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One Health Initiative

"One Health" is an approach towards optimizing individual and community health and wellness. This is accomplished by the collaboration of human, animal, and environmental health professionals. While the concept is not new, it is gaining traction in the face of multiple challenges to maintaining a safe food and water supply for a growing human population and creating sustainable built environments. One Health is at the forefront of issues related to emerging infectious diseases, especially with the encroachment of human civilizations into wild habitats and the relative ease with which people and animals or animal products can be transported around the globe. In addition, One Health builds upon the human-animal bond and positive aspects of contact with nature that is an important part of modern human societies, and which manifests itself in the frequency with which companion animals can be found in households and in the many contacts between humans and the natural world.

The potential benefits of the One Health approach are that it could facilitate increases in scientific knowledge, improved medical education and clinical care of human and veterinary medical patients, enhanced public health efficacy and accelerated biomedical research discoveries.

Individual Health

The One Health approach encourages communication and collaboration among the human health care providers treating human household members, the veterinarian caring for the family pets, and public health professionals. Zoonotic disease prevention includes routine veterinary care for all pets, hand-washing, proper hygiene in disposal of animal waste, appropriate diet for the pets, and timely treatment for diseased pets. This is especially important as human medical schools generally devote little time to zoonotic disease training and veterinarians are critical in the prevention and control of zoonotic diseases for the animals in their care. It is also important to protect the growing global population of immunocompromised individuals, including those with HIV infection and on immunosuppressive treatment for cancer and other medical conditions.

Whether aware of it or not, human health care providers often see patients who have one or more companion animals or backyard livestock and poultry sharing their living environments. These pets, some of which have been collected from the wild, may hold important clues for the patient's health issues. Close pet contact, including licking, kissing and sleeping on the bed, has resulted in disease transmission such as *Capnocytophaga canimorsus*, lymphocytic choriomeningitis, *Pasteurella spp*, plague, cat-scratch disease, and Chagas disease. Keeping wild or exotic pets carries increased risk of exotic pathogens, as with an outbreak of monkeypox in the United States traced to imported African rodents. Human health clinicians can exercise their One Health practice by considering the actions outlined in the box below. Guidance for all patients includes hand-washing after handling pets and pet dishes, and avoiding direct contact with animal feces and vomitus through proper disposal. Treating the human in isolation of animal and environmental health aspects may lead to unnecessary and emotionally challenging recommendations such as removing an animal from the household.

Veterinarians can guide appropriate pet selection to mitigate hazards to owners and counsel owners that pets permitted to roam outdoors or that are fed outdoors may have greater contact with wildlife and the pathogens they carry. Additionally, people at increased risk of zoonotic infection should not feed pets raw meat diets to prevent enteric pathogens. Veterinary medical staff are trained to counsel their clients about zoonotic disease risks when they routinely encounter zoonoses such as roundworm (toxocariasis) and *Cryptosporidia* infestations. Should an animal become infected with a zoonotic pathogen, timely diagnosis and treatment and proper husbandry serve to reduce transmission to people. However, as it is rare for veterinarians to directly contact their medical colleagues, animal "sentinel case" events may not provide warning of human disease threat in the environment.

Practicing "One Health" for the Human Health Clinician

(Physicians, Osteopaths, Physician Associates, Nurse Practitioners, Other Human Health Care Providers)

What is One Health Practice?

The One Health clinical concept recognizes that the health care of humans and animals in a community benefits when there is collaboration and communication between human and animal health professionals.

Why should human and animal health care professionals collaborate?

More than 50 % of households include at least one pet, and this percentage may be growing.

– Zoonotic infections: Animal contact can pose a risk of zoonotic infectious disease, and this risk increases if there are infants, elderly, or immunocompromised individuals in the household. Veterinarians are a source of expertise regarding zoonotic diseases; disease control in animals can help limit the patient's exposure to infectious pathogens.
– Animal allergies: If humans are developing allergies to animals in the household, a consultation with a veterinarian may help identify alternatives to getting rid of the pet
– Human animal bond: humans can develop deep bonds with animals, and this can have therapeutic value and implications for medical care. For example, people may change their behavior for the better (such as tobacco cessation) if they recognize that such changes will also benefit their pets.
– Animals as sentinels: like the "canary in the coalmine"', animals may show signs of exposure to a toxic or infectious hazard in the environment before humans, providing an "early warning" of environmental risk.

