Teaching the Concepts of One Health

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Summary

To respond to increasingly pressing local, national and global health needs we must further efforts to develop innovative ways of fostering truly integrative thinking and interdisciplinary approaches that perfuse all aspects of veterinary education, practice and research. Veterinary medicine must become a leader in One Health (OH), and this may be the single most important new opportunity for the profession for the foreseeable future and in particular for academic veterinary medicine [1].

The concept of OH is reported to be understood by the majority of veterinary graduates in NZ and South Asia but there is little or no specific inclusion of OH concepts or practicums in undergraduate curricula, or coordination or collaboration on undergraduate teaching of veterinary and medical/ public health students. Perceived attainment of OIE Day-1 Competencies (OIED1C) related to OH by veterinary graduates is highly variable in the region and substantial opportunity exists for revising curricula and pedagogies to improve competencies and more specifically develop OH understanding.

Keywords

One Health, veterinary education, zoonotic disease, food-borne disease, food hygiene, OIE Day-1 Competencies.

Introduction

The OH concept is a worldwide strategy for expanding interdisciplinary collaborations and communications in all aspects of health care for humans, animals and the environment [2]. The OIE has been one of the global leaders in recognising that an understanding of the principles of OH should be at the core of veterinary education, and the North American Veterinary Medical Education Consortium (NAVMEC) recommended that all veterinary students achieve competency in OH related to the intersection of animal, human and environmental health before graduation [1].

This paper describes the approach to teaching the concepts of OH at Massey University (MU) in New Zealand (NZ), and results of a survey of veterinary colleges in South Asia on interdisciplinary engagement and incorporation of OH in undergraduate and post-graduate teaching and research, and how OIE Day-1 Competencies (OIED1C) related to OH pertaining to zoonoses (ZD), food-borne diseases (FBD) and food hygiene (FH) [3], are taught in undergraduate teaching programs.

Teaching One Health at Massey University

Veterinary teaching in NZ has a core program of integrative and problem-based learning (PBL) that runs through all years of the curriculum. Input into this program is provided by veterinary, public health, animal science, agricultural and environmental science, biosecurity, animal welfare and bioethics, psychology and communications practitioners and researchers, underpinned by a strong culture of interdisciplinary inquiry and research. An active OH research network involves academics and researchers from the MU institutes of Veterinary, Animal and Biomedical Science, Fundamental Sciences, Advanced Studies, and the Centre for Public Health Research, the University of Otago Medical School, and the NZ Government Institute of Environmental Science and Research. A recent major OH initiative is the launch of the NZ Food Safety Science and Research Centre in 2016, hosted by MU in partnership with six other research organisations including both Faculties of Medicine in NZ, which will provide opportunities for interdisciplinary education and research in food safety, FBD and FH.

Subjects that include topics on ZD, FBD and FH are included in PBL, taught in all 5 years of the undergraduate program, and constitute an estimated 0.6%, 4.2%, 5.8%, 13.0%, 10.0% of the total content taught in years 1, 2, 3, 4 and 5 respectively (average 6.7%). OIED1C are assessed as attained by 100% of NZ veterinary graduates.

MU has developed Master's degree and professional development programs educating medical doctors and veterinarians together across South Asia using a OH approach to epidemiology, biosecurity and disease control policy design and economic evaluation for priority ZD. The core design principle is "education into action", combining cohort-based Master's degree education with the strengthening of multi-sectoral collaborative frameworks and the practical application of acquired knowledge and skills to epidemiological investigation and disease control policy evaluation. This integrated approach builds both individual and institutional capacity, fosters collaboration between institutions and sectors nationally and regionally, and drives research to generate information used to inform policy and decision making.

Since 2010, MU has delivered three such capacity building programs funded by the European Union (EU) and World Bank, each 2–4 years in duration, including postgraduate qualifications for 108 public health, animal health and wildlife health professionals in Afghanistan, Bangladesh, Bhutan, India, Nepal, Pakistan, Sri Lanka, China and Mongolia, and involving more than 2,200 participants in ZD investigations and policy evaluations.

Teaching One Health in South Asia

A survey was sent to 23 state veterinary colleges or universities in the South Asian countries of Afghanistan, Bangladesh, India, Nepal, Pakistan and Sri Lanka, identified through the One Health Network South Asia established during the Regional Training in Animal and Human Health Epidemiology in South Asia program implemented by MU from 2010–2014 (funded by the EU), or selected within these countries from the AVMA-listed veterinary colleges in the region.

