

Information Sources and Knowledge about Chronic Wasting Disease in Colorado and Wisconsin

JERRY J. VASKE,¹ MARK D. NEEDHAM,² NICOLE T. STAFFORD,¹ KATHI GREEN,³ AND JORDAN PETCHENIK⁴

¹Human Dimensions in Natural Resources Unit, Colorado State University, Fort Collins, Colorado, USA

²Department of Forest Resources, Oregon State University, Corvallis, Oregon, USA

³Colorado Division of Wildlife, Denver, Colorado, USA

⁴Wisconsin Department of Natural Resources, Madison, Wisconsin, USA

This research note examines hunters' and non-hunters' information sources and knowledge about chronic wasting disease (CWD). Data were obtained from surveys of Colorado (n = 1,315) and Wisconsin (n = 360) resident hunters, and resident non-hunters in Wisconsin (n = 253). In response to true/false knowledge statements about CWD, 32% of Wisconsin hunters, 40% of Wisconsin non-hunters, and 44% of Colorado hunters failed to answer at least half of the statements correctly. The most effective sources at improving Wisconsin hunters' CWD knowledge were the Department of Natural Resources (WDNR) website, WDNR secretary column, and local newspapers. The WDNR newsletter was the only source that improved Wisconsin non-hunters' CWD knowledge. In Colorado, effective sources included newspapers and the Colorado Division of Wildlife (CDOW) website and hunting regulations brochure. Understanding relationships among commonly used and effective sources of CWD information may allow wildlife agencies to better inform and educate their publics.

Keywords chronic wasting disease, hunters, landowners, information sources, knowledge

Introduction

Chronic wasting disease (CWD) is a disease of deer (*Odocoileus* spp.), elk (*Cervus elaphus*), and moose (*Alces alces*) that has been found in free-ranging herds in 11 states (Colorado, Kansas, Illinois, Nebraska, New Mexico, New York, South Dakota, Utah, West Virginia, Wisconsin, Wyoming) and two provinces (Alberta, Saskatchewan) (CDOW, 2005; Spraker et al., 1997). Research suggests that CWD is caused by a prion (i.e., infectious protein without associated nucleic acids) and transmitted through direct interaction with infected animals and indirectly through contaminated environments (Miller, Williams, Hobbs, & Wolfe, 2004). Although infected animals can look healthy, CWD eventually

This study was supported by the Colorado Division of Wildlife, Wisconsin Department of Natural Resources, and Federal Aide in Wildlife Restoration Act. The Human Dimensions in Natural Resources Unit at Colorado State University provided additional support. The authors thank the anonymous reviewers for helpful comments on earlier drafts.

Address correspondence to Jerry J. Vaske, Human Dimensions in Natural Resources Unit, Colorado State University, Fort Collins, CO 80523-1480, USA. E-mail: jerryv@warnercnr.colostate.edu

causes weight loss, excessive salivation, abnormal behavior, and death in all infected animals (Williams, Miller, Kreeger, Kahn, & Thorne, 2002). CWD is related to scrapie in sheep, bovine spongiform encephalopathy in cattle (i.e., BSE, mad cow), and Creutzfeldt-Jakob disease (CJD) in humans (McKintosh, Tabrizi, & Collinge, 2003). There is no evidence, however, to suggest that CWD has directly caused any human health problems (Belay et al., 2004; Raymond et al., 2000; Salman, 2003).

Human dimensions research has examined hunters' behavioral responses to CWD, perceived risk and agency trust related to the disease, acceptance of CWD management actions, landowners' responses to the disease, and economic impacts of CWD (e.g., Bishop, 2004; Heberlein, 2004; Needham, Vaske, & Manfredo, 2004; Vaske, Timmons, Beaman, & Petchenik, 2004). Less attention has focused on the effectiveness of educating and informing individuals about CWD. This research note addresses this knowledge gap by determining where hunters and non-hunters currently obtain their CWD information and how much they know about the disease.

