

Frequency of Interactions Between Veterinarians and Other Professionals to Guide Interprofessional Education

Margaret V. Root Kustritz ■ Laura K. Molgaard ■ John H. Tegzes

ABSTRACT

The objective of this study was to determine the frequency with which veterinarians interact with individuals in other health professions and related fields of work. Four thousand members of the American Veterinary Medical Association (AVMA) were surveyed. Demographic information was collected, and participants were asked how frequently they interacted with members of various professions. General comments were solicited regarding which professions veterinarians should reach out to in order to enhance veterinary health care and which professions veterinarians could interact with to improve human health care. The overall response rate was 18.6%. Demographic information suggested that the sample was representative of the profession. Frequency of interactions ranged from never to regularly, but for no group or profession was frequent interaction the norm. For practitioners, interactions with pharmacists, both dispensing and compounding, and with drug company representatives were most common. For educators, interaction with pharmacists and drug company representatives was also high compared to other professions, and they were also more likely to interact with laboratory technicians and physicians. For those in industry, interactions with laboratory technicians, physicians, drug and food company representatives, and public health officials were most common. All other respondents described their most common interactions as being with public health officials. The veterinarians surveyed cited a need for greater interaction with physicians regarding zoonotic disease and parasitism. Veterinarians do not frequently interface with human health care professionals. Those with whom practitioners have the greatest interaction are pharmacists and representatives of drug companies. Greater interaction may benefit management of zoonotic disease and parasitism.

Key words: communications, competency/competencies

INTRODUCTION

Interprofessional education (IPE) occurs when students from two or more professions learn about, from, and with each other to enable effective collaboration and improve health outcomes.¹ It is increasingly suggested that IPE is a necessary step in preparing a “collaborative practice-ready” health workforce that is better prepared to respond to local health needs.^{2(p.7)}

IPE is becoming progressively more common among health sciences education curricula and encompasses all health professions including medicine, nursing, dentistry, pharmacy, public health, osteopathy, physical therapy, occupational therapy, podiatry, optometry, social work, and veterinary medicine.² This initiative to implement IPE in curricula was brought forward by concerns about patient care and recognition that smoothly running health care teams, populated by collaborative professionals who all understand and respect each other’s expertise, can provide superior care compared to any given health professional who may be asked to act well outside his or her scope of training. For health professionals to act as a team, they must have the same or complemen-

tary competencies by the time of graduation. Jointly held competencies between all health sciences include^{3,4}

- value/ethics for interprofessional practice,
- recognition of each profession’s roles and responsibilities,
- interprofessional communication, and
- teams and teamwork.

There are few controlled studies regarding the effectiveness of IPE on health care outcomes in human medicine.⁵ Studies vary in terms of which professions were represented and whether or not positive health care outcomes were identified after IPE was instituted.⁶⁻¹¹

Veterinarians and veterinary students have been involved with other health professions in providing training and promoting positive outcomes for health care and the greater society.¹²⁻²³ Examples include training of interdisciplinary teams of veterinarians, physicians, and laboratory scientists to identify and manage zoonotic disease; coursework for veterinarians, public health officials, physicians, and PhD biologists to determine public health policy; joint training in pain management or surgery skills between veterinary, dental, podiatry, and medical

students; and creation of social programs with students from various health care professions to increase awareness of vaccination, promote diversity and healthy lifestyle changes, and screen for human and animal disease.^{5,24-27} There are no published studies regarding the effectiveness of IPE on health care outcomes in veterinary medicine.

Provision of IPE is complex due to the varying backgrounds of the learners, differing curricula and accreditation requirements between the professions, lack of functional role models in real life, traditional professional power dispositions, and varying abilities of the facilitators.^{5,28} Few validated and reliable measures for evaluation of IPE exist.²⁹

The University of Minnesota College of Veterinary Medicine and Western University of Health Sciences (Western U) College of Veterinary Medicine are both within larger academic health centers. First-year veterinary medical students at both schools participate in multidisciplinary interprofessional training. The Western U program is an inter-institutional program that also includes veterinary students from Oregon State University. Detailed information about these programs is available from the authors.

