

Letters to the Editor

Decline in North American wild bird populations

A recent *JAVMA* News story¹ describing a study of bird populations over the past half-century reported that the United States and Canada have seen a net loss of 2.9 billion breeding birds since 1970, or approximately 29% of the 1970 total. Further, > 90% of these losses, or > 2.5 billion birds, were from just 12 families, including sparrows, blackbirds, warblers, and finches. Avian population declines are influenced by many factors, and we agree with Dr. Licciardi's² recent comments on the veterinary profession's obligation to protect our planet from plastic pollution. However, the chain of causality between free-roaming cats and bird deaths is much clearer than that of plastics, and the veterinary profession is centrally involved.

The most recent estimates are that, in the United States, free-ranging domestic cats kill 1.3 to 4.0 billion birds and 6.3 to 22.3 billion small mammals annually, with most of these deaths caused by unowned rather than owned cats.³ A review⁴ of data obtained from 82 wildlife rehabilitation centers throughout North America over a 3.5-year period found that "[g]reater numbers of birds than reptiles, amphibians, or mammals were admitted for rehabilitation as a result of . . . domestic cat (*Felis catus*) attack, and 78% of these did not survive. The majority of immature individual animals of all species submitted because of cat attacks died or had to be euthanized because of the severity of injuries." Cats have been implicated in the extinction of 40 bird, 21 mammal, and 2 reptile species,⁵ and in an experimental study⁶ involving cats that had been deprived of food for 48 hours, cats were found to stop eating their preferred food to kill prey introduced into their enclosure.

It seems, therefore, that almost anything we can do to

reduce the free-roaming domestic cat population would be likely to have a positive effect on breeding bird populations. Unfortunately, effective solutions to the problem of free-roaming cats that are also acceptable to the various parties involved are lacking. In particular, despite their relative popularity, trap-neuter-release programs do not reduce free-roaming cat populations⁷ and do not alter the negative consequences of feral cat colonies on wild birds and small mammals or on human and environmental health. Trap-neuter-release programs also do not protect cats from vehicles, predators, harsh weather, aggression, parasites, or other causes of injury, illness, and death.

A good source of information on and solutions for the free-roaming cat problem is the American Bird Conservancy, especially their Cats Indoors program.⁸ Also, in Oregon, the Cats Safe at Home program is working to humanely reduce free-roaming pet, stray, and feral cat populations in the Portland Metropolitan Area.⁹ Both programs encourage the construction of catios (cat patios), outdoor enclosures that keep cats safe, protect wild birds and small animals from free-roaming cats, and reduce the dissemination of cat diseases that affect humans and other animals. If one health is indeed a central concept to modern veterinary medicine and

if we have a responsibility to deal with various forms of pollution and environmental degradation, shouldn't we focus first on the most impactful problems and those in which we are directly involved?

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programs on populations of feral cats. *J Am Vet Med Assoc* 2005;227:1775-1781.

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Questions on antimicrobial treatment

I read with interest the recent What Is Your Diagnosis? report¹ describing clostridial osteomyelitis in a dog. According to the report, bacterial culture of samples obtained from the dog's shoulder joint yielded monoclonal growth of *Clostridium perfringens* that was susceptible to ampicillin, clindamycin, and enrofloxacin, and the dog was treated with all 3 antimicrobials for 30 days.

With the current emphasis on antimicrobial stewardship, I think it would be instructive for practitioners to know the rationale for prescribing all 3 antimicrobials simultaneously for a 30-day treatment duration.

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Maintaining rabies vigilance

I read with interest the recent annual report on rabies surveillance by Ma et al.¹ The news about the absence since 2005 of dog-mediated human rabies deaths in Mexico was especially encouraging, keeping in mind the global "Zero by 30" strategic plan, which seeks to end human deaths from dog-mediated rabies by 2030.² North America has now achieved this goal.

The authors are also to be commended for reminding practitioners that we reside in a country in which this zoonotic disease remains enzootic. Despite our historical progress in preventing and controlling rabies, including among wildlife, the numbers of reported cases involving domestic species, such as cats, remain alarming. All domestic mammals

at risk of rabies virus exposure should be vaccinated against rabies.³ Even homebound pets may be exposed to rabid wildlife. For example, mesocarnivores, such as foxes, raccoons, and skunks, can enter homes via unsecured pet doors. Bats may access living quarters from unsealed attic spaces.