Conceptual Foundation and Research Questions

Information Sources and Channels

Wildlife agencies attempt to inform and educate their publics about wildlife-related topics (Eschenfelder, 2006). Hunters, for example, can obtain CWD information from agency websites and hunting regulations brochures. These agencies are concerned that if hunters have incomplete or inaccurate knowledge about CWD, they may stop hunting in areas where the disease is found (Needham et al., 2004). Given the benefits of hunting (e.g., agency revenue, herd control), agencies need to effectively inform and educate hunters about CWD (Eschenfelder, 2006).

The ability to successfully inform and educate is dependent on: (a) source, (b) receiver, (c) channel, and (d) message factors (Ajzen, 1992). Source factors are the observed or inferred characteristics of the communicator (e.g., wildlife agency) and include issues related to agency credibility and trust (Frewer & Miles, 2003; Trumbo & McComas, 2003). Receiver factors include characteristics of message recipients (e.g., hunters) such as their demographic profiles. Channel factors are the different modes of communication (e.g., brochures, websites, personal interactions). Message factors refer to ways in which information is presented and communicated (e.g., one-sided versus two-sided arguments). Combining these factors provides a context for contributing to the effectiveness of persuasive communication efforts (Ajzen, 1992).

This research note examines different sources and channels associated with informing and educating two groups of receivers—hunters and non-hunters—about CWD in Colorado and Wisconsin. Also examined are receiver factors such as age and education.

Knowledge

Knowledge is an important component of information processing and decision-making (Johnson & Russo, 1984; Raju, Lonial, & Mangold, 1995). For example, hunters' knowledge about a potential relationship (or the lack thereof) between CWD and human health could influence how they think about the disease and the types of management strategies that they deem appropriate.

Past research (e.g., Berkes, 1993; Roepstorf, 2000; Wilson, 2003) highlights differences in knowledge between scientists and the public. The public often bases knowledge on local information sources, whereas scientists typically rely on empirically grounded information (e.g., Sjöberg, 1999; Thompson & Dean, 1996). This difference may lead these groups to view issues in fundamentally different ways and can result in communication breakdowns. Finlayson (1994), for example, partially attributed the Canadian cod fishery collapse to a failure of Department of Fisheries and Oceans scientists to acknowledge views of inshore fishermen. Dismissal of this group's opinions was driven by dissimilar cognitive cultures: "knowledge claims by members of each culture were literally heard as incoherent by the other" (Finlayson, 1994, p. 103).

Given the rapidly changing scientific knowledge about CWD (Belay et al., 2004; CDOW, 2005; Raymond et al., 2000), this research note addresses two questions. First, what and how much do hunters and non-hunters currently know about CWD? Second, what source, channel, and receiver factors are effective at increasing hunters and non-hunters knowledge about CWD?

Methods

Data Collection

Data were obtained from mail surveys conducted in both Colorado and Wisconsin. In Colorado, the Division of Wildlife (CDOW) provided names and addresses of 2,580 residents (≥ 18 years of age) who purchased a license to hunt deer or elk with a gun in 2004. Three mailings were used to administer the surveys beginning in December 2004. In total, 74 surveys were undeliverable (i.e., incorrect address, moved) and 1,315 completed surveys were returned, yielding a 53% response rate ($1,315/2,580 - 74$). Ancillary analysis showed statistical equivalency in deer and elk hunters' survey responses, so data from the two groups were aggregated and weighted to reflect the actual population proportions. Limited funding prohibited a non-response bias check.

In Wisconsin, surveys were mailed to 973 landowners residing in the CWD southwest disease eradication zone (DEZ), which is a 1,351 square-mile area where infected deer have been found. Four mailings were used to administer the surveys beginning in October 2004. In total, 613 completed surveys were returned, yielding a 63% response rate after adjusting for undeliverables. Three hundred and sixty respondents were hunters and 253 were non-hunters.¹ A non-response bias check indicated no differences between those who did and did not respond to the survey in Wisconsin.

Analysis Variables

Knowledge. Nine true/false statements were used to measure respondents' knowledge about CWD (see Table 1 for statement wording). Respondents answered true, false, or unsure for each statement. Unsure responses were considered incorrect answers.