At both schools, questions have arisen regarding the role of veterinary medicine in IPE, the schools recognizing that many veterinarians act as sole practitioners or with a small group of other veterinarians and technicians and that veterinary medical practice is broader than practice in many other health professions. It was decided to include veterinary medicine in the University of Minnesota program because it is a part of the Academic Health Center. Veterinary health and human health will occasionally overlap at all levels of the health system, involving issues such as zoonotic disease, food safety, and large-scale catastrophic events; the hope is that required coursework of this type makes it clearer to other health professionals what the roles of veterinarians can be in these scenarios. Skills in effective communication, teamwork, application of professional standards, and rational decision making are relevant to veterinary medicine as well as other health professions. At Western U, the One Health competency is emphasized throughout the IPE curriculum, and the veterinary students play an integral part in representing the animal issues and perspectives that impact health care for all.

A survey of veterinarians in the major fields represented within the American Veterinary Medical Association (AVMA) was undertaken to determine which other professions veterinarians regularly interact with on a professional level. The intent is to better understand the real-life interprofessional interactions of veterinarians, as well as to explore possible future interactions that would improve the health of animals and people. It is also hoped that we can ensure that learning objectives and intended coursework mimic real-life practice for all professional students involved.

MATERIALS AND METHODS

Four thousand members of the AVMA were surveyed; the sole inclusion criterion was membership in the AVMA. Employment functions were those used by the AVMA

and were self-identified by members. The authors permitted the AVMA to identify those who would be asked to participate in the survey, asking of the AVMA that 3,000 of those surveyed be from the largest group, General Medicine and Surgery, and that the remaining 1,000 be split by percentage of total membership, with geographic distribution a secondary selection criterion (Table 1). Names and addresses were supplied to the investigators by the AVMA following the prescribed privacy procedures. This study was approved by an institutional review board.

A hard copy of the survey was mailed out, and access to an electronic copy of the survey was provided at the same time. No reminders were sent. Demographic information was collected including year of graduation as a veterinarian; state(s) in which the veterinarian was licensed; state(s) in which the veterinarian practiced; type of practice and primary species, if applicable; and employment function. Participants were asked how frequently they interacted with members of various professions on a scale of "never," "rarely" (less than 12 times per year), "regularly" (at least once a month), and "frequently" (at least once a week). A numerical designator was generated with 1 equaling "never" and 4 equaling "frequently" for each parameter. The survey did not ask respondents to provide information about communication with veterinary technicians or nurses, farriers, or groomers. Respondents were split into groups based on employment function (Table 1). General comments were solicited regarding which professions veterinarians should reach out to in order to enhance veterinary health care and which professions veterinarians could interact with to improve human health care. Comments were reviewed by one author (MVRK) and collated by theme.

RESULTS

Of the 4,000 surveys sent out, 16 surveys were returned as non-deliverable, 19 respondents chose not to complete the survey because they were retired, and 9 respondents did not provide demographic data and so were not included. Data from 532 hard copies and 212 electronic surveys were evaluated, for an overall response rate of 18.6%.

Year of graduation from veterinary school varied from 1944 through 2012, with 106 respondents having graduated within the past 10 years, 289 respondents having graduated 11–25 years ago, 301 respondents having graduated 26–45 years ago, and 37 respondents having graduated more than 45 years ago. One respondent is an honorary member of the AVMA and is not a veterinarian; comments from that respondent but no numerical data were included in the results.

Of the respondents, 479 were licensed in one state, 155 in two states, 57 in three states, 17 in four states, 6 in five states, and 3 in more than five states. At least one respondent was licensed from every state, and there were two respondents licensed in Washington, DC, and one licensed in Puerto Rico. Licensure in countries other than the United States included Canada (5 respondents), the United Kingdom (5), Australia (2), India (2), Brazil (1), France (1), Germany (1), Japan (1), Romania (1), and Singapore (1).

Table 1: Employment type and response rate

Employment category	Number of members surveyed	Number of surveys returned	Response rate
Practice			
General medicine/surgery	3,000	557	18.6%
Humane organization	41	10	24.4%
Business/consulting services (pathology or specialty practice)	43	10	23.3%
Zoo/aquarium	13	2	15.4%
Wildlife	16	3	18.8%
Teaching*			
Veterinary medical school/college	479	67	14.0%
Veterinary technician training	17	4	23.5%
Animal science department	14	4	28.6%
Industry			
Pharmaceutical/biological	103	18	17.5%
Feed/nutrition	13	3	23.1%
Laboratory	16	7	43.8%
Other			
Government (federal)	120	25	20.8%
Government (state)	55	14	25.5%
Armed forces (Army)	42	8	19.0%
Armed forces (Air Force)	10	2	20.0%
Membership organization/professional society	11	4	36.4%
Foundation/charity	5	2	40.0%
Missionary	2	1	50.0%

* One respondent did not use the American Veterinary Medical Association employment categories and teaches in a university medical school.

