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Short Report

Human and Veterinary Medicine: Expanding Opportunities for Interprofessional Collaboration

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Abstract

Background: Interprofessional education (IPE) in undergraduate medical education is often limited to human health professionals including nurses, pharmacists, social workers, or physical and occupational therapists. IPE activities that include both human medicine and veterinary students are crucial with the rise of complex one health issues such as climate change, antimicrobial resistance, and zoonotic diseases that involve and affect both humans and animals.

Methods: In order to foster collaboration between human and veterinary medicine trainees, a veterinary shadowing program was developed for first-year human medicine students. The impact of the shadowing experience and further opportunities for collaboration between the human medicine and veterinary medicine space were explored in a focus group. The anonymized focus group transcript was analyzed by the research team members for themes to help us understand how students saw connections between human and animal healthcare after engaging in this experience.

Results: Themes that emerged from the focus group include: i) opportunities for learning from veterinary colleagues including death and dying, quality of life conversations, approaches to non-verbal patients and second-hand history taking, cost of care discussions, provider safety, and impact of human medications and food on animals and vice versa; ii) interdisciplinary relationships and appreciation including jointly addressing burnout and mental health challenges and finding solutions to debt during training; iii) imposter syndrome and increasing confidence including effects on fostering a growth mindset, being comfortable with not being an expert, and opportunities for repeated and extended physical exam practice, and lastly; iv) joint community engagement programming including collaborative advocacy and leveraging animal health as a tool to improve human health.

Conclusion: As interprofessional programming continues to be implemented across health professional educational spaces, activities that bring human and veterinary medicine trainees together can be developed. This may lay the foundation for improved success in tackling complex One Health issues of the future.

Keywords: Collaboration, human medicine, interprofessional, veterinary medicine.

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Introduction

Interprofessional education (IPE) is defined as learning about, from, and with members of other health professions to improve collaboration and care quality. (1) IPE is an important component of health profession training and is in accreditation requirements for most healthcare fields, including human and veterinary medicine. (2) The goal of IPE is to develop learners' skills in working with other professions to improve patient care and community health through enhanced teamwork.

IPE in undergraduate medical education is often limited to human health professionals including nurses, pharmacists, social workers, or physical and occupational therapists. Few schools engage veterinary and human medicine providers together (1,3). However, IPE activities that include both human medicine and veterinary students are crucial with the rise of complex issues such as climate change, antimicrobial resistance, and zoonotic diseases, as exemplified by the COVID-19 pandemic. (4,5) Tackling such One Health issues, which demand an understanding of the interconnections between humans, animals, and the environment, requires collaboration between human and veterinary professionals.

Methods

A veterinary shadowing program (VSP) was developed in 2021 for first-year medical students at a regional undergraduate medical campus located at an institution of higher education with a Doctor of Veterinary Medicine (DVM) program. The first year of medical school is primarily classroom based with limited exposure to patient care settings. Participating students spent 4 to 6 hours shadowing a veterinary critical care physician and veterinary learners in a teaching hospital emergency service. The learning objectives for the experience were:

1. Recognize that collaboration between human and veterinary medical professionals can benefit healthcare for humans and animals
2. Recognize that humans and animals share the same environment and health is interdependent
3. Elicit a history of human-animal-environment interactions.

The aim of this study was to explore first-year medical student perceptions of and experiences in a veterinary clinical setting and to understand opportunities for further collaboration between human and veterinary medicine.

To help us understand student perceptions and experiences, we conducted a one-hour, in-person focus group with three students who participated in the VSP. The focus group was audio-recorded and transcribed verbatim. Questions were asked about learned skills, opportunities for collaboration, approaches to human healthcare, and the interdependency of human and animal health. Three researchers read the transcript to brainstorm initial themes related to the study aims. Then the first author re-coded the transcripts with these initial themes in mind using an open coding method. (6) Codes were shared with the second author for comments and edits, towards finalizing a codebook.

Results

Four major themes emerged to describe students' experiences and perceptions of the VSP:



- 1) Opportunities for learning from veterinary colleagues, 2) Interdisciplinary relationships and appreciation, 3) Combatting imposter syndrome and increasing confidence, and 4) Joint engagement opportunities. A table of themes, codes, and example excerpts is included in Appendix A.

