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Dr. Kachani specializes in parasitic zoonoses and Veterinary Public Health. Her current research focuses on cystic echinococcosis (CE) (*Echinococcus granulosus* infection) in animals and in humans.

She has developed strategies to control CE in an endemic area of Morocco. She has organized extension, education and training programs for the prevention of zoonoses and promotion of animal and public health involving various target audiences. She has conducted various development activities in rural areas of Morocco, such as integrated programs to alleviate poverty, supervision of agricultural and income generating activities of rural women, formal and informal education for rural children, intensive village studies to evaluate the importance and the cost of parasitic zoonosis in humans and animals, public health education programs and control of zoonotic diseases. She was a co-editor of a compendium on CE in Africa and in the Middle-Eastern countries, published in 1997. She was the principal investigator in several projects funded by the European Union on tick-borne and zoonotic diseases.

She works with Intergovernmental organizations such as The Food and Agriculture Organization of the United Nations (FAO), the World Health Organization (WHO). She also has working relationships with the ILRI, IAEA, IFAD, PAHO, CDC, Heifer International and the USDA. She has worked with the FAO on parasitic zoonoses, Veterinary Public Health, Dog Population Management for the Control of Zoonotic Disease, and served as moderator of the FAO VPH network for Francophone Africa.

She is currently a member of the WHO Strategic and Technical Advisory Group (STAG) for Neglected Tropical Diseases and she is the current chair of the STAG working group on Neglected Zoonotic Diseases. She is also currently a member of the Stone Mountain working group on One Health and is the co-chair of the One Health Proof of Concept subgroup.

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At Western University of Health Sciences, she organizes student exchange programs with Colleges of Veterinary Medicine in Africa and Latin America. She also participates in health interprofessional educational programs. She collaborates with researchers in Peru on CE control. She has been the Principal Investigator in numerous grants funded by the EU, American private foundations, WHO and various NGOs.

Throughout her activities, she has been a strong advocate for the One Health approach in Morocco, Peru, European, North African and Middle Eastern countries and in the USA.

# INFLUENCE OF INTERPROFESSIONAL EDUCATION

on Student Knowledge, Attitudes and Beliefs  
of One Health. Preliminary results.

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## INTRODUCTION

Interprofessional education can potentially teach One Health topics in a novel interactive format, bringing together future health professionals in a forum that enables them to understand the importance of interdisciplinary collaboration.

The purpose of this study is to determine the influence of interprofessional education (IPE) on student knowledge, attitudes and beliefs (KAB) of One Health. The rationale behind the research is that while there are multiple studies that promote the importance of interdisciplinary care in human health delivery, less is known about the effectiveness of using IPE to promote cross-disciplinary collaboration that includes veterinary and environmental components. Western University of Health Sciences is in a unique position to conduct such research as its IPE program is comprised of over 900 students from various health professions.

## MATERIALS AND METHODS

Groups of 9 students, 1-2 from each college meet

3 times per IPE case. A facilitator helps guide the students through the case with a cross-disciplinary collaborative approach. Every case is designed with human-animal-environmental interactions that require involvement of multiple health professions. This yields an excellent educational environment, in which students gain a perspective that would not otherwise be present in a traditional, single discipline, classroom.

Out of the 900 first year IPE students, 307 completed an electronically administered anonymous survey. Professions represented were: Veterinary Medicine, Osteopathic Medicine, Dentistry, Allied Health, Graduate Nursing, Pharmacy, Physician Assistant, Podiatric Medicine and Optometry.

