

Letters to the Editor

Methodological issues on reliability of interpretation of neurologic examination findings for the localization of vestibular dysfunction in dogs

We were interested to read the paper by Boudreau et al¹ on the reliability of using neurologic examination findings to localize the underlying cause of vestibular dysfunction in dogs. Specifically, the authors aimed to determine whether certain features of the clinical examination were reliably associated with the presence or location of MRI-identified lesions of the vestibular system in dogs. Neurologic examination findings for dogs were reviewed by 3 independent observers, who were asked to score each dog as having signs of peripheral, central, or nonvestibular dysfunction, and agreement among observers was assessed by calculating the κ statistic. The authors reported that agreement among the 3 independent observers was good ($\kappa = 0.72$) regarding use of neurologic examination findings to distinguish central from peripheral vestibular dysfunction and very good ($\kappa = 0.85$) regarding use of MRI to identify peripheral vestibular lesions.

In evaluating the study findings, one should remember that the κ statistic has 2 important limitations.² First, the κ value depends on prevalence. Thus,

one can obtain different κ values with different disease prevalences, even if the percentages of concordant and discordant cells are the same (Table 1). Second, the κ value depends on the number of categories. Thus, in situations involving > 2 categories, calculation of a weighted κ value may be preferred. Given these limitations of the κ statistics, the authors' findings should be interpreted with caution.

Table 1—Illustration of how the κ statistic for agreement between 2 observers depends on prevalence.

Observer 2	Observer 1		Total
	Positive	Negative	
High prevalence ($\kappa = 0.44$)			
Positive	85	5	90
Negative	5	5	10
Total	90	10	100
Moderate prevalence ($\kappa = 0.80$)			
Positive	45	5	50
Negative	5	45	50
Total	50	50	100

Mehdi Naderi, MSc
Department of Operating Room
School of Paramedical
Kermanshah University of Medical
Sciences
Kermanshah, Iran

Siamak Sabour, MD, PhD
Department of Clinical Epidemiology
School of Public Health
Safety Promotions and Injury
Prevention Research Center
Shahid Beheshti University of
Medical Sciences
Tehran, Iran

1. Boudreau CE, Dominguez CE, Levine JM, et al. Reliability of interpretation of neurologic examination findings for the localization of vestibular dysfunction in dogs. *J Am Vet Med Assoc* 2018;252:830-838.
2. Szklo M, Nieto FJ. *Epidemiology beyond the basics*. 2nd ed. Burlington, Mass: Jones and Bartlett Learning, 2007.

Going beyond rabies surveillance

I was pleased to read the recent report on rabies surveillance in the United States during 2016.¹ The CDC's annual report of rabies surveillance represents one of the most thorough data sources for this viral zoonosis throughout the world. Dissemination of this information is important to all veterinarians, particularly because of the insights it provides related to animal reservoirs and vectors, rabies in humans, and spatial and seasonal distributions of rabies.

Unfortunately, as the report documents, tens of thousands of domestic animals suspected or confirmed to be rabid are euthanized annually in the United States. These preventable deaths continue to occur despite the availability of highly effective vaccines for most domestic animals at risk.² Even for those animals with unknown or lapsed vaccination status, serologic testing for anti-rabies virus neutralizing antibodies could potentially minimize the number that are euthanized.^{2,3} In addition, development of postexposure prophylaxis protocols for unvaccinated animals may decrease the need for euthanasia.^{2,4} However, no realistic options are available today for the treatment of rabies once clinical signs manifest, regardless of species.

Clearly, veterinarians have the requisite academic knowledge, clinical skills, and biomedical abilities to pursue new opportunities against one of the world's oldest known zoonoses. Unlike their physician colleagues, most veterinarians are familiar with rabies and are immunized against the virus.

Instructions for Writing a Letter to the Editor

Readers are invited to submit letters to the editor. Letters may not exceed 500 words and 6 references. Letters to the Editor must be original and cannot have been published or submitted for publication elsewhere. Not all letters are published; all letters accepted for publication are subject to editing. Those pertaining to anything published in the *JAVMA* should be received within 1 month of the date of publication. Submission via email (JournalLetters@avma.org) or fax (847-925-9329) is encouraged; authors should give their full contact information, including address, daytime telephone number, fax number, and email address.

