

► **DirectTalk** MUSINGS FROM THE 10TH FLOOR



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## One Health

“ ... one love, one life ... leaves you baby if you don't care for it.”

Ah, the amazing voice of Johnny Cash. He does a spectacular cover of this brilliant lyric from U2's “One.”

Yet, I digress and should get to the topic of this month's column—One Health.

The One Health concept is a global strategy that recognizes the interrelatedness between the health of humans, animals, and the environment. It encourages interdisciplinary collaborations with all other applicable health related professionals (e.g., physicians, veterinarians, ecologists, health scientists, and others) to help achieve more expeditious and efficacious results. Hang with me for a few minutes to discover and explore its relevance and significance to you and your community.

Let's start with an examination of Lyme disease to see how all this works.

Lyme disease is awful. Just ask musician Kris Kristofferson, who was misdiagnosed with Alzheimer's disease when he actually had Lyme disease. Lyme disease symptoms are initially characterized by rash, fever, chills, fatigue, body aches, and headache, with longer term challenges of arthritis-like joint disease and disorders of the nervous system and heart. The disease is caused by the bacterium *Borrelia burgdorferi* and is transmitted to humans through the bite of infected *Ixodes scapularis* ticks, also known as blacklegged or deer ticks. These ticks acquire the bacteria by biting small animals that are infected. Ticks do not actually get Lyme disease from deer, as it is commonly believed.

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Ticks contract it when they feed on lizards, birds, and most commonly, infected mice, generally the white-footed deer mouse.

As people move into and build homes in historically undeveloped areas, birds of prey and carnivores such as bobcats and owls are displaced. Rodent populations explode with few natural predators to keep their numbers in check. The abundance of mice, coupled with people's love of the outdoors, is a recipe for exposure. What was once a Lyme disease risk for weekend warriors is now a backyard risk for suburbanites. As you can see, the health of ecosystems, coupled with land use planning decisions and the health of rodents, is interrelated.

While Lyme disease is bad, antibiotic use in animal husbandry practices and its impact on human health is downright scary. In food animals, the Food and Drug Administration has approved the use of antibiotics for

- disease treatment for animals that are sick,
- disease control for a group of animals when some of the animals are sick,

- disease prevention for a group of healthy animals that are at risk of becoming sick, and
- growth promotion or increased feed efficiency in a herd or flock of animals to promote weight gain.

Pay close attention to the last bullet.

Since they were first discovered in 1928, antibiotics have saved millions of lives. Unfortunately, less than 100 years later, we are on the verge of what the World Health Organization has called a “postantibiotic era” due to the misuse and overuse of these important drugs. Actually, a significant part of the problem stems from the innate nature of bacteria developing antibiotic resistance by themselves.

Most man-made antibiotic resistance has developed over many years due to physicians administering antibiotics to patients for infections not amenable to them, e.g., viruses. Unfortunately, many patients insist that their healthcare providers give them or their children these drugs because they are uninformed on how they should be properly used.

Now, back to the farm. A sizeable percentage of the meat we consume originates from factory farms and farm animals. The factory farming system is the biggest global consumer of antibiotics. Intensive animal husbandry employs sub-therapeutic doses of antibiotics to promote livestock growth. These pharmaceuticals do not have to be administered by a veterinarian and represent 80% of all antibiotics produced. This overuse of antibiotics in livestock is causing the development of antibiotic resistant bacteria

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that can spread to humans. Antibiotic resistant bacteria are transferring between humans and animals more frequently than initially thought. Informed estimates suggest that 23,000 human deaths and more than two million cases of antibiotic resistant infections occur every year in the U.S.—pretty scary stuff!

Antibiotic resistance already costs the U.S. \$20 billion every year in excess direct healthcare costs and an additional \$35 billion in indirect societal costs. The Centers for Disease Control and Prevention (CDC) estimates that people spend more than eight million additional days in hospitals due to drug resistance. Some examples of antibiotic resistant organisms include *Clostridium difficile*, methicillin-resistant *Staphylococcus aureus*, and *Mycobacterium tuberculosis*.

The drugs used in animal husbandry and through overly generous prescriptions by clinicians can spill over into health challenges for the general public, much like a love affair gone awry. We should kiss our capricious reliance on antibiotics goodbye.

Considered in the proper context, love and affection expressed through kissing is almost universally recognized. Sadly, a perverted version of this meme is about to go viral.

Large-scale hemispheric migration, along with other factors, have increased the likeli-

hood that Chagas' disease will become a public health challenge in the U.S. The disease is caused by a protozoan named *Trypanosoma cruzi*, which until recently, was primarily tropical in distribution. The organism is spread by kissing bugs, named for their preference to feed on the faces of their human hosts. Most people don't know they have been bitten. Bite victims may be asymptomatic or suffer from mild localized swelling and enlarged lymph nodes, among other minor symptoms. While effective treatment exists, those who don't receive it may endure chronic conditions including potentially fatal enlargement of heart ventricles. Like Zika, the high profile—in the news—arbovirus transmitted by mosquitoes and also through sexual activity, a vaccine does not currently exist.

Historically, Chagas' disease has been primarily a Latin American phenomenon; however, the northern range of the disease is now creeping into the U.S. The disease affects around 10 million people who mostly live in traditional mud and thatch housing.

So, what's the big deal for those of us in the U.S.?

For a start, there are reportedly 300,000 people residing in the U.S. with the disease. CDC has classified the disease as a neglected parasitic infection due to the number of people infected, the severity of the illnesses, and the ability to prevent and treat it. The risk

increases where known reservoirs of the protozoan exist in animals like opossums, raccoons, and skunks. These are animals that live in my neighborhood—all three of which have been uninvited occupants of my homes over time. Again, the animal vector-human health connection is evident, and too close to home.

So, what's an environmental health professional to do? Look out for opportunities to educate yourself on the One Health approach. A good place to start for resources is at [www.onehealthinitiative.com](http://www.onehealthinitiative.com). This concept has achieved considerable recognition internationally during the early 21st century. It was formerly called One Medicine during the latter half of the 20th century. The One Health concept, however, has been known for centuries and has been used by a limited, but notable, number of visionary public and clinical health professionals. Widespread implementation of One Health principles can help protect and save millions of human (and animal) lives. You can check out numerous examples of One Health (just the tip of the iceberg) at <http://goo.gl/CBsqrMr>.

"One" nailed it, but with some modification by me: One love, one life, **One Health** ... leaves you baby if you don't care for it. 🐾

*Dave*

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