

Report to the Boards of Health

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Mid-Michigan District Health Department, Wednesday, May 24, 2023
Central Michigan District Health Department, Wednesday, May 24, 2023
District Health Department 10, Friday, May 19, 2023



One Health

One Health is the concept that our health is closely connected to the health of animals, plants, and our environment. While this term and the initiatives of One Health are less than 20 years old, this overall concept dates back centuries. One Health involves many disciplines as well as work at the local, regional, national, and global level. Outlined below are some of the components of the One Health focus.

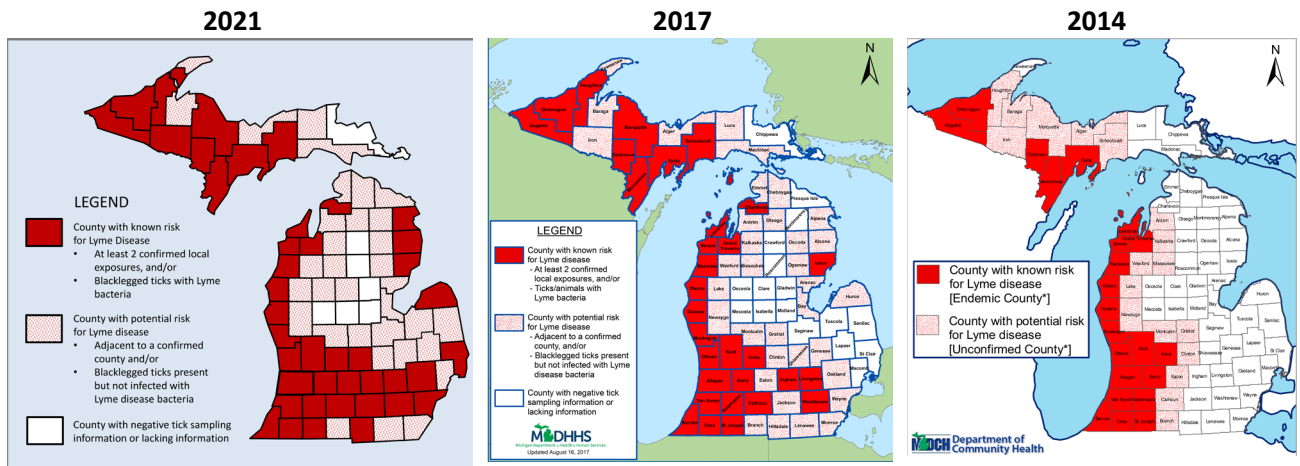


1. Infectious disease
 - a. Emerging diseases between wildlife and humans or domestic animals: some factors contributing include climate change, ecological changes (deforestation due to population increase and increasing need of agricultural land), humans living closer to wildlife, and transportation of animals outside of native areas.
2. Risks and benefits of companion animals
 - a. Pets are common. In a study of 22 countries, 33% of households have a dog, 23% a cat, and 12% fish.
 - i. Benefits: companionship, decreased depression, anxiety, loneliness.
 - ii. Harms: animal bites, allergies, infections, infestations, encourage exotic animal trade.
3. Water and food security and safety
 - a. Threats include climate change, infectious disease, chemicals, social conflict, population growth, and bioterrorism. Lack of clean water also effects wildlife
4. Socioeconomic and cultural environments
 - a. Effects basic health such as access to healthcare and proper nutrition.

- b. Includes social determinants or the conditions in which people conduct their lives, such as income, wealth, education, and access to spaces and resources like recreational areas or healthful foods.
 - c. Cultural practices are also a factor, such as cooking practices (example could be use of bushmeat which can be risk for zoonotic illness or contaminants, funeral practices, close habitation with livestock).
5. Antimicrobial resistance
- a. This is due to widespread use of antimicrobials in animal production (livestock and aquaculture), agriculture, human medicine, and from environmental contamination with antimicrobials. This is facilitated by the transmission of antimicrobial resistance genes between microorganisms and by globalization, which facilitates the rapid spread and mixing of these genes.
6. Environmental contamination
- a. Can be due to farming practices, sanitation, microplastics, manufacturing, spills, drug use in livestock, waste disposal, etc.
7. Climate change
- a. There is a direct effect of extreme temperatures on human and animal health.
 - b. Secondary effects include flooding and mold growth, storms, fires, drought, etc.
 - c. Agricultural production, grazing lands, and food security are adversely affected by extreme temperatures and precipitation.
 - d. Algal blooms pose a health threat and can cause disturbance to aquatic life.
 - e. Changes in climate have led to an increase and spread of vector born illnesses.
 - f. Changes in climate have led to changes in emerging diseases and their distribution.
8. Habitat loss for wildlife
- a. Leads to increased spillover of zoonotic illnesses.
 - b. Loss of biodiversity with potential loss of scientific advancements, such as sources for new pharmaceuticals.

Globally, 60% of all infectious diseases in humans can spread from animals. In the last 3 decades, 30 new human pathogens have been found, 75% of them originated in animals. Our two most recent pandemics, COVID-19 and H1N1, were started by viruses from animals. A zoonosis is an infectious illness that has moved from a non-human animal to a human. They can be caused by any type of germ, such as bacteria, virus, fungus, or parasite. There are over 200 known types of zoonoses. In 2017, a One Health Zoonotic Disease Prioritization (OHZDP) was held and identified the eight top zoonotic diseases as top priorities for the United States. Those diseases were zoonotic influenza, Salmonellosis, West Nile virus, plague (*Yersinia pestis*), emerging coronaviruses, rabies, Brucellosis, and Lyme disease.

There are over 17 different vector-borne diseases reported to the CDC in the United States. Between 2004 and 2018, the annual number of vector-borne disease cases in people reported to CDC doubled from 27,388 to 53,591. In Michigan, the number of vector-borne diseases acquired nearly tripled between 2017 and 2021, going from 326 cases to 931 cases. The two biggest increases were in the number of cases of Ehrlichiosis (specifically caused by *Anaplasma phagocytophilum*) and Lyme disease. Both these illnesses are spread by the blacklegged tick. Below are the Lyme disease risk maps for Michigan in 2014, 2017, and 2021 to show how this risk has spread across the state over those years.



For the most part, One Health is still a broad concept that is not widely recognized by the public. The integration of different disciplines and cultures is challenging, and information sharing is complicated. It is very important that we monitor for illness in animals and vectors as well as humans. It is also important that we share this information between animal health, public health, and others who may be impacted. Collaboration and communication are important for this work.

Resources

- Michigan Emerging Diseases www.mi.gov/emergingdiseases
- CDC One Health <https://www.cdc.gov/onehealth/index.html>
- One Health Commission <https://www.onehealthcommission.org/>
- Spring Climate and Health Education Resource Packet
- <https://www.michigan.gov/mdhhs/-/media/Project/Websites/mdhhs/Safety-and-Injury-Prevention/Environmental-Health/Climate/Documents/MICHAP-Spring-Resource-Packet.pdf>
- CDC Healthy Pets, Healthy People <https://www.cdc.gov/healthypets/index.html>

Recommendations:

1. Consider healthy environments, such as walking and biking paths, parks, ground water drainage, and vector control, during city planning.
2. Integrate One Health philosophies into 4-H, hunting, fishing, fairs, agriculture, and other areas of human and animal interaction.
3. Highlight the effects our environment has on our health and the health of our wildlife and animals as a way to unite us to combat climate change and pollution.

Sources

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