Information sources and channels. Potential sources and communication channels for obtaining CWD information were identified from 16 items in the Colorado survey and 21 items in the Wisconsin survey (see Table 2 for items). Respondents were asked how often they obtained information about CWD from each source and channel on a 5-point scale of "never" to "often" (i.e., 5 or more times).

Table 1
Comparison of percentage of respondents who responded correctly
to true/false knowledge statements

True/false statements ¹	Percent correct responses			χ^2	p-value	V
	Wisconsin hunters	Wisconsin non-hunters	Colorado hunters			
CWD is a disease found in deer and elk (T)	95	93	95	1.85	.396	.03
Weight loss is one symptom of CWD in animals (T)	91	86	83	15.31	<.001	.09
An animal that has CWD can still look healthy (T)	88	81	80	11.39	.003	.08
CWD is believed to be caused by an abnormal brain protein called a prion (T)	87	80	68	55.49	<.001	.17
CWD is believed to be spread by animal-to-animal contact (T)	74	79	72	5.33	.070	.05
Animals infected with CWD always die (T)	60	71	44	76.47	<.001	.20
Research suggests that there is no relationship between CWD and human health problems (T)	52	30	54	47.41	<.001	.16
CWD location (found in north WI [F], not found in south CO [T])	40	33	32	7.48	.024	.06
CWD prevalence (>500 infected in WI, <200 in CO) (F)	21	13	36	77.10	<.001	.20

¹All statements coded 1 = correct, 0 = incorrect; T = True, F = False.

Demographics. Age and education were included in the analyses. Age was a fill-in-the-blank question. Respondents indicated the highest education level they completed. For analysis purposes, education was dummy-coded as 0 “had not” and 1 “had” attained a college degree.

Data Analysis

Each respondent’s overall CWD knowledge score was calculated by summing the number of correctly answered true/false CWD statements. Each respondent then received a letter grade ranging from A (i.e., 9/9 correct) to F (i.e., $\leq 5/9$ correct). Ordinary least squares multiple regression analyses determined what information sources and demographics (i.e., independent variables) significantly influenced overall CWD knowledge (i.e., dependent

Table 2
Percentage of respondents using sources and channels in Wisconsin and Colorado

Sources and channels	Wisconsin hunters	Wisconsin non-hunters	Colorado hunters
Television news reports	91	89	77
Local (i.e., Madison, Milwaukee) newspapers	90	91	
WDNR newsletter	86	82	
Radio news reports	85	84	59
Newspaper articles	83	78	93
Friends and family	82	75	94
Agency (i.e., WDNR, CDOW) publications	72	57	81
Magazines/books	61	42	76
Hunting publications	55	26	48
WDNR secretary newspaper column	52	47	
Hunting clubs	47	24	35
Special interest groups	40	23	26
University of Wisconsin	35	33	
Agriculture department	33	24	
Agency (i.e., WDNR, CDOW) website	31	18	64
Letters/telephone calls from WDNR	30	28	
Agency (i.e., WDNR, CDOW) personnel	25	22	50
Private industry	22	13	
Other websites	21	14	32
Other universities	17	12	
Health department	17	13	
CDOW hunting regulations brochure			97
Other television			58
Live presentation			20
Video and DVDs			19

variable). Differences among the three respondent groups (i.e., Colorado hunters, Wisconsin hunters, Wisconsin non-hunters) were examined using chi-square (χ^2) and one-way ANOVA (F) tests. Effect size indicators (e.g., V) were reported where appropriate.

Results

Knowledge about CWD

Almost all resident Colorado and Wisconsin DEZ hunters (95%), and Wisconsin DEZ non-hunters (93%) knew that CWD was a disease of deer and elk, $\chi^2(2, n = 1820) = 1.85$, $p = .396$, $V = .03$ (Table 1). Most respondents in each group (72% to 79%) were also aware that CWD is believed to spread by animal-to-animal contact, $\chi^2(2, n = 1391) = 5.33$, $p = .070$, $V = .05$. Statistically significant differences ($p \leq .05$) among the three groups, however, were observed for each of the remaining comparisons, $\chi^2(2, n = 591 \text{ to } 1621) \geq 7.48$, $p \leq .024$, $V \leq .20$. For example, less than 55% of hunters in both states and 30% of Wisconsin non-hunters knew that research suggests that there is no relationship between