Opportunities for learning from veterinary colleagues

Students noted opportunities for learning from veterinary colleagues on topics that overlapped with human medicine. They described engaging in conversations related to death, dying, and quality of life and imagined what may be translatable to human medicine. Students also found discussions on cost of care and financial impacts of death helpful to observe. Additionally, students observed that the veterinary team's clinical approach to non-verbal patients and second-hand history-taking were transferrable to medicine. Other opportunities for learning included observing different clinical procedures and practicing translatable clinical skills, practicing team-based care, and increasing understanding of topics that affect both humans and animals including mental health, overlapping illnesses, food production and safety, provider safety, and toxicity from pharmacologic drugs.

Interdisciplinary relationships and appreciation

Students discussed how cross-professional clinical engagement allowed them to create relationships with and interest in other healthcare professionals with similar challenges and experiences. They discussed the social benefit of engaging with those outside of human medicine in a healthcare field and noted that exposure to the training models in veterinary medicine created an appreciation for veterinary expertise.

Combatting imposter syndrome and increasing confidence

The third theme that emerged from the focus group was how the VSP helped combat feelings of self-doubt and increase confidence. Students described a sense of freedom in having no expectation from their preceptors or their patients, allowing them to be openly curious, ask questions, and develop an increased comfort in the unknown and in not having to be an expert. Lastly, they discussed the opportunity for confidence building in their translatable clinical skills via repeated and lengthy physical exams on animals.

Joint community engagement opportunities

Students left the experience excited about future opportunities to collaborate. They reported a new understanding of the human-animal bond and how collaborative community engagement opportunities may benefit both groups such as joint blood and vaccine drives, health fairs, exercise initiatives, and opioid-abuse awareness education.

Discussion

Results from our focus group suggest the utility of medical students shadowing in veterinary clinical spaces. We note that students described veterinary medicine topics they were exposed to as being absent in their training thus far. This suggests that these opportunities may allow students to start thinking about topics that they will learn more in later training. Those designing



similar IPE experiences may find it helpful to discuss what topics may come up later in human medicine education.

Further potential learning opportunities from this experience aligned with the themes above can also be imagined. Burnout and physician well-being is an area of overlap in which innovative solutions could be created and disseminated in both fields. (7,8) Both careers demand long training hours that often place trainees in emotionally intense, high-stress clinical settings while accruing debt. Also, suicide rates are known to be disproportionately high for both physicians and veterinarians. Tools for addressing these crises could be developed together. Additionally, both educational systems are committed to anti-racism and increasing diversity (9,10) and workplace violence is a concern in both fields. (11, 12)

Secondly, medical students are often faced with the duality of not being experts but having to demonstrate clinical knowledge and skills. (13) The VSP experience allows students to embrace those dual roles in a low-stakes environment where they can focus on learning and not just performing. Additionally, the noted skills gained in confidence and curiosity are some that are difficult to foster in current structures of medical education. We may be able to prioritize development of these attributes by taking students out of their traditional clinical contexts.

There is also the potential opportunity for veterinary and medical students to learn overlapping clinical skills such as IV placement in small veins, temperature regulation, nutrition management, and identifying sick vs not sick in small, non-verbal patients. Furthermore, as we saw during the height of the COVID-19 pandemic, there may be future need to share resources such as ventilators, emergency care workers, and zoonotic disease experts. (14) Building these relationships during training strengthens the foundation of these partnerships early on in low-stakes, non-crisis environments that can allow for improved collaboration and outcomes when they may be essential.

Furthermore, there are shared opportunities for advocacy. Training could go beyond current siloed service-learning engagement and didactics on social determinants of health. To train effective leaders, learning activities that are embedded in the crosscutting One Health framework requiring collaboration of human, animal, and environmental health partners should be embraced. (15) No single sector can address issues such as hygiene, zoonotic disease, food and water safety, or climate change. Instead, future physicians need skills to communicate, collaborate, and coordinate activities with those outside of human medicine to be effective advocates that move priorities into action. Joint and early advocacy between human and veterinary medicine trainees is one way in to foster this collaboration.