The survey sought to assess the students capacity to correctly define One Health. Respondents were then given a definition of One Health: "A collaborative effort of multiple disciplines- working locally, nationally, globally – to attain optimal health for people, animals and the environment". In a separate section of the survey, a 5 point Likert scale was used to identify students level of agreement to statements regarding their knowledge of zoonoses and infectious diseases, biomedical

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**Table 1- Student Respondent Enrollment by College**

| College               | Frequency  | Percent      | Valid Percent | Cumulative Percent |
|-----------------------|------------|--------------|---------------|--------------------|
| Allied Health         | 27         | 7.9          | 8.8           | 8.8                |
| Dental Medicine       | 25         | 7.3          | 8.1           | 16.9               |
| Graduate Nursing      | 7          | 2.0          | 2.3           | 19.2               |
| Nursing               | 6          | 1.7          | 2.0           | 21.2               |
| Optometry             | 16         | 4.7          | 5.2           | 26.4               |
| Osteopathic Medicine  | 133        | 38.8         | 43.3          | 69.7               |
| Pharmacy              | 27         | 7.9          | 8.8           | 78.5               |
| Podiatric Medicine    | 10         | 2.9          | 3.3           | 81.8               |
| Veterinary Medicine   | 55         | 16.0         | 17.9          | 99.7               |
| Physician Assistant   | 1          | .3           | .3            | 100.0              |
| <b>Total</b>          | <b>307</b> | <b>89.5</b>  | <b>100.0</b>  |                    |
| <b>Missing System</b> | <b>36</b>  | <b>10.5</b>  |               |                    |
| <b>Total</b>          | <b>343</b> | <b>100.0</b> |               |                    |

and comparative research, environmental health, human-animal bond and their perceptions of effective health care delivery. Options on the Likert scale included “strongly agree, agree, neither agree nor disagree, disagree and strongly disagree”.

Similarities and differences between health professions were identified and analyzed. For the Likert scale responses, each category was assigned a point value ranging from 1-5 with 5 equivalent to “strongly agree” and 1 equivalent to “strongly disagree”. The T test for comparison of means was utilized to assess whether responses by students at differing health professional colleges were statistically significant.

*Table 1 shows the breakdown of students by college of attendance.*

## RESULTS AND DISCUSSION

This study involved students from 9 colleges. However, for the purposes of this paper, preliminary

results relating to responses by the students from the colleges of Veterinary Medicine (n=55) and Osteopathic Medicine (n=133) are being reported. Ages ranged from 18-55 with 36% male and 64% female.

### DEFINITION OF ONE HEALTH:

*Table 2 shows responses to the question “If asked could you define what One Health means?”.*

While 71.3 % of veterinary and osteopathic medical students combined believed they could define one health, only 44.1% adequately

**Table 2: Students' Self-Assessment of Ability to Define “One Health”**

|              | Frequency  | Percent      | Valid Percent | Cumulative Percent |
|--------------|------------|--------------|---------------|--------------------|
| <b>Yes</b>   | 134        | 71.3         | 71.3          | 71.3               |
| <b>No</b>    | 54         | 28.7         | 28.7          | 100.0              |
| <b>Total</b> | <b>188</b> | <b>100.0</b> | <b>100.0</b>  |                    |