Table 2: Primary source of practice revenue*

Practice type	Number of respondents
Small animal (canine and feline)	478
Small exotics	6
Bovine (dairy)	4
Bovine (beef)	3
Bovine (dairy and beef)	2
Equine	18
General large animal practice	4
General mixed practice	54
Other: Small animal and exotics	17
Other: Small animal and equine	5
Other: Laboratory animal	5
Other: Wildlife	3
Other: Zoo	2
Other: Swine	2
Other: Shelter	1
Other: Not specified	1

* Includes those respondents listed under Practice in Table 1 and those in academia who identified themselves as practitioners

Of the respondents, 622 practiced in one state, 37 in two states, 7 in three states, and 1 in four states. There was at least one respondent practicing from every state.

Primary source of revenue is shown in Table 2. Size and scope of practice is shown in Table 3. Of the practices, 308 were in suburban areas, 145 in rural areas, and 121 in urban areas. Six practices described themselves as suburban and rural, and three practices described themselves as urban and suburban.

Frequency of interaction with various professions by employment grouping is shown in Figure 1. Frequency of interactions ranged from “never” to “regularly,” and “frequent” interaction was not the norm for any group or profession. Practitioners reported interaction with pharmacists, both dispensing and compounding, and with drug company representatives much more than with other professions. The next most common interaction was with representatives from feed or diet companies. For those in education, interaction with pharmacists and drug company representatives was also high; they were also more likely to interact with laboratory technicians and physicians than with other professions. Respondents in industry described their most regular interactions as being with laboratory technicians, physicians, drug and food company representatives, and public health officials. All other respondents described their most common interactions as being with public health officials; interactions with law enforcement, physicians, laboratory technicians, and pharmacists were the next most common interactions described.

Respondents were asked which professions they believed an interaction with could most benefit patient care and

Table 3: Size and scope of practice*

Practice type	Number of respondents
Solo practitioner, 24-hour emergency service provided	54
Solo practitioner, outsources emergency service	92
Multiple veterinarians (2–5), 24-hour emergency service provided	98
Multiple veterinarians (2–5), outsources emergency service	271
Multiple veterinarians (>5), 24-hour emergency service provided	36
Multiple veterinarians (>5), outsources emergency service	30
Other: Relief veterinarian	3

* Includes those respondents listed under Practice in Table I and those in academia who identified themselves as practitioners

