Volume 7, Issue 3

November 2013

Editor, Lois Lux



## Let's Talk About Microbiomes

James David Bales, Jr., MD

This edition of Antibiotic Commonsense will have a tangential relationship to antibiotics and their use and will be more philosophical than scientific. However, recognizing that common sense is not always common and philosophy sometimes drives our investments in science, I would like to build a foundation for the knowledge that is surfacing from the National Institute of Health's (NIH) Common Fund Human Microbiome Project (HMP).

The Human Microbiome Project "aims to characterize the microbial communities found at several different sites on the human body, including nasal passages, oral cavities, skin, gastrointestinal tract, and urogenital tract, and to analyze the role of these microbes in human health and disease."<sup>1</sup> Critical and different in this approach is the combination of health with disease.

George Santayana's quote, "Those who do not remember the past are condemned to repeat it" reminds me of another microbial question from the last two centuries—control of malaria.

Gordon Harrison in *Mosquitoes, Malaria, and Man* commented:

"The history of the seventy-five-year war against malaria mosquitoes . . . is one small chapter in the mostly unwritten history of man's relationships with the rest of nature. It is a history of ecological entanglements,

mostly unrecognized at the time, many of which by revealing the attitudes brought to the war on mosquitoes throw unexpected light on some of the more usual concerns of history."<sup>2</sup>

Those of us in the health care professions are naturally focused on disease and the care of those who are diseased. As we pursue the trees of disease we may fail to appreciate the surrounding forest of health. The NIH Human Microbiome Project is beginning to shine a light on that forest similar to the light shed by the Human Genome Project (HGP) on both health and disease.

How often are we asking the question "Is this colonization or disease?" We had to step back when addressing Community Acquired Methicillin *Staphylococcus aureus* (CA-MRSA) and ask ourselves if the patient was colonized and what to do if they were. If there were no symptoms, did we need to treat? Did we attempt to decolonize and, if so, how? And what did decolonization or treatment do? Is a person "infected" for life and, if so, what do we do about it?

With the growing recognition of other pathogens that are "community acquired" such as *Clostridium difficile* or Extended Spectrum  $\beta$ -Lactamase (ESBL) organisms,<sup>3</sup> we are again faced with blurring definitions of health and disease. If the organism is present, is it causing

disease? Should we treat the patient just because the organism is present? If we assume that the organism is a “ticking time bomb” just waiting for a break in immune defenses, do we have the data to support that assumption and response.

I sometimes take my personal guidance from obscure and unorthodox places and my own approach to missing or absent data comes from Sir Arthur Conan Doyle’s short story Silver Blaze from the *Memoirs of Sherlock Holmes*:

Detective: “Is there any point to which you would wish to draw my attention?”

Holmes: “To the curious incident of the dog in the night-time.”

Detective: “The dog did nothing in the night-time.”

Holmes: “That was the curious incident.”

So, just as Sherlock Holmes attached some degree of importance to the absence of data—namely, that something (a barking dog) should’ve been there but wasn’t—I attach some degree of importance to the absence of symptoms or even the absence of data to the presence of microbes.

The implications of the Human Microbiome Project are vast, especially when addressing antimicrobial common sense. We may eventually find our “relationship with the rest of nature” in terms of our personal relationship with our resident microbes. Some of the hints already surfacing are the impact of antimicrobials on microbe populations—especially in the early years of life—with such disparate disease entities as obesity, coronary artery disease, and autoimmune disorders. The lack of benefit in the most common reasons for antibiotic use is largely defined, but the risk of such use is just beginning to raise its ugly head.<sup>4</sup> The question *Do you really need an antibiotic?* may have a complicated answer that is found in the risk:benefit ratio of our “ecological entanglement” with the microbiome.

## References

1. National Institute of Health, Human Microbiome Project (<https://commonfund.nih.gov/hmp>)
2. Harrison, G. (1978). *Mosquitoes, Malaria, and Man: a history of the hostilities since 1880*. London. John Murray, page 3.
3. Doi Y. Park YS. et al., *Community-associated extended-spectrum  $\beta$ -lactamase-producing Escherichia coli infection in the United States*. Clin Infect Dis 2013 Mar;56(5):641-8.
4. Shapiro DJ, et al. *Antibiotic prescribing for adults in ambulatory care in the USA, 2007-09*. J Antimicrob Chemother: doi:10.1093/jac/dkt301 advanced access pub July 25, 2013.

### Antibiotic Resistant Threats in the United States, 2013

[www.cdc.gov/drugresistance/threat-report-2013](http://www.cdc.gov/drugresistance/threat-report-2013)

For the first time ever, CDC has prioritized bacteria into one of three categories: urgent, serious, and concerning, (page 7).

The use of antibiotics is the single most important factor leading to antibiotic resistance around the world. Antibiotics are among the most commonly prescribed drugs used in human medicine. However, up to 50% of all antibiotics prescribed for people are not needed or are not optimally effective as prescribed, (page 11).

### Contact

Lois Lux	<a href="mailto:llux@tpchd.org">llux@tpchd.org</a>
Phone:	(253) 798-6416
Fax	(253) 798-7666