Conclusion

Taken together, we believe that we should invest in creating interprofessional clinical opportunities for collaboration between human and animal physicians and trainees for the benefit of both fields, all our patients, and our communities. There are several next steps that



could help clarify and further expand upon this work. First, repeated shadowing experiences when students are farther in their clinical training may allow for increased collaborative opportunities in the veterinary space. Secondly, additional exploration should be conducted to evaluate what programming would specifically benefit veterinary students and faculty. Some ideas that come to mind include veterinary experiences in human neonatal ICUs to learn about procedures on small patients, in geriatrics to contrast how death and dying and quality of life differs in the two fields and to discover opportunities for enhancing both, and with human medicine pharmacists to explore the use of opioids in human patients and risks to their pets. Additionally, understanding existing community engagement work that is being done by trainees and then expanding upon them to include human and veterinary medicine stakeholders would be another way to more purposefully collaborate around an idea of shared health. Lastly, identifying clinical topics that affect both humans and animals such as infectious disease, opioids, preventative medicine, exercise, nutrition, and others and then creating programming to address these topics jointly would allow for engagement between veterinary and human medicine professionals across different points of training and practice. We feel that the opportunities and rewards in this space are immense and hope to continue to find ways to work together to ensure the health of humans and of animals. (16)

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Annex 1: Illustrative Statements from Participants by Theme

Opportunities for Learning from Veterinary Colleagues

Code	Example
Learn from how DVM teaches/talks about death and dying	I think there's a lot of opportunity in death and dying. During my shadowing experience, one of the pets that was brought into the emergency room...the vet hospital...did end up dying. And so I think that veterinary medicine might get even more training in that



	area because euthanasia is such a regular part of veterinary medicine. And so...I think human medicine could learn a lot from vet med in that aspect. [Student 3]
Learn about end-of-life choices and quality of life	People will do just about everything to for--you know--prolong a human life but have less consideration of the quality of that life. Versus for animals, a lot of time the impetus is that...you know, they just, it's time to end their suffering... [Student 3]
See how DVM cost communications are "more transparent upfront"	And, also, the cost, I think that the cost of...veterinary care is much more transparent upfront. And that...very much guides what procedures are done because, you know, they'll figure something out and they'll go talk to the owners and be like, "It's gonna cost this much...option x costs this, option y costs this..." and the cost actually drives the care. Which is what we're taught not to do in a sense, but we still have to consider that. [Student 3]
See how DVM communicates with nonverbal patients	I think pediatrics, but also anytime you have a second person speaking, like it just really kind of opened my eyes. Like that information, you cannot take as fact. Like you have to still do your own workup and keep your own mind open whenever [mumbled] like, a case. [Student 2]
Learn from DVM students about validating concerns when they are vague	And I think that veterinarians are probably really good at validating when...when the pet owners notice unusual behaviors and encouraging them to bring it in and get it checked out because sometimes it's nothing but sometimes it is a thing. [Student 3]
See different clinical procedures in DVM space	I think from my side it was very interesting as a teaching tool [...] so you can have six or seven patients in the same room all being worked on at the same time, and so, from a teaching standpoint, I felt like I got to see a lot of different things happening. And like if one kinda ebbed I could go over and check out something else and be able to see like several large teams working around each other. [Student 2]
Practice translatable clinical skills	And one of the things we did was like testing for proprioception on a dog and how can a dog tell if it's body's in the right spot and space. And like we talked the day before in class so I knew the answer, but like if you turn their paw upside down and they like fix it, and so like doing...having that correlation in the back of your head is a way to think outside the box when you're working with human patients, I think would be really good [Student 1]
Learn from how DVM teaches/talks about bloodwork/labs	I think kind of the different...systems...so when I was there we got to go see some of the imaging and they do bloodwork and labs, and so, a lot of the similarities between human and animal medicine and just kind of understanding those processes I think an opportunity. [Student 3]
Opportunities to observe and reflect on history	It's learning to ask the right questions. And making sure they're open ended. And staying...initially pretty broad and then...probably getting narrower, kind a similar to what we kind of do in human health. [Student 3]