**Table 3. Comparison of Means of Zoonoses and Infectious Diseases Statements**

| <b>Zoonoses and Infectious Diseases Statements</b>  |                            |          |             |                       |
|---|----------------------------|----------|-------------|-----------------------|
|   | <b>Diseases Statements</b> | <b>N</b> | <b>Mean</b> | <b>Std. Deviation</b> |
| <b>Animal health can impact human health</b>  | <b>Veterinary student</b>  | 47       | 4.85        | .416                  |
|   | <b>Medical student</b>     | 114      | 4.28        | .659                  |
| <b>Animals can serve as disease sentinels for human health</b>  | <b>Veterinary student</b>  | 47       | 4.83        | .481                  |
|   | <b>Medical student</b>     | 113      | 4.31        | .682                  |
| <b>Humans and animals are not susceptible to many of the same chronic diseases</b>                              | <b>Veterinary student</b>  | 47       | 1.66        | .700                  |
|   | <b>Medical student</b>     | 113      | 2.69        | 1.018                 |
| <b>Zoonotic diseases do not pose a serious threat to the health of the human population</b>                     | <b>Veterinary student</b>  | 47       | 1.36        | .819                  |
|   | <b>Medical student</b>     | 113      | 2.01        | .950                  |
| <b>It is important to monitor animal populations in order to detect disease outbreaks as soon as they occur</b> | <b>Veterinary student</b>  | 47       | 4.57        | .580                  |
|   | <b>Medical student</b>     | 111      | 4.07        | .583                  |
| <b>Many pathogens that get people sick also get animals sick</b>  | <b>Veterinary student</b>  | 47       | 4.47        | .747                  |
|   | <b>Medical student</b>     | 110      | 3.73        | .800                  |
| <b>Being knowledgeable in One Health will be important to my professional practice</b>                          | <b>Veterinary student</b>  | 47       | 4.36        | .673                  |
|   | <b>Medical student</b>     | 110      | 3.68        | .918                  |

defined it when asked to write their own definition. A correct definition of one health was fairly leniently assessed. Inclusion criteria included words such as collaborative, integrated approach, multi-professional/intersectoral. At the very least students had to understand that veterinarians and physicians should work together. Based on those criteria 76% of veterinary students (n=42) correctly defined One Health, but only 21% of those (n=9) were aware of an environmental component. Interestingly, fewer medical students successfully defined one health (30.8%, n=41), but for those

correct definitions, 36.5% (n= 15) included an environmental component.

### **ANALYSIS OF LIKERT SCALE RESPONSES**

Tables 3- 8 present comparisons of the means for student responses to statements assessing their knowledge of zoonoses and infectious diseases, biomedical and comparative research, environmental health, human-animal bond and their perceptions of effective health care delivery. All differences in means between

veterinary and medical students were statistically significant to a p value of < 0.01.

Table 3 shows that, compared to medical students, veterinary students were statistically significantly more likely to strongly agree that:

- animal health can impact human health
- animals can serve as disease sentinels for human health
- humans and animals are susceptible to many of the same chronic diseases
- zoonotic diseases pose a serious threat to the health of the human population
- it is important to monitor animal populations in order to detect disease outbreaks as soon as they occur
- many pathogens that get people sick also get animals sick
- being knowledgeable in One Health will be important to their professional practice

Table 4 shows that, compared to medical students, veterinary students were statistically significantly more likely to strongly agree that:

- research into obesity treatment and prevention translates well between animals and people
- collaborative research between human and animal health workers in the field of obesity can result in more rapid research advances.

**Table 5. Comparison of Means for Environmental Health Statements**

| Environmental Health  |                    | N   | Mean | Std. Deviation |
|---|--------------------|-----|------|----------------|
| Climate change can have direct and indirect effects on human and animal health  | Veterinary student | 47  | 4.57 | .542           |
|   | Medical student    | 110 | 4.07 | .875           |
| Population encroachment can cause previously isolated diseases to come into contact with naïve human and animal populations | Veterinary student | 47  | 4.55 | .653           |
|   | Medical student    | 112 | 4.12 | .732           |

Table 5 shows that, compared to medical students, veterinary students were statistically significantly more likely to strongly agree that:

- Climate change can have direct and indirect effects on human and animal health
- Population encroachment can cause previously isolated diseases to come into contact with naïve human and animal populations.