Letters containing defamatory, libelous, or malicious statements will not be published, nor will letters representing attacks on or attempts to demean veterinary societies or their committees or agencies. Viewpoints expressed in published letters are those of the letter writers and do not necessarily represent the opinions or policies of the AVMA.

Also, facilities exist for isolation and quarantine, with a high regard for biosafety, of animals suspected or confirmed to be rabid, and novel insights for prevention and treatment of rabies are likely to be forthcoming.⁵ Euthanasia should not be the only management option for domestic animals exposed to rabies in the 21st century. Hopefully limited personnel, shrinking resources, and competing priorities will not restrict future reporting and engagement related to this particular pathogen, especially given its public health and agricultural importance.

In my opinion, true progress in human rabies treatment will only succeed by extension from experimental treatment of infected domestic species. Respectfully, I challenge the veterinary community at large to rise to the occasion. If the United States is to remain as a prominent example during the renewed global program to eliminate canine rabies through mass vaccination,⁶ our standards for rabies suspicion, detection, reporting, characterization, and response—including eventual treatment—must continue to expand and improve.

Charles E. Rupprecht, VMD, PhD
Lyssa LLC
Lawrenceville, Ga

1. Ma X, Monroe BP, Cleaton JM, et al. Rabies surveillance in the United States during 2016. *J Am Vet Med Assoc* 2018;252:945-957.
2. Brown CM, Slavinski S, Ettestad P, et al. Compendium of Animal Rabies Prevention and Control, 2016. *J Am Vet Med Assoc* 2016;248:505-517.
3. Moore MC, Davis RD, Kang Q, et al. Comparison of anamnestic responses to rabies vaccination in dogs and cats with current and out-of-date vaccination status. *J Am Vet Med Assoc* 2015;246:205-211.
4. Cho HC, Lawson KF. Protection of dogs against death from experimental rabies by postexposure administration of rabies vaccine and hyperimmune globulin (human). *Can J Vet Res* 1989;53:434-437.
5. Gnanadurai CW, Huang CT, Kumar D, et al. Novel approaches to the prevention and treatment of rabies. *Int J Virol Stud Res* 2015;3:8-16.
6. Abela-Ridder B, Knopf L, Martin S, et al. 2016: the beginning of the end of rabies? *Lancet Glob Health*. 2016 Nov;4(11):e780-e781.

The authors respond:

On behalf of the authors, I want to thank Dr. Rupprecht for his response to our recent report on rabies surveillance in the United States during 2016.¹ We appreciate his recognition of the value of systematic surveillance and reporting for zoonotic diseases. However, we would like to clarify that our report only represents information for animals submitted for rabies diagnostic testing and that persistent surveillance gaps preclude full recognition of the burden of suspect rabies exposure in the United States.

Since the elimination of canine rabies, human rabies prevention within the United States has relied on integrated bite management. Investigations are initiated after a report of possible human rabies exposure (eg, an animal bite) and rely on animal control workers, public health authorities, and clinicians to conduct a risk assessment, evaluate the animal, and administer postexposure prophylaxis to exposed persons, if indicated. Situations involving domestic pets (ie, cats, dogs, and ferrets) should involve a 10-day observation period of the animals in accordance with national recommendations.^{2,3} The alternative is euthanasia and laboratory diagnosis. With this approach, postexposure prophylaxis can be safely averted for a substantial proportion of persons suspected to have been exposed.

This Sisyphean task, carried out primarily by local health authorities and animal control workers, is largely unheralded and seldom reported to state or national health authorities or published. A recent report⁴ suggests that a considerable percentage (60%) of domestic pets involved in human bite cases are held for observation and that only a low percentage (2%) are euthanized for rabies diagnostic testing.⁴ An older study⁵ reported higher rates of euthanasia among dogs (18%) and cats (52%), but also noted that the observed euthanasia rate for cats was high because of the high proportion submitted that were unowned, relative to dogs. Information on animal ownership status is unfortunately lacking in national

animal rabies reporting, making it difficult to determine the proportion of unowned versus owned animals submitted for rabies diagnostic testing or the degree to which unowned animals impact diagnostic submission rates. The CDC continues to work with state health departments to improve data collection and reporting timeliness to try to answer some of these questions. However, reporting of animal bites or rabies postexposure prophylaxis remains inconsistent, with almost half the states not requiring either to be reported in their jurisdictions.⁶