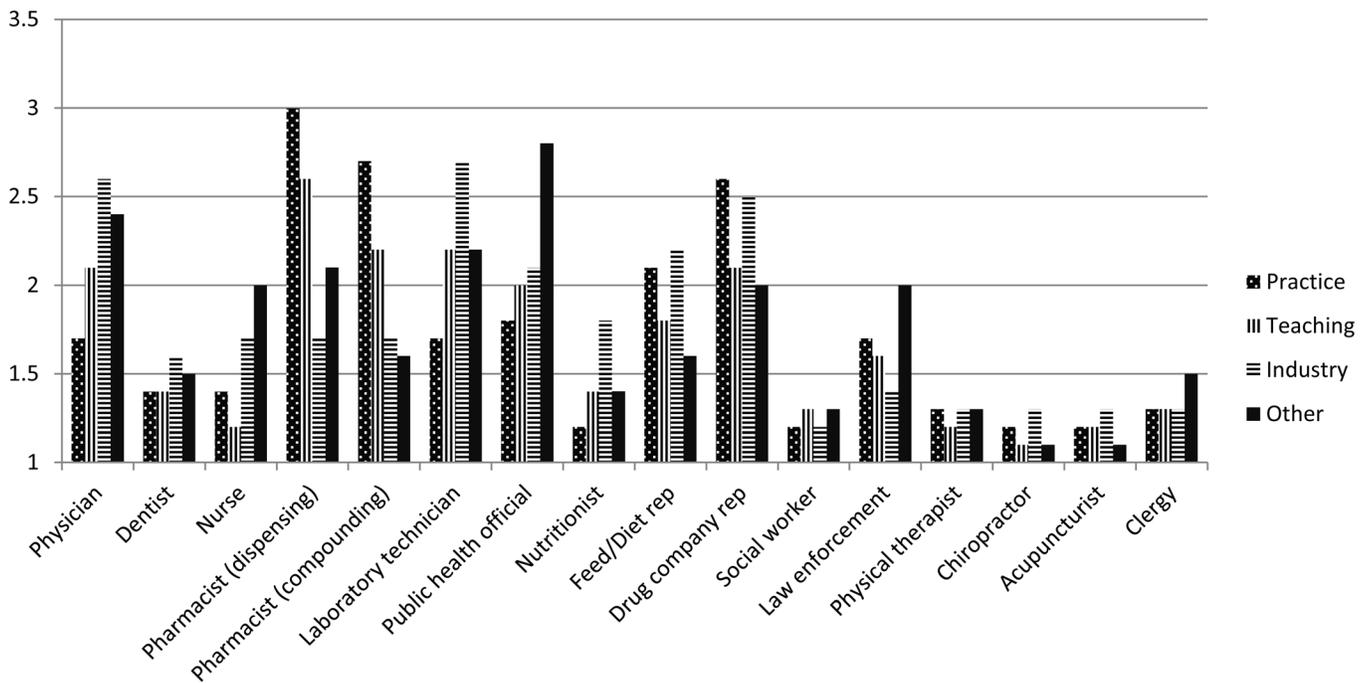


Figure 1: Frequency of interaction with other health professions by veterinarians in various employment categories Scale: 1 = no interaction; 2 = rare interaction; 3 = regular interaction; 4 = frequent interaction

growth of the veterinary profession, which professions we could most positively affect as veterinarians, and for general comments. Of the respondents, 446 (59.9%) made comments. Many respondents wrote lengthy discussions about interprofessional encounters and general concerns about the veterinary profession. The professions with which veterinarians should promote interaction to enhance patient care and growth of the profession and the professions we could most positively affect are presented in Tables 4 and 5, respectively. There were 31 general comments: 17 described the nature of interactions with other professions, 4 described barriers to interprofessional collaboration with lack of time cited as the most common barrier, 3 described personal relationships that fostered interprofessional collaboration, 3 gave opinions regarding veterinary curricula, and 4 regarded the

inability of those respondents to access the survey electronically.

DISCUSSION

The overall response rate was 18.6% and varied by employment type. Some respondents were unable to access the electronic survey for unknown reasons, and that may have decreased response rate. A broad range of ages and all states were represented, as were all practice types. A much larger sampling of the AVMA membership may, of course, have yielded different results.

Pharmacists and representatives of pharmaceutical companies were the professions with which veterinarians in many fields most commonly interacted. This high level of interaction may be driven by changes in legislation requiring veterinarians to interact more with pharmacists

Table 4: Professions with which veterinarians should promote interaction to enhance patient care and growth of the profession

Profession and roles	Number of respondents
Physicians and dentists – Participating in joint or interprofessional continuing education	59
Physical therapists, chiropractors, and acupuncturists – Providing non-traditional care and rehabilitation (These comments were often tempered with concerns about ensuring veterinary oversight of all animal health care.)	49
Social workers and psychologists – Training in how to work with clients and manage their personal stress	39
Physicians, emergency medical technicians, public health officials, and other human health care workers – Working together in crisis situations, disaster preparedness, and promotion of One Health (joint human/veterinary health care)	22
Physicians, PhDs, biomedical engineers, and other researchers – Collaborating on research	17
Law enforcement officers – Helping veterinarians better understand their role in identifying abuse situations, working with animal rights groups, and ensuring adherence to local, state, and federal regulations	15
Legislators – Making policy based on science, providing support for small businesses and for research, and understanding and maintaining the practice act	13
Pharmacists – Understanding new drugs, drug interactions, and species-specific drug concerns	11
Accountants and business professionals – Helping veterinarians better understand practice management	11
Attorneys – Ensuring appropriate medical record documentation and clear understanding by veterinarians of legal issues pertaining to animals and veterinary medical practice	10
Nutritionists – Working with veterinarians and their clients to ensure proper nutrition for pets and family members	9
Nurses – Providing greater understanding of hospice care	8
Physicians and anesthesiologists – Providing training in pain management	2
Statisticians – Critically reading the scientific literature and understanding the scientific method	2
Communications specialists – Training in client communications	2

and by more stringent requirements in drug storage and handling that require a greater level of expertise than most veterinarians have the time or desire to maintain.

Interaction with laboratory technicians was common for the veterinarians in industry and was fairly high for those in education and other professions as well. It may be that practitioners rely on commercial laboratories to provide accurate results and are not interested in pursuing new tests or tests that have not been validated well enough in a given species to make them available through a commercial laboratory. Those at teaching hospitals or in research may interact more with laboratory technicians because they are looking for diagnostic testing beyond what is necessary for general practice.