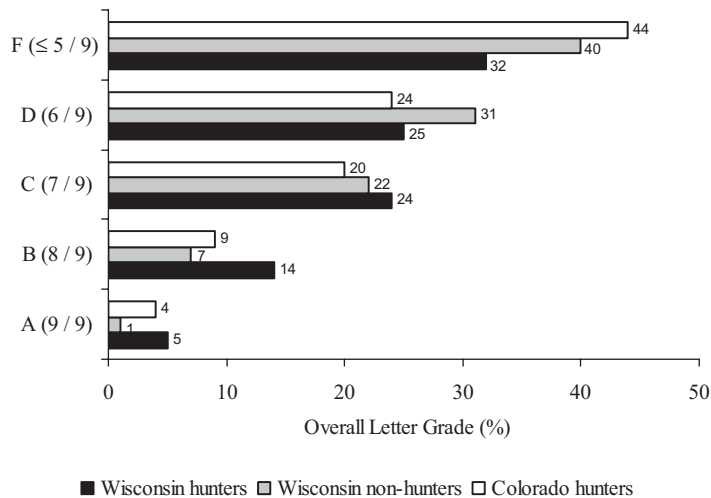


Figure 1. Respondents' letter grades based on true and false items. Respondent groups differed significantly, $\chi^2(8, n = 1912) = 31.27, p < .001, V = .09$.

CWD and human health problems. The percentage of respondents who correctly answered many of the statements was greater for both Wisconsin DEZ hunters and non-hunters than Colorado hunters. Colorado hunters were, however, more knowledgeable about CWD prevalence than Wisconsin respondents.

After calculating an overall CWD knowledge score for each respondent, only 5% or less of respondents in each group received an A letter grade (i.e., correctly answered all statements; Figure 1). The majority of respondents in each group (57% to 71%) received a D or F letter grade, with the largest proportion (32% to 44%) receiving a failing grade (i.e., F, 5 or less correct). The three respondent groups differed significantly on the overall CWD knowledge score, $\chi^2(8, n = 1912) = 31.27, p < .001, V = .09$.

CWD Information Sources and Channels

For Wisconsin DEZ hunters, the most frequently used sources and channels of CWD information were television news reports (91%), local (i.e., Madison, Milwaukee) newspapers (90%), and the Wisconsin Department of Natural Resources (WDNR) newsletter (86%; Table 2). The least frequently used sources and channels were the health department (17%), universities other than the University of Wisconsin (17%), and websites other than the WDNR website (21%).

Wisconsin DEZ non-hunters most frequently used local newspapers (91%), television news reports (89%), and radio news reports (84%) for their CWD information. The least frequently used sources and channels included universities other than the University of Wisconsin (12%), the health department (13%), and private industry (13%).

For Colorado hunters, the most frequently used sources and channels were the CDOW hunting regulations brochure (97%), friends and family (94%), and newspaper articles (93%). Videos and DVDs (19%), live presentations (20%), and special interest groups (26%) were used relatively infrequently by Colorado resident hunters to access information about CWD.

Influence of Information Sources and Channels on Knowledge

For Wisconsin DEZ hunters, 5 of the 21 information sources and demographic variables significantly influenced CWD knowledge, explaining 18% of the variance in knowledge scores, $F(5, 328) = 15.96, p < .001$ (Table 3). Variables that had an influence on improving CWD knowledge included the WDNR Secretary newspaper column, local newspapers, WDNR website, and if respondents had a college degree. Whether respondents had a college degree had the greatest positive influence on CWD knowledge ($\beta = .29, p < .001$). The frequency that respondents used the WDNR website to obtain CWD information had the least significant positive impact on knowledge about the disease ($\beta = .12, p = .022$). Information from the University of Wisconsin had a negative influence on CWD knowledge ($\beta = -.21, p < .001$).