taking/communication skills	
Educational opportunities between parallel specialties/disciplines	I feel like there opportunities, like educational opportunities in every field, like almost every specialty filed. Maybe like psych would be a little hard [laughing], but I feel like for imaging like you noted, and for like heme and stuff, I feel like there are opportunities for that. I remember we saw a dog with a stroke, so I feel like every specialty, there were so many specialists we saw even in the [veterinary] ER that day, and I feel like there are opportunities for education to draw parallels between the two. [Student 1]
Opportunities to observe and practice team-based care	I feel like something that was... prepared me for clinic was working on a team environment. Because we were like all in a room with a bunch of different animals. And like we would just like, we would all be like, you know, one person would be petting the animal and like making sure it was relaxed, while the other one would like, kind of low-key pin it down, and then the other one was giving it a shot – it was very collaborative. And that was really awesome to see, because I think in a lot of our preceptorships...we are just mainly following our...our like, the doctor who we see but not the nurses or the MAs. Because we all go in the room at separate times. At least that's what mine is like. But this one was really cool because all of us were in there together, we were all working as a team together, and that was a really cool...super cool to appreciate, and it will prepare me more for like being in an ER next year or being in certain clinical settings...next year as well. [Student 1]
Awareness about the role of a pet in human health/mental health	I think asking about pets. I realize now, especially after we just had our [clinical skills exam] and stuff, that...that's traditionally not something we ask anywhere in our histories. [...] I don't think I've ever had a patient bring it up unless I specifically asked. Sometimes they'll mention it when you ask about exercise, "Oh I walk my dog." But when you ask about living, they talk about the humans they live with...and rarely the animals they live with. And that can have big health implications. [Student 3]
Opportunities to learn about disease that affects humans and animals	I don't think I realized how many human diseases transmit to animals and vice versa. And like, what the implications of that kind of are. So that's kind of got me thinking. [Student 2]
Learn from DVM students about food production/safety	Vets get a lot of training in broader fields like about food production and food safety...that I don't think we often do. But it has such an impact on people's health. So, I'm curious if there's opportunities for...us to learn more about that and...if that's something we can learn from our vet colleagues. And potentially...bring into...our practice and knowledge. [Student 3]



<p>Opportunities to learn about provider safety strategies</p>	<p>Something else I just thought of is I think the veterinary medicine spends a lot more time learning how to keep the provider safe. And you know, when the dogs and the cats and the whatever animal is not happy to be there. You know, how do they restrain them and protect the providers and, especially recently, in the past decade especially in the last couple years during COVID, the amount of violence towards physicians and other healthcare providers has just increased dramatically. And so, potentially bringing in what [our] veterinary medicine colleagues have learned about staying safe. [Student 3]</p>
<p>Opportunities to learn about pharmacology effects on animals and implications on humans</p>	<p>[T]here are a lot of, like specific medications that are totally safe in humans but like very dangerous to animals...because of the way their kidneys are different. And I thought that was really interesting, just the...implications of human medicines accidentally getting ingested by dogs. Or dog medicines with like the opioids getting ingested by humans [...] So like, having just that overlap of two medication pools that people are like, “Oh it’s totally fine to swapsies [sic] them back and forth” and it’s not actually. And I think there’s very little education about that. So that’s a very interesting point to...to kind of explore for me. [Student 2]</p>

Interdisciplinary Relationships and Appreciation

Code	Example
<p>Appreciation for DVM training</p>	<p>It really helped me appreciate how like...I guess intensive the training is for that. So that...that was a really...a great way to appreciate everything that...vet students and residents go through. [Student 1]</p>
<p>Comparing curriculum and getting to know vet med educational approach</p>	<p>I’m like really interested in comparing the two curricula...curricula? Yeah. Just like comparing them and...knowing like I guess because they have...you know they have the same blocks probably that we do with neurology and then, you know, cardio...but they have so many different species and stuff. And then as far as the actual patient interaction, they still, they still learn to ask open ended questions and stuff. So, I’d be really interested in comparing the two, like the two curricula [sic] and learning more about that and how to build a more...like...I guess like...I guess like more curriculum that prepares us to be, like, the kind of physicians and veterinarians that ask the right questions, I guess. So that, that would be really interesting to me. [Student 1]</p>
<p>Appreciation for skills of vet techs</p>	<p>There were these...premature puppies that came in. And some were really dehydrated, just being so impressed at the vet techs being able to get IVs on these tiny, tiny little veins. So as someone else mentioned the different anatomy with different animals, and then...you know, different ages...puppies versus older adults, and just being very very impressed at...the skills. [Student 3]</p>



Benefit of interaction with other health professional students	I think having that experience of interacting with other students in the healthcare field is kind of nice to be reminded, like, it's not just [our group of MD students]. There are other people. And so I think finding ways to have that overlap, you know, where we could recognize faces, and like, things like that would be really great. [Student 2]
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Combatting Imposter Syndrome and Increasing Confidence