Responses were received from 2/2 colleges surveyed in Afghanistan, 2/3 in Bangladesh, 6/12 in 12 states in India, 2/2 in Nepal, 3/3 in Pakistan and 1/1 in Sri Lanka (total 16/23 = 70%). The estimated percentage of the total degree program content that specifically related to ZD, FBD and FH averaged 6.1% (median 4.7%, range 0.3%–15.3%). Subjects relating to ZD, FBD and FH were most commonly taught in four of the five years of study, and in almost all programs (93%) in Years 3 and 5, with the greatest percentage of content being taught in Year 3.

Use of a PBL approach for teaching ZD, FBD and FH was reported by 7/16 colleges. Interdisciplinary teaching of veterinary and medical or public health students was reported by 5/16 colleges, whilst 5/16 provided opportunities for veterinary students to participate in collaborative investigations related to public health or wildlife. OH postgraduate certificate, diploma or Master's degree programs were offered by 2/16 colleges, and 9/16 reported conduct of OH research.

The estimated percentage of graduates that attained the specific OIED1C related to ZD, FBD and FH [3] reported by the survey respondents is summarised in Table 1. Overall, 53–87% of colleges estimated >50% of their graduates attained the OIED1C related to these subjects.

All respondents reflected a positive awareness and attitude towards the OH concept and its importance in undergraduate veterinary education. All reported that the concept of OH was understood by graduates but to a variable degree, and that the practical applications were much less well understood at the undergraduate level. A strong OH focus was apparent from the survey responses from 4/16 colleges but less so for the others. Comments generally reflected: little or no coordination or collaboration on undergraduate teaching of veterinary and medical students; both need and support for including for-credit or non-credit courses specifically about OH concepts, case studies and practical experience in the undergraduate curriculum; support for collaborative teaching and projects for undergraduate veterinary and medical students, and for greater exposure of undergraduate students to OH activities locally, nationally and internationally.

Conclusions

The concept of OH is understood by the majority of veterinary graduates in NZ and South Asia but there is little or no specific inclusion of OH concepts or practicums in undergraduate curricula, or coordination or collaboration on undergraduate teaching of veterinary and medical or public health students. Perceived attainment of OIED1C related to OH by veterinary graduates is highly variable. Significant opportunity exists for revising curricula and pedagogies to more specifically include OH concepts and their application and improve competencies.

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References

1. North American Veterinary Medical Education Consortium (NAVMEC) (2011). Roadmap for Veterinary Medical Education in the 21st Century. NAVMEC, Washington DC. Available at: www.aavmc.org/roadmap (accessed on 3 June 2016).
2. One Health Initiative. At http://www.onehealthinitiative.com/about.php (accessed on 3 June 2016).
3. World Organisation for Animal Health (OIE) (2012). OIE recommendations on the competencies of graduating veterinarians ('Day 1 graduates') to assure National Veterinary Services of quality. OIE, Paris. Available at: www.oie.int/support-to-oie-members/veterinary-education/ (accessed on 3 June 2016).

Table 1. **Percentage of South Asian veterinary colleges surveyed that estimated <25%, <50%, >50%, >75% or 100% of their graduates attained the Day-1 Competencies shown**

OIE Day-1 Competency related to zoonoses, food-borne disease and food hygiene [3]	Estimated % graduates achieving competency				
	<25 %	<50 %	>50 %	>75 %	100 %
a) Identify the clinical signs, transmission and pathogen associated with common zoonotic and food-borne diseases	7	27	80	67	7
b) Use or explain the use of current diagnostic and therapeutic tools for common zoonotic and food-borne diseases	20	33	73	33	7
c) Understand the implications of common zoonotic and food-borne diseases for human health and know where to find up-to-date information	13	20	87	47	7
d) Understand regulatory implications of common zoonotic and food-borne diseases and pathogens and know where to find up-to-date and reliable information	20	40	67	40	7
e) Understand and explain on-farm food safety practices	13	33	73	27	7
f) Participate in slaughter inspection, including ante-mortem, post-mortem and humane slaughter	27	47	60	33	13
g) Understand & explain integration of animal health controls, public health & the role of veterinarians, physicians, public health practitioners & risk analysts to ensure food safety	13	53	53	27	7