For Wisconsin DEZ non-hunters, only 2 of the 21 variables significantly influenced CWD knowledge, explaining only 8% of the variance in knowledge scores, $F(2, 216) = 10.92, p < .001$ (Table 4). The WDNR newsletter ($\beta = .21, p < .001$) and whether the respondent had a college degree ($\beta = .21, p < .002$) significantly improved non-hunters' CWD knowledge.

Five of the 16 information sources and demographic variables included in the Colorado survey significantly influenced Colorado hunters' CWD knowledge scores, explaining 14% of the variance, $F(5, 1256) = 42.65, p < .001$ (Table 5). Variables that had an influence on improving CWD knowledge included newspaper articles, the CDOW website and hunting regulations brochure, and age. The frequency that respondents used newspaper articles to obtain CWD information had the strongest influence on improving CWD knowledge ($\beta = .23, p < .001$); age had the weakest influence ($\beta = .08, p = .002$). Information from television news reports about CWD had a weak negative influence on CWD knowledge ($\beta = -.09, p = .001$).

Discussion

This research note showed that resident Colorado and Wisconsin DEZ hunters and Wisconsin DEZ non-hunters did not know many basic facts about CWD. Most respondents

Table 3
Regression analysis predicting Wisconsin hunters' CWD knowledge

Independent variables ²	Dependent variable: Knowledge score ¹					
	Zero-order correlation (<i>r</i>)	<i>p</i> -value	B	SE	β	<i>p</i> -value
Madison/Milwaukee newspapers	.251	<.001	.216	.067	.171	.001
WDNR Secretary newspaper column	.184	<.001	.222	.073	.169	.003
WDNR website	.186	<.001	.139	.060	.121	.022
University of Wisconsin	-.183	<.001	-.343	.090	-.206	<.001
College degree	.293	<.001	.979	.173	.288	<.001

¹ $R^2 = 0.18, F(5, 328) = 15.96, p < .001$. Knowledge scores based on number of true/false statements answered correctly (0–9).

²Information sources coded on a 5-point scale from 0 = never to 4 = often (i.e., 5 or more times). College degree coded as 0 = not attained college degree; 1 = attained college degree. Independent variables not shown were not statistically significant at $p < 0.05$.

Table 4
Regression analysis predicting Wisconsin non-hunters' CWD knowledge

Independent variables ²	Dependent variable: Knowledge score ¹					
	Zero-order correlation (<i>r</i>)	<i>p</i> -value	B	SE	β	<i>p</i> -value
WDNR newsletter	.201	.002	.256	.079	.210	.001
College degree	.204	.002	.651	.206	.206	.002

¹ $R^2 = 0.08$, $F(2, 216) = 10.92$, $p < .001$. Knowledge scores based on number of true/false statements answered correctly (0–9).

²Information sources coded on a 5-point scale from 0 = never to 4 = often (i.e., 5 or more times). College degree coded as 0 = not attained college degree; 1 = attained college degree. Independent variables not shown were not statistically significant at $p < 0.05$.

Table 5
Regression analysis predicting Colorado hunters' CWD knowledge

Independent variables ²	Dependent variable: Knowledge score ¹					
	Zero-order correlation (<i>r</i>)	<i>p</i> -value	B	SE	β	<i>p</i> -value
Newspaper articles	.279	<.001	.240	.032	.229	<.001
CDOW website	.235	<.001	.154	.027	.163	<.001
CDOW hunting regulations brochure	.261	<.001	.175	.033	.151	<.001
Television news reports	-.063	.025	-.102	.032	-.093	.001
Age (years)	.084	.002	.012	.004	.084	.002

¹ $R^2 = 0.14$, $F(5, 1256) = 42.65$, $p < .001$. Knowledge scores based on number of true/false statements answered correctly (0–9).