Code	Example
Low-pressure learning environment leading to reaffirming feeling about own skills	And then the other thing I really enjoyed about the shadowing experience was that I was coming in...like four or five months into med school. So, like not knowing a ton, but everyone there expected me to know nothing, because I study human medicine and not animal medicine. And so it was a very low-pressure way to like, get asked questions and stuff and like the expectation was zero. And so it was really reaffirming to like...have a clinical experience where I knew way more than anyone expected me to [Student 2]
Freedom from judgement/grading/imposter syndrome	Student 2: Like I said earlier, coming so early in med school to med school to just reaffirm I am learning things, I can do these things, and to like, get more comfortable. And so, things like, doing that or...I watched a couple catheters be placed, and just being like, "Oh, that's what's going on!" In a way where I didn't feel like there was any other humans there who were going to judge me for not knowing or doing it poorly. Student 1: I completely agree. Especially with, because the heart and lungs, that's like...I feel like at first, I was like, with humans like, I have to get it on the exact right spot. And if I have to like move, you're going to think I'm a fool. But then with animals like you just like moved it and it was like no big deal. And I was like, "What does it matter with humans if I can't feel your pulse on the right spot? I'm just going to try it again at a slightly different spot." So, it did make me less nervous about physical exams with humans.
Ability to ask questions without fear of failure	The other thing I was going to say is asking questions. I know you kind of alluded to this earlier. [...] Sometimes I'm like, "I don't know if I should ask this question because I feel like I should know it and my preceptor probably feels like I should know it." [Student 1]
Practicing on animals increases physical exam confidence	I feel like because we listened to a dog's lung and heart. And it was right around the time we learned to do that on humans. And I was so awkward doing it with like [standardized patients] or like even [my partner], cause it's like, "Do they know that I don't know what I'm doing?" [Laughter] But like, I never was worried about the dog being



	like, “Well this [person] doesn’t know anything...” [Student 2]
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Joint Engagement Opportunities

Code	Example
Joint blood drives	For example, for outreach, doing blood drives, or we have humans, and their pets come in, and stuff like that. [Student 1]
Vaccine drives	How can we use veterinary outreach events to also reach, like, human...the human population as well. So, for vaccine drives, can we also bring like human vaccines and try to get humans vaccinated. [Student 1]
Joint health fairs	[T]hey [veterinary students] have a hard time finding people from the community who will bring their pets, and even for like free checkups, so the vet students can practice, and so pairing that with like a health fair, like you come and your pet comes, could be a really cool way to like, pull more people in and serve, you know, maybe give vet care and like human health care to people to would not otherwise be going in to get that. [Student 2]
Joint human/animal health opportunities	And then potentially influencing both animal health and human health. So, if the dog’s really overweight and needs more exercise, and so does the human, kind of having the veterinarian and the human physician team up together and figure out how to help motivate the owner, like, whether they’re more motivated to improve their health or the dog’s [health]. And see if they can kind of collaborate and improve both of their health together, not consider it separately. If that makes any sense. So, I think that could be really interesting. [Student 3]
Partner on opioid-abuse initiatives	Through some other work I’m involved in I recently learned about how opioids, everybody’s pretty aware about...in human medicine, not over-prescribing opioids, and I think there’s awareness in dentistry and things like that. But many people don’t think about veterinary medicine, and that the vets will prescribe opioids for the animals but then the humans take them. That, that’s not going into the same system. Like all of the human prescriptions do. And so, there’s this big potential for abuse, because were not communicating with our veterinary medicine counterparts appropriately [Student 3]
Human/animal safety initiatives	I think animal behavior and...some of the implications for when...it goes wrong...like interactions between animals and humans go wrong. And the legalities, when the law’s behind that. Because I know dog bites have to be reported, and...I think cat bites and stuff...and checking for rabies and stuff like that. But so potentially educate – is it...who’s responsibility is it to try and see if people are making sure their pets are trained enough so they’re not going to cause harm to other animals or other



	humans. And especially with kids, right? Babies and kids...is a big one. So, you know, if you've got a family, and they've got a new baby and stuff, and they also have a dog, like...is it our responsibility to have, you know, ask about the dog's behavior around the baby? Is that the vet's job? Who...like where's that intersection fall, I guess. [Student 3]
Designing dog parks	I appreciate some of the dog parks around here but compared to the dog parks back home they're kind of trash [laughing]. And I, like have a whole folder on my computer about how do we improve dog parks, how do we get more people to come, how do we get them more pleasant spaces to be in, also more self-sufficient spaces to be in so I think looking into that overlap between human and animal health and how do we promote those side-by-side is a very interesting thing. [Student 2]

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