Finally, I believe that there is no reason why rabies cases are not investigated more fully by public health officials, and I echo the CDC's call for greater vigilance. Any veterinarian who submits a domestic animal for rabies testing should follow up with local or state authorities to ensure that relevant circumstances are recorded and variant typing is pursued if rabies is diagnosed. If the state laboratory is unable to perform variant typing, the CDC can. Rabies virus variant typing is critical to maintaining epidemiological vigilance and supporting the claim that the United States remains free of canine rabies virus transmission.¹ Similar vigilance should be exercised when dealing with recently imported animals, shelter animals that die suddenly, and uncommon species.⁴

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The authors respond:

The authors thank Dr. Rupprecht for his response to our 2018 national rabies surveillance report.¹ We too are encouraged by the progress of

rabies control efforts in the Western Hemisphere, highlighted by the recent World Health Organization validation that Mexico has eliminated dog-mediated human rabies deaths. This was achieved primarily through routine vaccination of domestic animals, high-quality surveillance programs, and increased access to human rabies postexposure prophylaxis. All these measures are important to maintain in North America. We appreciate and agree with Dr. Rupprecht's perspective on the importance of continuing domestic animal rabies vaccination and expanding rabies case investigations and rabies virus variant characterization.

Although the threat of dog-mediated rabies in North America is extremely low, numerous wildlife species still act as reservoirs for the virus, and spillover into domestic animals and people still occurs on an annual basis. The USDA Wildlife Services cooperatively implements a multistate oral rabies vaccination program to stop the spread of and eventually eliminate rabies in targeted terrestrial wildlife populations. This program has shown progress in the management of rabies in wildlife populations, but rabies vaccination of pets and livestock remains a critical public health responsibility. The National Association of State Public Health Veterinarians recommends routine vaccination against rabies for dogs, cats, ferrets, and any livestock that have routine contact with people (eg, animals in petting zoos).² As stated by Dr. Rupprecht, rabies reservoir species in North America are often found in attics, crawlspaces, and backyards. Although most pets will never interact with a rabid animal in the wild, rabid wildlife are still commonly found in human environments,³ as evidenced by the 309 dogs and 1,290 cats in which rabies was diagnosed from 2014 through 2018 in the United States.

Importantly, the United States and its partner countries in North America have developed the world's most robust public health systems to identify, respond to, and diagnose rabies in animals.

There are over 130 rabies diagnostic laboratories in North America. In 2019, these laboratories tested 125,449 animals suspected to have rabies, representing a testing rate that far exceeds the rate in any other region. However, routine evaluations must be conducted and improvements made when these systems fail to meet their objectives.

The Council of State and Territorial Epidemiologists recommends reporting variant typing information to state and national programs.⁴ Rabies virus variant typing is a critical component for monitoring changes in rabies reservoirs, identifying host-shift events, and detecting the emergence of novel rabies virus variants. When a case of canine rabies is diagnosed, variant typing is critical to ensuring that the United States remains canine rabies virus free. The CDC is actively working with state rabies programs to improve variant typing capacity and reporting.

The CDC's National Rabies Reference Laboratory provides training in rabies diagnostic techniques, including variant typing, for state rabies diagnosticians through the National Laboratory Training Network. The CDC's Epidemiology and Laboratory Capacity for Prevention and Control of Emerging Infectious Diseases program provides funding to support state health partners, and over the past 5 years, the CDC has provided > \$1,000,000 in funding to improve state rabies laboratory capacity, including variant typing. The CDC's National Rabies Reference Laboratory also performs variant typing on several hundred samples every year to help in the investigation of rabies cases with epidemiological importance. Moreover, two recent *JAVMA* publications^{5,6} provide helpful guidance for state public health professionals to prioritize rabies virus variant typing for specimens of epidemiological importance. As a result of these efforts, the National Rabies Surveillance Program has documented increased reporting of variant results. There is still much room for improvement, and as the National Rabies Surveillance

Program, we will continue to pursue multiple efforts to support sensible rabies control efforts, along with our USDA Wildlife Services and state public health partners.

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Once more around the track

The *JAVMA* News story¹ about recent efforts to address horse racing deaths and safety concerns clearly identifies the role veterinarians can play, particularly with regard to prerace medications. I would argue, however, that veterinarians could also work to increase racing safety by advocating that horses not be allowed to race as two-year-olds.

According to the chart on fatal injuries from the Jockey Club's Equine Injury Database, for 2009 to 2018, two-year-olds experienced 1.37 fatal injuries per 1,000 starts, three-year-olds experienced 1.79 fatal injuries per 1,000 starts, and four-year-olds and up experienced 1.86 fatal injuries per 1,000 starts. This suggests to me that adverse effects leading to racing fatalities accumulate with age and raises the question of what the fatality rates would have been if horses had not been raced until they were three-year-olds or four-year-olds.