²Information sources coded on a 5-point scale from 0 = never to 4 = often (i.e., 5 or more times). Independent variables not shown were not statistically significant at $p < 0.05$.

knew that CWD is a disease of deer and elk, weight loss is a symptom of the disease, and animals with CWD can still look healthy. However, approximately half of respondents were unaware that research has not found a direct relationship between CWD and human health problems, and even fewer had an accurate understanding of the prevalence and location of the disease in their state. Although Wisconsin hunters were slightly more knowledgeable about CWD than Colorado hunters and Wisconsin non-hunters, few respondents in each group attained an A or B letter grade and over half received a D or F, which are failing grades at most educational institutions. Although some sources of CWD information (e.g., newspapers, agency websites) were effective at improving respondents' CWD knowledge, many traditional sources (e.g., radio, television) were ineffective. These findings have implications for management and future research.

Management Implications

Wisconsin DEZ hunters most frequently used television and radio news reports, local newspapers, and the WDNR newsletter to obtain information about CWD. Only one of these sources (i.e., local newspapers) significantly improved Wisconsin hunters' CWD knowledge. Other effective sources included the WDNR website and secretary newspaper column. The WDNR may want to focus on improving the amount and quality of CWD information in the WDNR newsletter and television and radio news reports. In addition, it may be useful for the WDNR to analyze CWD information in sources and channels that were effective at improving CWD knowledge and replicate it using the most frequently used sources and channels.

Newspapers, television and radio news reports, and the WDNR newsletter were the most frequently used sources of CWD information for Wisconsin DEZ non-hunters. The WDNR newsletter, however, was the only source to significantly improve this group's CWD knowledge. To increase CWD knowledge of Wisconsin non-hunters, the WDNR should analyze information in the WDNR newsletter and communicate it in additional sources and channels frequently used by this group.

Unlike Wisconsin, several sources and channels used frequently by Colorado hunters to obtain CWD information were effective at improving knowledge about the disease. Frequently used sources and channels included the CDOW hunting regulations brochure, newspaper articles, and other agency publications. Of these sources, newspapers and CDOW websites and hunting regulations brochures significantly improved Colorado hunters' CWD knowledge. To educate Colorado hunters about CWD, agencies should examine CWD information in effective sources/channels and replicate it using additional means of information dissemination. Agencies in both states may benefit from asking hunters and non-hunters who are knowledgeable about CWD where they get their information and then targeting and publicizing those sources and channels.

For Wisconsin hunters, obtaining information from the University of Wisconsin was negatively related to CWD knowledge. University information likely discussed complexities of CWD rather than straightforward facts about the disease. Perhaps hunters who used this source were overwhelmed and unable to draw conclusions about the disease. Colorado hunters who frequently obtained CWD information from television news reports also had less knowledge about the disease perhaps due to the often oversimplified "soundbyte" nature of television reports. Given that 35% of Wisconsin hunters used the University of Wisconsin and over 75% of Colorado hunters used television news reports to obtain CWD information, it may be useful for agencies to collaborate with universities and television stations to ensure that messages are consistent with those in sources and channels that improved knowledge (e.g., agency websites, newspapers).

In Wisconsin, actions taken by the media and WDNR have been referred to as rapid, extreme, and aggressive, and have been partially blamed for the decline in deer hunting following discovery of CWD in the state (Heberlein, 2004). CWD was found in free-ranging herds in Wisconsin in 2002 and in Colorado in the 1980s. Perhaps the newness of CWD in Wisconsin may be one reason why CWD knowledge scores were slightly higher in Wisconsin than Colorado. The WDNR could lose credibility and trust, however, if different publics consider CWD information to be sensationalized (Earle & Cvetkovich, 1995; Slovic, 1993).

The WDNR and CDOW communication campaigns stress that although precautions should be taken (e.g., wear rubber gloves and disinfect table surfaces when handling

harvested animals), a link between CWD and human health problems has never been established. Results showed, however, that approximately half of respondents did not know that there is no known relationship between CWD and human health problems. Future information campaigns should reinforce the lack of scientific evidence showing a connection between CWD and human health (Salman, 2003). Many people, however, would likely argue that agencies should continue to communicate precautionary messages, especially for legal reasons. These precautionary messages may dominate over scientific facts in the minds of different publics. Agencies should take this into consideration when developing CWD communication campaigns.