Interaction with public health officials and law enforcement officers was uncommon for practitioners but very common for those in government or the armed forces. The latter is the most likely employment type designated by respondents specifically working in the fields of public health and regulatory veterinary medicine.

Some respondents noted in the comments that interaction may be fostered by availability. Those working in industry, government, military, and veterinary colleges were more likely than their practice colleagues to have interprofessional interactions, oftentimes because those other professions were represented in their place of work

or those interactions were an expectation of their job. A related concept is that of solicited versus unsolicited interaction. Interactions with food and drug company representatives may have been more common simply because those representatives usually arrive at the practice unsolicited. Practitioner exposure to other professions may be limited by lack of time to pursue such interactions and by lack of readily available colleagues in another discipline. Respondents varied in their opinions of whether or not physicians would ever solicit advice from a veterinarian.

Respondents overwhelmingly cited training in zoonotic disease for physicians and public health officials as an interaction that could be positively affected by veterinary intervention. Similarly, respondents cited veterinarians working with physicians, public health officials, and other human health care workers in disaster preparedness as a fruitful interaction. These findings support the goals of the One Health Initiative, a movement to better integrate resources in veterinary and human health care to ensure optimum health care globally.

The most commonly cited interaction requested by veterinarians in this survey was joint continuing education with physicians, including specialists, and dentists, with the goal of ensuring that human and veterinary health professionals learn new diagnostic methods and

Table 5: Professions which veterinarians could most positively affect

Profession and roles	Number of respondents
Physicians, nurses, and public health officials – Training in zoonotic diseases	227
Social workers – Promoting the human-animal bond, the value and responsibilities of animal ownership, and pet therapy	61
Physicians and nurses – Training in parasitology and parasite-borne diseases	35
Human health care systems – Modeling care of the whole patient, affordable health care provision, and communications	26
Physicians and public health officials – Training in prudent use of antimicrobials and control and surveillance of infectious diseases	25
Pharmacists – Understanding of physiologic variation in domestic animals, pharmacokinetics, routes of administration and specific challenges in administering drugs to animals, and specific contraindications	19
Physicians, PhDs, and other researchers – Using animal models of disease for research	17
Public health officials, physicians, and educators – Training in dog bite prevention	14
Teachers and other educators – Promoting animal care, science literacy, and veterinary medicine as a career	11
Physicians and public health officials – Training in food animal production including animal welfare, food safety, and antimicrobial resistance	7
Journalists and the media – Providing a science-based portrayal of animal issues	6

treatment techniques with and from each other. This is the very definition of IPE. Respondents also expressed a desire to see alternative therapies, including physical therapy, chiropractic, and acupuncture, be made more available to the practicing veterinarian. These comments were often tempered with concerns about ensuring veterinary oversight of all animal health care.

Three respondents questioned the value of IPE in the veterinary curriculum, suggesting that students already are overburdened by being required to learn normal structure and function, preventive medicine, and management of disease in multiple species. However, one could argue that many of the non-technical competencies we already evaluate for at admissions or introduce into the curriculum can be met through IPE. Examples include communications, small-group problem solving, professionalism, leadership, and understanding of the role of the veterinarian in society.^{30–32}

Many students in interprofessional courses identify interaction with their colleagues from other professions as the best part of the course.³³ They enjoy getting to know each other and learning about each other's professions. This knowledge of others' professions and an understanding of one's own role among those professions has been stated as a critical piece in IPE and in interprofessional practice.^{34,35} At Minnesota, in student evaluations completed at the end of the course, many students from other professions express surprise at learning how difficult it is to gain admittance into veterinary school and the rigor of the curriculum. Students have a potential opportunity in IPE to educate others about the roles of animals in society and the roles of veterinary medicine in both animal and human health care. Students at the University of Minnesota have sometimes questioned

whether it is their responsibility to promote this societal education.