In a 1999 study, Smith et al² concluded that "immature tendon can respond to exercise while mature tendon has limited, if any, ability to do so" and hypothesized that their findings "support potentially controversial earlier conditioning and racing of younger, rather than older, equine athletes." However, many horses racing as two-year-olds have not yet reached skeletal maturity. For example, Luszczyński et al³ reported that for 19 Thoroughbreds, the mean age for radiographic closure of the distal radial metaphyseal growth plate was 756.3 days, and Gabel et al⁴ reported that for 113 Standardbreds, the age at closure of the distal radial physes ranged from 26 to 35 months.

From these and similar findings, I believe that even with appropriate exercise and conditioning and optimal nutrition and husbandry, horses should not be raced until they are three-year-olds

or four-year-olds. This assertion appears to be supported by the findings of Wilsher et al,⁵ who tracked 1,022 Thoroughbred foals born in 1999 and found that of the 537 foals that entered training as two-year-olds, only 327 (61%) competed at least once and only 28 (5%) earned enough prize money to cover their training fees. In contrast, of the 456 horses in training as 3-year-olds, 347 (76%) raced at least once and 78 (17%) earned enough prize money to cover their training fees.

The Jockey Club's Vision 2025 report⁶ does not mention at what age Thoroughbreds should be raced competitively, but Gramm and Marksteiner⁷ found that a typical horse's peak racing age was 4.45 years and Takahashi⁸ found that for Thoroughbred racehorses, average speed increased up to the first half of the four-year-old year.

Taken together, these findings suggest that although there may be benefits to training race horses as two-year-olds, they should not be raced until they are more mature.

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The AVMA responds:

We appreciate Dr. Fox's observations regarding the "Once more around the track" *JAVMA* News article¹ and thought it appropriate to share information about a growing body of research that has emerged over the past decade regarding the beneficial effects and long-term outcomes of training and racing two-year-old Thoroughbred racehorses.

A study by Tanner et al² looked at 4,683 foals in New Zealand over a seven-year period. Horses that were raced as two-year-olds outpaced those raced as three-year-olds in both number of starts and earnings. In further evaluating their data, the authors concluded that the training and racing of horses as two-year-olds may result in improved musculoskeletal health throughout life, compared with that of horses trained and raced at a later age.

In another study, Firth et al³ examined the effects of early conditioning of racehorses on bone density and strength. They found that conditioning young horses at an early age resulted in stronger bones in the distal portions of the limbs, compared with bone strength in horses that were not similarly conditioned. Specifically, increased resistance to deformation of the diaphysis and metaphysis of the third metacarpal bone and first phalanx as a result of conditioning at an early age was consistent across these horses and differed from findings in horses conditioned later in life. These results imply that conditioning horses early for racing results in better bone structure.

Another meaningful source of data is the Equine Injury Database. Established in 2008 by The Jockey Club, the intent of the database is to track factors related to fatal injury in Thoroughbred racehorses so that corrective actions can be implemented. Notably, an analysis of injury data by epidemiologist Dr. Tim Parkin that was presented at the 2016 Grayson-Jockey Club Welfare and Safety Summit⁴ showed a positive

correlation between racing starts as a two-year-old and future long-term soundness. Dr. Parkin's retrospective analysis revealed that age at first start is a risk factor associated with fatal injury or fracture in racehorses, with starting racing as a two-year-old associated with a lower risk for fatal injury than starting racing as a three-year-old or older.

In summary, these recent analyses of data from the United States and New Zealand suggest that the skeletal development of racehorses is strengthened by training when horses are two years old, thereby enhancing long-term soundness and the longevity of racing careers. However, as with all populations, certain two-year-old horses are not ready to begin race training owing to other factors, and so there is a need for additional investigation of conditioning and racing regimens for this group of horses. Each horse is unique and should be treated as such.

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Vaccine hesitancy

I was pleased to read the *JAVMA* News article "Vaccine hesitancy: veterinary professionals face challenges surrounding vaccinations."¹ Drs. Wooten, Day, Brown, and Lea, who are

all quoted in the article, provide well-reasoned approaches to exploring and discussing issues that arise when owners are reluctant to vaccinate their pets. However, an additional alternative could have been presented for dogs and cats documented to have been vaccinated previously, namely, measuring serum antibody titers rather than providing booster vaccinations with core vaccines other than the rabies vaccine.² This alternative approach is recognized and discussed by the AVMA, American Animal Hospital Association, World Small Animal Veterinary Association, and American Association of Feline Practitioners in their guidelines. In my experience, many owners readily accept the alternative of measuring serum antibody titers, even though doing so is typically more costly than giving booster vaccinations.

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