Future Research

To increase the generalizability of these findings, the following research considerations are offered. First, this study involved Colorado and Wisconsin residents; not examined were CWD information sources and knowledge of nonresidents. Nonresident hunters and non-hunters are important publics. Nonresident hunters, for example, constitute a substantial proportion of hunter populations and spend millions of dollars on travel expenditures, hunting licenses, and other related items (Needham et al., 2004). In 2001, for example, nonresident hunting expenditures in Wisconsin were estimated at \$33 million. An estimated 19% decline in nonresident hunting occurred following the discovery of CWD in Wisconsin, resulting in a \$6 million revenue loss for the state (Bishop, 2004). Ensuring that non-hunters receive credible and accurate information should be a priority for managing agencies, and research is required to understand CWD information sources and knowledge among nonresident hunters and non-hunters.

Second, Wisconsin respondents resided in the disease eradication zone, which is located in the southwest region of the state. To date, this area has contained the greatest prevalence of CWD in Wisconsin and agencies have targeted many communication campaigns toward landowners in this zone. This may partially explain why Wisconsin respondents had slightly higher CWD knowledge than Colorado respondents. It is important to recognize, however, that knowledge and information sources of these Wisconsin respondents may not be consistent with or representative of individuals residing in other areas of Wisconsin. Research is needed to understand information sources and knowledge of Wisconsin hunters and non-hunters residing outside the CWD eradication zone.

Third, respondents' knowledge about CWD was only partially explained (i.e., 8% to 18%) by the source, channel, and receiver factors investigated in this study. Research is needed to determine other variables that influence hunters' and non-hunters' CWD knowledge. Factors associated with these variables should also be considered. Social trust, for example, is an integral component of an agency's credibility and information that it provides (e.g., Earle & Cvetkovich, 1995; Slovic, 1993). In addition, other factors such as personality traits, message characteristics, and involvement in the issue might influence knowledge about CWD.

Finally, most respondents did not know much about CWD, especially the prevalence and location of the disease and that CWD has not been directly linked to human health problems. These are some of the most important issues propagated by agencies and the media in their CWD messages and communication campaigns. Findings, however, are limited to hunters in Colorado and Wisconsin, and non-hunters in Wisconsin. Results may not generalize to hunters and non-hunters in other states. This study should be viewed as a

starting point for understanding information sources and knowledge related to CWD. Researchers are encouraged to examine these issues in more detail and to implement various theoretical and methodological approaches to improve understanding of the human dimensions of CWD.

Notes

1. For simplicity, this research note will refer to respondents as “Wisconsin hunters” and “Wisconsin non-hunters.” Given that respondents were landowners living in the southwest disease eradication zone, we are not implying that results generalize to all hunters and non-hunters in the state.