**Table 4. Comparison of Means for Biomedical and Comparative Research Statements**

| Biomedical and Comparative Research Statements  |                    | N   | Mean | Std. Deviation |
|---|--------------------|-----|------|----------------|
| Research into obesity treatment and prevention translates well between animals and people   | Veterinary student | 47  | 4.00 | .885           |
|   | Medical student    | 111 | 3.24 | .765           |
| Collaborative research between human and animal health workers in the field of obesity can result in more rapid research advances | Veterinary student | 47  | 4.64 | .568           |
|   | Medical student    | 111 | 3.81 | .733           |

**Table 6. Comparison of Means for Human Animal Bond Statements**

| Human Animal Bond   |                    | N   | Mean | Std. Deviation |
|---|--------------------|-----|------|----------------|
| Statements  |                    |     |      |                |
| People who own pets tend to be happier than those who do not          | Veterinary student | 47  | 4.11 | .729           |
|   | Medical student    | 114 | 3.46 | .854           |
| Pets can serve important roles in helping patient recovery and morale | Veterinary student | 47  | 4.66 | .522           |
|   | Medical student    | 111 | 4.20 | .685           |

Table 6 shows that, compared to medical students, veterinary students were statistically significantly more likely to strongly agree that:

- people who own pets tend to be happier than people who do not
- pets can serve important roles in helping patient recovery and morale

Responses for these statements were also stratified based on current ownership of pets. Out of a total of 188 respondents, 52.7% (veterinary and medical students) owned pets.

Table 7 shows that, compared to non pet owners, students who own pets were statistically significantly more likely to agree that:

- people who own pets tend to be happier
- pets can serve important roles in helping patient recovery and morale

Table 8 shows that, compared to medical students, veterinary students were statistically significantly more likely to strongly agree that:

- their role as healthcare providers is not just to maintain health but to improve it and also not just to fight disease but prevent it
- collaboration between human and animal healthcare providers is important for protecting Public Health

## CONCLUSION

This study showed that there were significant differences between veterinary and medical students in their ability to define One Health and in their appreciation of One Health concepts. These results seem to reflect the professional differences that may be impacting the adoption of the One Health approach in the current public

**Table 7. Comparison of Means for Human Animal Bond Statements Stratified by Ownership of Pet(s)**

|   | Do you own any pets? | Std. |      |           |
|---|----------------------|------|------|-----------|
|   |                      | N    | Mean | Deviation |
| People who own pets tend to be happier than those who do not          | 1 Yes                | 137  | 3.93 | .769      |
|   | 2 No                 | 114  | 3.31 | 1.014     |
| Pets can serve important roles in helping patient recovery and morale | 1 Yes                | 136  | 4.50 | .596      |
|   | 2 No                 | 113  | 4.14 | .766      |

**Table 8. Comparison of Means for Perceptions of Effective Health Care Delivery Statements**

|   |                     | Effective Health Care |      |                |
|---|---------------------|-----------------------|------|----------------|
|   | Delivery Statements | N                     | Mean | Std. Deviation |
| <b>Our role as healthcare providers is not just to maintain health, but improve it</b>                            | Veterinary student  | 46                    | 4.80 | .453           |
|   | – Medical student   | 111                   | 4.40 | .704           |
| <b>Collaboration between human and animal health care providers is important for protecting the public health</b> | Veterinary student  | 47                    | 4.64 | .568           |
|   | – Medical student   | 110                   | 4.02 | .704           |
| <b>Our role as healthcare providers is not just to fight disease, but prevent it</b>                              | Veterinary student  | 46                    | 4.83 | .486           |
|   | – Medical student   | 112                   | 4.48 | .697           |

health arena. It suggests that greater emphasis should be paid to medical curricula to further advance and apply the One Health approach.

Strengthening education regarding the environmental component of One Health is also needed.

A limitation of this study was that the student knowledge of One Health was not assessed before taking the IPE course. It is hard to appreciate the educational value of IPE as it relates to One Health and quantify whether students were knowledgeable before the IPE course. A future study should thus include a pre and post test of knowledge, attitudes and beliefs.

Despite this shortcoming, Western University should be commended for taking the step to expose students from all health professions to One Health through the IPE program. It is clear that having students from various professions in the same room and discussing common health issues is already a first step towards greater intersectoral collaboration. In real life, health professionals rarely have the opportunity to interact at conferences and meetings, to collaborate on projects or to communely address health issues.

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