A common concern voiced by the veterinarians who responded to this survey was their perception that medical health professionals do not consider veterinarians to be peers in health provision. A study evaluating perceptions of power in human medical professions verified that physicians tended to view themselves as the leaders and decision-makers, based on their years of schooling and the ultimate liability of the physician in a human health care setting should things go wrong.³⁶ The University of Minnesota attempts to circumvent this kind of power struggle by introducing a discussion of negative and positive stereotypes early in interprofessional training. The University of Washington human health professions schools highlight the need for true peer-to-peer collaboration in their stated IPE competencies, which include "collaborates effectively with others to assess, plan, provide, and review care that optimizes health outcomes for patients" and "assists in identifying and overcoming barriers to interprofessional collaboration."^{37(p.6)} Effective collaborative health care involves building relationships among all health care providers. Reviews of the literature regarding IPE suggest that it is easy to educate professionals about each other's knowledge and skills, but it is much harder to influence attitudes and perceptions.³⁸ By fostering the building of relationships among first-year health care learners, it is possible to promote veterinary medicine among members of a group who are at the very beginning of their professional lives. The long-term effects of these relationships could impact patient care in the future in ways that cannot be currently measured.

In human medicine, care is divided by discipline, and specific legal definitions define which discipline is responsible for which aspects of patient care. For physicians, some specialization is required, and this includes general practice. Much of the current literature and focus on IPE in the health sciences revolves around the concept of interprofessional care, recognizing the need to ensure that all members of the health team recognize and value each other's expertise.³⁵ In veterinary medicine, there are no such defined roles, and veterinarians are trained and have legal authority to perform as internists, surgeons, pharmacists, dentists, physical therapists, laboratory scientists, and public health officials. Specialization is voluntary. Some suggest that interprofessional practice and team-based care do not have much of a place in standard veterinary practice, but these concepts can be valuable to practitioners and veterinarians in fields outside of practice to help them recognize the boundaries of their own expertise and when to reach out for assistance. There are many discussions at the national level regarding how best to educate veterinarians to give them the necessary tools to excel in practice or in non-practice careers, including many career pathways that have not traditionally been filled by veterinarians. IPE may assist with this effort.

Recently, the World Medical Association and World Veterinary Association signed a memorandum of understanding that states that the two organizations will collaborate on projects including educational initiatives between medical and veterinary schools, support of cross-species disease surveillance and control of spread of zoonotic diseases, and consideration of responsible use of antibiotics in all species.³⁹ These initiatives will require veterinarians, physicians, public health officials, and other health professionals to understand each other's professions and know how to communicate and collaborate effectively. It is hoped that data like those generated here will promote appropriate interprofessional coursework to foster such collaborations.

CONCLUSION

Veterinarians do not frequently interface with human health care professionals as a component of their daily work. Those with whom practitioners have the greatest interaction are pharmacists and representatives of drug companies. Different results may be garnered from a much larger study, which also might permit greater definition of differences in interaction between practice types. Greater interaction may benefit veterinary medicine, as we draw information from our colleagues, and may benefit human medicine, as we bring greater knowledge of issues such as zoonotic disease and parasitism to that community. Concerns largely revolve around perceptions that attitudes of health professionals will keep them from overcoming barriers to collaboration.

REFERENCES

- 1 Barr H. *Interprofessional education: today, yesterday and tomorrow*. London: Learning and Teaching Support Network for Health Sciences and Practice; 2002.
- 2 World Health Organization. *Framework for action on interprofessional education and collaborative practice*

[Internet]. Geneva: WHO Press; 2010 [cited 2013 Feb 20]. 64 p. Report No.: WHO/HRH/HPN/10.3. Available from: http://www.who.int/hrh/nursing_midwifery/en/.