References

- Ajzen, I. (1992). Persuasive communication theory in social psychology: A historical perspective. In M. J. Manfredi (Ed.), *Influencing human behavior: Theory and applications in recreation, tourism, and natural resource management* (pp. 1–27). Champaign, IL: Sagamore.
- Belay, E. D., Maddox, R. A., Williams, E. S., Miller, M. W., Gambetti, P., & Schonberger, L. B. (2004). Chronic wasting disease and potential transmission to humans. *Emerging Infectious Diseases*, *10*(6), 977–984.
- Berkes, F. (1993). Traditional ecological knowledge in perspective. In J. T. Inglis (Ed.), *Traditional ecological knowledge: Concepts and cases* (pp. 1–9). Ottawa: International Program on Traditional Ecological Knowledge, International Development Research Center.
- Bishop, R. C. (2004). The economic impacts of chronic wasting disease in Wisconsin. *Human Dimensions of Wildlife*, *9*(3), 181–192.
- Colorado Division of Wildlife (CDOW) (2005, September 29). *Hunter harvested moose tests positive for CWD*. Denver: Colorado Division of Wildlife Press Release.
- Earle, T. C., & Cvetkovich, G. T. (1995). *Social trust: Toward a cosmopolitan society*. Westport, CT: Praeger.
- Eschenfelder, K. R. (2006). What information should state wildlife agencies provide on their CWD websites. *Human Dimensions of Wildlife*, *11*(3), this issue.
- Finlayson, A. C. (1994). *Fishing for truth: A sociological analysis of northern cod stock assessment from 1977 to 1990*. Social and Economic Studies No. 52. Institute of Social and Economic Research. St. Johns: Memorial University of Newfoundland.
- Frewer, L. J., & Miles, S. (2003). Temporal stability of the psychological determinants of trust: Implications for communication about food risks. *Health, Risk, and Society*, *5*(3), 259–271.
- Heberlein, T. A. (2004). “Fire in the Sistine Chapel”: How Wisconsin responded to chronic wasting disease. *Human Dimensions of Wildlife*, *9*(3), 165–179.
- Johnson, E., & Russo, J. (1984). Product familiarity and learning new information. *Journal of Consumer Research*, *11*, 542–550.
- McKintosh, E., Tabrizi, S. J., & Collinge, J. (2003). Prion diseases. *Journal of NeuroVirology*, *9*, 183–193.
- Miller, M. W., Williams, E. S., Hobbs, N. T., & Wolfe, L. L. (2004). Environmental sources of prion transmission in mule deer. *Emerging Infectious Diseases*, *10*(6), 1003–1006.
- Needham, M. D., Vaske, J. J., & Manfredi, M. J. (2004). Hunters’ behavior and acceptance of management actions related to chronic wasting disease in eight states. *Human Dimensions of Wildlife*, *9*(3), 211–231.
- Raju, P. S., Lonial, S. C., & Mangold, W. G. (1995). Differential effects of subjective knowledge, objective knowledge, and usage experience on decision making: An exploratory investigation. *Journal of Consumer Psychology*, *4*, 153–180.
- Raymond, G. J., Bossers, L. D., Raymond, K. I., O’Rourke, K. I., McHolland, L. E., Bryant III, P. K., et al. (2000). Evidence of a molecular barrier limiting susceptibility of humans, cattle and sheep

- to chronic wasting disease. *The European Molecular Biology Organization (EMBO) Journal*, 19(17), 4425–4430.
- Roepstorf, A. (2000). The double interface of environmental knowledge. In B. Neis & L. Felt (Eds.), *Finding our sea legs: Linking fishery people and their knowledge with science and management* (pp. 165–188). St. John's, Newfoundland: ISER Books.
- Salman, M. D. (2003). Chronic wasting disease in deer and elk: Scientific facts and findings. *Journal of Veterinary Medical Science*, 65(7), 761–768.
- Sjöberg, L. (1999). Risk perception by the public and by experts: A dilemma in risk management. *Human Ecology Review*, 6(2), 1–9.
- Slovic, P. (1993). Perceived risk, trust, and democracy. *Risk Analysis*, 13(6), 675–682.
- Spraker, T. R., Miller, M. W., Williams, E. S., Getzy, D. M., Adrian, W. J., Schoonveld, G. G., et al. (1997). Spongiform encephalopathy in free-ranging mule deer (*Odocoileus hemionus*), white-tailed deer (*Odocoileus virginianus*) and Rocky Mountain elk (*Cervus elaphus nelsoni*) in north-central Colorado. *Journal of Wildlife Diseases*, 33(1), 1–6.
- Thompson, P. B., & Dean, W. (1996). Competing conceptions of risk. *Risk: Health, Safety, and Environment*, 7, 361–384.
- Trumbo, C. W., & McComas, K. A. (2003). The function of credibility in information processing for risk perception. *Risk Analysis*, 23(2), 343–353.
- Vaske, J. J., Timmons, N. R., Beaman, J., & Petchenik, J. (2004). Chronic wasting disease in Wisconsin: Hunter behavior, perceived risk, and agency trust. *Human Dimensions of Wildlife*, 9(3), 193–209.
- Williams, E. S., Miller, M. W., Kreeger, T. J., Kahn, R. H., & Thorne, E. T. (2002). Chronic wasting disease of deer and elk: A review with recommendations for management. *Journal of Wildlife Management*, 66(3), 551–563.
- Wilson, D. C. (2003). Examining the two cultures theories of fisheries knowledge: The case of bluefish management. *Society and Natural Resources*, 16, 491–508.