Communication between human health care providers and veterinarians is necessary to share such information.

What are some potential benefits of a One Health Approach?

1. Improved diagnosis and prevention of infectious diseases transmitted between animals and people
2. Improved management of animal allergies
3. Improved psychosocial status of patients
4. Early detection of environmental health hazards
5. Improved patient satisfaction

What changes in practice are necessary?

The One Health approach can involve very simple and manageable changes in clinical practice.

1. Take a history of animal contact for your patients.
2. Consider consulting with a veterinarian on cases related to animal contact.
3. Encourage your patients to have their veterinarian contact you with questions about health issues that overlap between humans and animals.
4. Set up a meeting between local veterinarians and human health care providers to discuss possible cross-referrals and other collaborations.

References and website resources:

Human-Animal Medicine – Clinical Approaches to Zoonoses, Toxicants and other Shared Health Risks http://www.us.elsevierhealth.com/product.jsp?isbn=9781416068372 – 1st Edition (2010)

Handbook For Zoonotic Diseases of Companion Animals – http://www.cfsph.iastate.edu/Products/handbook-for-zoonoticdiseases-of-companion-animals.php – 1st Edition (2008)

CDC Healthy Pets Healthy People http://www.cdc.gov/healthypets/

One Health Initiative website www.onehealthinitiative.com

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By reporting sentinel surveillance cases to a public health authority or to other practitioners in the community, human and animal health professionals provide critical information about disease incidence which may be acted upon to control and prevent future disease.

Population Health

Human and animal population health ("Herd health") are dependent upon appropriate preventative measures such as safe and adequate nutrition, hygiene, and vaccination. In some cases, animal vaccinations reduce the risk of both the animal presenting with infection as well as zoonotic transmission to people. This is so, for example with rabies, leptospirosis and brucellosis immunizations. In addition, the goal of "strategic deworming" of companion animals is to eliminate intestinal parasites as well as reduce the hazard of environmental contamination with ova which can lead to health problems in people (e.g., ocular larval migrans from dog or cat roundworm infections are a preventable cause of childhood blindness). In these ways, veterinary medical kstaff have a significant role in the public health control of zoonoses.

Cross-species disease transmission often emerges at the animal-worker interface in settings ranging from bushmeat hunting to industrialized animal production. For example, serologic evidence revealed that live animal market workers in China had early exposure to severe acute respiratory syndrome (SARS) from the wild animals they were selling. In Malaysia, the first human Nipah virus cases were swine workers exposed to diseased pigs. One of the first recorded fatalities to highly pathogenic avian influenza was a veterinarian responding to the Netherlands' H7N7 avian influenza poultry outbreak. Likewise, documented cases of reverse zoonotic transmission of H1N1 from infected swine workers to pigs may have contributed to the recent emergence of a recombinant strain.

The human-animal occupational setting therefore represents an ideal and underutilized setting for early detection and prevention of zoonoses. Further, the worldwide expansion of concentrated agricultural animal production demands a more organized approach to infectious disease risks, including both worker health and reduction of pathogen pollution from animal waste. Specific development of occupational health services along a One Health model could include expanded surveillance for animal workers to detect transmission events, assessment of infection risk in specific jobs and tasks and reduction of such risk through animal disease control and interruption of transmission pathways by appropriate use of hygiene measures and personal protective equipment including gloves and respiratory protection. Input from animal health clinicians (veterinarians) will be crucial in these efforts to ensure that steps are taken in such a way as to maximize both human and animal health as well as agricultural viability and sustainability.

The One Health approach considers environmental health and environmental interventions as central to addressing emerging infectious disease threats. However, human and animal health clinicians often lack training or awareness regarding environmental health assessment and interventions. This obstacle to incorporating One Health principles is overcome by gaining basic understanding of patients' access to and quality of food, air and water. For example, after diagnosing a case of leptospirosis in a dog, a veterinarian can inform the environmental investigation to identify potential sources of contaminated water and communicate this information appropriately to prevent other animal or human infection. Further, general understanding that certain chemical contamination (e.g., perfluorinated compounds) can stunt childhood vaccine responses, or that changes in climate can result in emergence of vectorborne diseases in expanding regions are central to policy changes and other adaptive strategies for the future. These strategies can help ensure the safety of food and water supplies and the sensible conservation of wildlife habitat in order to preserve biodiversity and maximize human, animal and environmental health.

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