- 3 Interprofessional Education Collaborative Expert Panel. *Core competencies for interprofessional collaborative practice: report of an expert panel*. Washington: Interprofessional Education Collaborative; 2011 [cited 2013 Feb 20]. Available from: <http://www.asph.org/userfiles/collaborativepractice.pdf>.
- 4 Thistlethwaite J, Moran M. Learning outcomes for interprofessional education (IPE): literature review and synthesis. *J Interprof Care*. 2010;24(5):503-13. <http://dx.doi.org/10.3109/13561820.2010.483366>. Medline:20718596
- 5 Reeves S, Zwarenstein M, Goldman J, et al. The effectiveness of interprofessional education: key findings from a new systematic review. *J Interprof Care*. 2010;24(3):230-41. <http://dx.doi.org/10.3109/13561820903163405>. Medline:20178425
- 6 Brown JB, Boles M, Mullooly JP, et al. Effect of clinician communication skills training on patient satisfaction. A randomized, controlled trial. *Ann Intern Med*. 1999;131(11):822-9. <http://dx.doi.org/10.7326/0003-4819-131-11-199912070-00004>. Medline:10610626
- 7 Thompson C, Kinmonth AL, Stevens L, et al. Effects of a clinical-practice guideline and practice-based education on detection and outcome of depression in primary care: Hampshire Depression Project randomised controlled trial. *Lancet*. 2000;355(9199):185-91. [http://dx.doi.org/10.1016/S0140-6736\(99\)03171-2](http://dx.doi.org/10.1016/S0140-6736(99)03171-2). Medline:10675118
- 8 Thompson RS, Rivara FP, Thompson DC, et al. Identification and management of domestic violence: a randomized trial. *Am J Prev Med*. 2000;19(4):253-63. [http://dx.doi.org/10.1016/S0749-3797\(00\)00231-2](http://dx.doi.org/10.1016/S0749-3797(00)00231-2). Medline:11064229
- 9 Campbell M, Fitzpatrick R, Haines A, et al. Framework for design and evaluation of complex interventions to improve health. *BMJ*. 2000;321(7262):694-6. <http://dx.doi.org/10.1136/bmj.321.7262.694>. Medline:10987780
- 10 Morey JC, Simon R, Jay GD, et al. Error reduction and performance improvement in the emergency department through formal teamwork training: evaluation results of the MedTeams project. *Health Serv Res*. 2002;37(6):1553-81. <http://dx.doi.org/10.1111/1475-6773.01104>. Medline:12546286
- 11 Young AS, Chinman M, Forquer SL, et al. Use of a consumer-led intervention to improve provider competencies. *Psychiatr Serv*. 2005;56(8):967-75. <http://dx.doi.org/10.1176/appi.ps.56.8.967>. Medline:16088014
- 12 Hendrix CM, McClelland CL, Thompson I, et al. An interprofessional role for veterinary medicine in human health promotion and disease prevention. *J Interprof Care*. 2005;19(1):3-10. <http://dx.doi.org/10.1080/13561820400021700>. Medline:15842076
- 13 Crocken B. Veterinary medicine and social work: a new avenue of access to mental health care. *Soc Work Health Care*. 1981;6(3):91-4. http://dx.doi.org/10.1300/J010v06n03_09. Medline:7292248
- 14 Davis DK. Veterinary geography as interdisciplinary research. *Geogr Rev*. 2001;91(1/2):463-71. <http://dx.doi.org/10.2307/3250849>.