Increasing awareness of national recommendations and guidelines among veterinary and human health providers alike should be a priority.^{2,3} This includes awareness of routine vaccination requirements for domestic animals, the need for a 10-day observation period for domestic pets involved in suspected human exposures, and the possibility of euthanasia and testing when an observation period is not feasible. National guidelines on the management of cats and dogs without a current vaccination status that are suspected to have been exposed to rabies have been updated.³ In these instances, serologic testing may be requested to confirm the animal's status and appropriate response to booster vaccination as an alternative to strict quarantine or euthanasia. National recommendations for rabies continue to be evaluated and updated as new evidence on rabies vaccines and procedures are generated for both humans and animals. Dr. Rupprecht has encouraged the veterinary community to rise to the occasion of improving our knowledge of rabies treatment. The authors of the 2016 report believe that there is a similar need to improve our understanding of the rabies burden in the United States and to identify best practices for integrated management of suspected human rabies exposures and administration of rabies postexposure prophylaxis on the basis of one-health approaches.

Jesse D. Blanton, DrPH
CDC
Atlanta, Ga

1. Ma X, Monroe BP, Cleaton JM, et al. Rabies surveillance in the United States during 2016. *J Am Vet Med Assoc* 2018;252:945-957.
2. Manning SE, Rupprecht CE, Fishbein D, et al. Human rabies prevention—United States, 2008: recommendations of the Advisory Committee on Immunization Practices. *MMWR Recomm Rep* 2008;57:1-28.
3. National Association of State Public Health Veterinarians. Compendium of Animal Rabies Prevention and Control, 2016. *J Am Vet Med Assoc* 2016;248:505-517.
4. Lyu C, Jewell MP, Piron J, et al. Burden of bites by dogs and other animals in Los Angeles County, California, 2009-2011. *Public Health Rep* 2016;131:800-808.
5. Patrick GR, O'Rourke KM. Dog and cat bites: epidemiologic analyses suggest different prevention strategies. *Public Health Rep* 1998;113:252-257.
6. Vora NM, Clippard JR, Stobierski MG, et al. Animal bite and rabies postexposure prophylaxis reporting—United States, 2013. *J Public Health Manag Pract* 2015;21:E24-E27.

Hearing health and veterinary dentistry

As a veterinarian approaching his 38th year in practice, I am truly amazed by the advancements that have occurred in the field of companion animal dentistry. But, there seems to have been little focus on the ergonomics of this area of practice. As far as I know, for example, potential health issues resulting from poor posture,

inappropriate use of dental handpieces, or the lack of hearing protection during routine dental procedures are rarely addressed in continuing education presentations for veterinarians and their staff members.

Now that full-mouth radiography is routinely recommended, even for routine dental prophylaxis procedures, I have noticed a substantial increase in the number of extractions performed in our practice. Some of these teeth would not have been considered abnormal on the basis of a gross examination, and consequently, some of these extractions have been quite difficult, especially those involving multirooted teeth. It is fairly common in our practice to have veterinarians involved in dental procedures lasting several hours, with cumulative use of a dental drill for an hour or more.

I have also noticed more complaints of neck and back pain, along with hand fatigue and soreness. I am also concerned about potential long-term effects on hearing due to the high-pitched sound of the handpiece.

During my recent inquiries on VIN, several suggestions for modifying posture and hand position were given that I believe will be helpful going forward. Interestingly, potential negative effects related to the sound of

dental handpieces were somewhat downplayed, but a brief literature search yielded multiple studies indicating detrimental effects of handpiece (drill and scaler) sound on the hearing of human dentists and their assistants. In addition, a 2016 study¹ found that although the rate of hearing loss in US dentists was similar to the national average, the incidence of tinnitus was significantly higher, and the authors concluded that dentists could be placing their hearing health at risk in their daily work environment.

I believe there needs to be a concerted effort to address this concern going forward. In both veterinary school and continuing education programs for veterinarians, those who provide dental services for companion animal patients should be made aware of this issue. Although it is likely not as big of a concern for veterinarians of my generation, the long-term negative effects could be extremely important for veterinarians and their staff members who are in the early stages of their careers.

**Robert Koch, DVM
Tempe, Ariz**

1. Myers J, John AB, Kimball S, et al. Prevalence of tinnitus and noise-induced hearing loss in dentists. *Noise Health* 2016;18:347-354.