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“ONE HEALTH” ... in Action! [#6]

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Despite nationwide efforts at prevention, lead poisoning continues to occur in the U.S. According to the CDC, the greatest risk of lead poisoning to children is from lead-based paint and dust from deteriorating buildings <http://www.cdc.gov/nceh/lead/faq/about.htm>. Since primary prevention cannot prevent all cases, clinicians must rely on secondary preventive measures, including the screening of children who are close contacts with a child diagnosed with lead poisoning.

Since more than 50% of U.S. households have pets, a “One Health” approach to prevention of lead poisoning involves awareness that lead poisoning in an animal could indicate risk of lead poisoning in an asymptomatic child sharing the household. It is also possible that a human case of lead poisoning may inform veterinarians about the risk to animals in the vicinity. The following actual cases illustrate these points.

A letter to the New England Journal of Medicine reported on a lead treatment program’s experience with lead poisoning in animals and children. (Dowsett BM, Shannon M. Childhood plumbism identified after lead poisoning in household pets. *NEJM*; 331:1661-1662, 1994).

In the first case, a dog was admitted to a veterinary hospital with persistent vomiting and weight loss. The owner revealed that the pet lived in a house that had had exterior renovation one month earlier. During his admission, the dog was diagnosed with lead poisoning and recovered fully after chelation therapy. Nine months later, the dog was readmitted with a similar syndrome of vomiting at which time the blood lead level was markedly elevated (120 micrograms/dL (ug/dL)). At this point, the family’s one and three year old children were referred for testing even though they were asymptomatic. Both were found to have lead intoxication, with blood levels of 48 and 37ug/dL respectively (CDC recommended level: <10ug/dL). They required treatment and close follow-up. It turned out that the children and the dog spent considerable time playing in the yard, and that paint chips from the building exterior had contaminated the yard, exposing both the children and the dog.

In the second case, a family cat was found to have vomiting, somnolence and ataxia a month after exterior renovation of the house next door. After the cat was diagnosed with lead poisoning, the family’s asymptomatic two year old child was found to have lead poisoning, with a blood lead level of 24 ug/dL.

While these cases involved pets being exposed at higher levels than nearby children, sometimes, as in the following case, it could be a human who has the highest exposure and provides warning about the risk to nearby animals. A self-employed painter was evaluated in an Occupational Medicine clinic for abdominal pain, weakness, and vomiting. He had recently been sanding the exterior of a Victorian era house for its new owners. Blood testing for lead revealed a significantly elevated level (112 ug/dL), and he began chelation treatment. The treating physician contacted the local health department, who contacted the couple who had just purchased the house to inquire whether there were any children in the house who might need referral and testing for lead poisoning. The couple did not have any children, but did own two dogs that in recent days had been vomiting and appearing drowsier than usual. The dogs were referred to a veterinarian, diagnosed with lead poisoning, and admitted to a veterinary hospital for chelation treatment.

These cases demonstrate how cooperation and communication between physicians and veterinarians, can lead to improved diagnosis and treatment outcomes for hazards posing a “shared risk” to both humans and animals. Insights and discoveries from one discipline can be of use to practitioners of the other discipline. In this way the line between “human health” and “animal health” truly dissolves, leading to a “One Health” approach.

Just as canaries once warned coal miners about the presence of deadly mine gases, animals may serve as “early warning” sentinels for humans about environmental health hazards if they are either exposed at a higher level, have increased susceptibility, or a shorter latency/incubation period between exposure and effect compared to humans. For lead poisoning, family pets such as dogs, cats, birds, rabbits, and iguanas can develop severe and symptomatic lead poisoning, and may have greater exposure compared to humans. Less is known about comparative susceptibility between species to an equivalent exposure.

In recent years, the “Canary Database”, a project funded by the National Library of Medicine has been assembling such pieces of ***scientific evidence that animals can serve as effective sentinels for human health hazards in the environment.*** This database (<http://canarydatabase.org>) is a free online resource for human and animal health professionals providing information about what is known scientifically about the comparative susceptibility and risk of exposure of humans and non-human species to both toxic and infectious hazards in the environment.

The Canary Database project has revealed that while much is known about such linkages between human and animal health, there is a pressing need for further and more comprehensive merging of the knowledge bases of the medical and veterinary medical disciplines. The “One Health” approach provides an opportunity for this process to occur at the accelerated pace necessary to address emerging health threats from a rapidly changing global environment.