- 15 Entin AD. Pets in the family. *Nat Acad Prac Forum Issues Interdiscip Care*. 2001;3:219–22.
- 16 Foley-Nolan C, Buckley J, O'Sullivan E, et al. United front—veterinary and medical collaboration. *Ir Med J*. 1998;91(3):95–6. Medline:9695431
- 17 Goscienski PJ. Zoonoses. *Pediatr Infect Dis*. 1983;2(1):69–81. <http://dx.doi.org/10.1097/00006454-198301000-00018>. Medline:6340080
- 18 Guay DR. Pet-assisted therapy in the nursing home setting: potential for zoonosis. *Am J Infect Control*. 2001;29(3):178–86. <http://dx.doi.org/10.1067/mic.2001.115873>. Medline:11391280
- 19 Johnson RA, Meadows RL. Promoting wellness through nurse-veterinary collaboration. *West J Nurs Res*. 2000;22(7):773–5. <http://dx.doi.org/10.1177/01939450022044746>. Medline:11077546
- 20 Jones LM. Professional interrelations of pharmacy and veterinary medicine. *J Am Vet Med Assoc*. 1967;151:1772–6.
- 21 Long SA. Incorporating veterinary preventive dental instruction into a traditional dental hygiene program. *J Dent Hyg*. 1999;73(4):208–12. Medline:10709554
- 22 Netting FE, Wilson CC, New JC. Developing a multidisciplinary pet placement program for community-based elderly. *J Appl Gerontol*. 1984;3(2):181–91. <http://dx.doi.org/10.1177/073346488400300208>.
- 23 Zopf LC. Pharmacy-veterinary medicine relations. *J Am Pharm Assoc*. 1971;11(4):168–70. Medline:5165032
- 24 Becker KM, Oluabunwo C, Ndjakani Y, et al. Field epidemiology and laboratory training programs in West Africa as a model for sustainable partnerships in animal and human health. *J Am Vet Med Assoc*. 2012;241(5):572–9. <http://dx.doi.org/10.2460/javma.241.5.572>. Medline:22916854
- 25 Herrmann JA, Johnson YJ, Troutt HF, et al. A public-policy practicum to address current issues in human, animal, and ecosystem health. *J Vet Med Educ*. 2009;36(4):397–402. <http://dx.doi.org/10.3138/jvme.36.4.397>. Medline:20054077
- 26 Briggs EV, Carr ECJ, Whittaker MS. Survey of undergraduate pain curricula for healthcare professionals in the United Kingdom. *Eur J Pain*. 2011;15(8):789–95. <http://dx.doi.org/10.1016/j.ejpain.2011.01.006>. Medline:21330174
- 27 Edwards JC, van Walsum K, Sanders CW, et al. Attitudes of veterinary medical students and medical students toward collaborative learning: an experiment. *J Vet Med Educ*. 2004;31(1):76–8. Medline:15962254
- 28 Baldwin DC Jr. Some historical notes on interdisciplinary and interprofessional education and practice in health care in the USA. 1996. *J Interprof Care*. 2007;21(Suppl 1):23–37. <http://dx.doi.org/10.1080/13561820701594728>. Medline:17917941
- 29 Thannhauser J, Russell-Mayhew S, Scott C. Measures of interprofessional education and collaboration. *J Interprof Care*. 2010;24(4):336–49. <http://dx.doi.org/10.3109/13561820903442903>. Medline:20540613
- 30 Burns GA, Ruby KL, Debowes RM, et al. Teaching non-technical (professional) competence in a veterinary school curriculum. *J Vet Med Educ*. 2006;33(2):301–8. <http://dx.doi.org/10.3138/jvme.33.2.301>. Medline:16849315
- 31 Root Kustritz MV, Nault AJ. Professional development training through the veterinary curriculum at the University of Minnesota. *J Vet Med Educ*. 2010;37(3):233–7. <http://dx.doi.org/10.3138/jvme.37.3.233>. Medline:20847331
- 32 Lewis RE, Klausner JS. Nontechnical competencies underlying career success as a veterinarian. *J Am Vet Med Assoc*. 2003;222(12):1690–6. <http://dx.doi.org/10.2460/javma.2003.222.1690>. Medline:12830860
- 33 Curran VR, Sharpe D, Flynn K, et al. A longitudinal study of the effect of an interprofessional education curriculum on student satisfaction and attitudes towards interprofessional teamwork and education. *J Interprof Care*. 2010;24(1):41–52. <http://dx.doi.org/10.3109/13561820903011927>. Medline:19705318
- 34 Lister L. Role training for interdisciplinary health teams. *Health Soc Work*. 1982;7(1):19–25. Medline:7076046
- 35 Anholt RM, Stephen C, Copes R. Strategies for collaboration in the interdisciplinary field of emerging zoonotic disease. *Zoonoses Publ Hlth*. 2012;59(4):229–40. <http://dx.doi.org/10.1111/j.1863-2378.2011.01449.x>.
- 36 Baker L, Egan-Lee E, Martimianakis MA, et al. Relationships of power: implications for interprofessional education. *J Interprof Care*. 2011;25(2):98–104. <http://dx.doi.org/10.3109/13561820.2010.505350>. Medline:20846045
- 37 Bridges DR, Davidson RA, Soule Odegard P, et al. Interprofessional collaboration: three best practice models of interprofessional education. *Med Educ Online*. 2011;16:6035. <http://dx.doi.org/10.3402/meo.v16i0.6035>. Medline:21519399
- 38 Hammick M, Freeth D, Koppel I, et al. A best evidence systematic review of interprofessional education: BEME Guide no. 9. *Med Teach*. 2007;29(8):735–51. <http://dx.doi.org/10.1080/01421590701682576>. Medline:18236271
- 39 WMA president calls for closer cooperation between doctors and vets. *Vet Rec*. 2012;171(23):582. <http://dx.doi.org/10.1136/vr.e8181>. Medline:23223466

AUTHOR INFORMATION

Margaret V. Root Kustritz, DVM, PhD, DACT, is Professor of Theriogenology and Assistant Dean of Education, Department of Veterinary Clinical Sciences, University of Minnesota College of Veterinary Medicine, St. Paul, MN 55108 USA.
E-mail: rootk001@umn.edu.

Laura K. Molgaard, DVM, is Associate Dean of Academic and Student Affairs, Department of Veterinary Clinical Sciences, University of Minnesota College of Veterinary Medicine, St. Paul, MN 55108 USA.

John H. Tegzes, VMD, MA, ABVT, is Professor of Toxicology and Director of Year One Curriculum, Western University of Health Sciences College of Veterinary Medicine, Pomona, CA 91766 USA.