



One Health in food safety and security education: A curricular framework



J. Angelos*, A. Arens, H. Johnson, J. Cadriel, B. Osburn

Western Institute for Food Safety and Security, University of California–Davis, 1477 Drew Ave., Suite 101, Davis, CA 95618, United States

ARTICLE INFO

Article history:

Received 23 August 2015

Received in revised form

10 November 2015

Accepted 23 November 2015

Keywords:

Food safety

Food security

One Health

Curriculum

Framework

Sustainability

Food systems

Ecosystem health

ABSTRACT

The challenges of producing and distributing the food necessary to feed an anticipated 9 billion people in developed and developing societies by 2050 without destroying Earth's finite soil and water resources present extremely complex problems that lack simple solutions. The ability of modern societies to adequately address these and other food-related problems will require an educated workforce trained not only in traditional food safety, security, and public health, but also in other areas including food production, sustainable practices, and ecosystem health. To help address the need for such an educated workforce, a curricular framework was developed to assist those tasked with designing education and training for future food systems workers.

One sentence summary: A curricular framework for education and training in food safety and security was developed that incorporates One Health concepts.

© 2015 The Authors. Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

1. Introduction

The challenges of producing and distributing the food necessary to feed an anticipated 9 billion people in developed and developing societies by 2050 without destroying Earth's finite soil and water resources present extremely complex problems without simple solutions. The ability of modern societies to effectively address these and other food related problems will require an educated workforce trained not only in traditional food safety, security, sanitation, hygiene, and public health, but also in other areas including food production, sustainable practices, waste management, and ecosystem health. Furthermore, success in dealing with complex food related problems will be best achieved through ways that embrace a collaborative One Health approach for effective problem-solving.

One Health approaches to problem-solving are best described as being transboundary or cross-disciplinary. Inherent in a One Health approach is the idea that experts working together to solve complex problems will be more successful than experts working within an isolated field. The need for using One Health approaches in solving complex societal health problems has been well documented [1–4].

Modern food safety problems are complex in nature and do not have simple solutions; as such, they have been described as 'wicked problems' [5]. Finding effective solutions to these wicked problems will require a One Health approach that considers not only the problem itself, but also the interconnected web of upstream factors related to the particular problem [5].

Education in the area of food safety has traditionally embraced disciplines of microbiology, sanitation, hygiene, food science, and public health as well as good agricultural practices, good manufacturing practices, and implementation of principles of risk assessment through hazard analysis and critical control points. These subjects have been critically important in provisioning of safe plant and animal-based food sources to modern societies. Nevertheless, recent examples have emerged wherein solutions to particular food safety problems required cross-disciplinary approaches that involved researchers and subject matter experts from diverse fields, e.g. wildlife specialists, veterinarians, epidemiologists, toxicologists, and microbiologists [6,7].

To our knowledge no well-defined curricular framework exists for guiding education and training in food safety and security that embraces the many diverse disciplines that are involved in production and provisioning of safe and secure food supplies. To help address this need we designed a One Health in food safety and security curricular framework to assist those tasked with designing education and training for future food systems workers including

* Corresponding author. Tel.: +1 530 752 7407; fax: +1 530 752 0414.
E-mail address: jaangelos@ucdavis.edu (J. Angelos).

Food Safety/Security Leadership & Management		Food Safety/Security Foundations		Suggested Foundational Sciences	
Subtopic	Major Topic	Subtopic	Major Topic		
Agricultural Dynamic Management	Core	Global Food Supply	Local and Global Food and Feed Supply and Safety	Cell Biology	
Risk Analysis		Regulatory Oversight of Food & Feed Safety		Cross Cultural Competency/Anthropology	
Epidemiology					
Biosecurity	Food & Feed	Food- and Waterborne Illnesses	Food- and Waterborne Illnesses: Sources & Prevention	Economics	
Food Safety Plans		Public Health		Food science	
Pest Management		Health & Hygiene		Genetics (animal & plant)	
Sanitation & Disinfection		Sanitation & Disinfection		Inorganic Chemistry	
Feed Manufacturing		Food & Feed Adulterants and Contaminants		Math	
Ecosystem Monitoring	Agriculture & Ecosystem	Pre- and Post-Harvest Food Safety	Food Security	Microbiology	
Water & Waste Management		Food Safety Diagnostics		Molecular Biology	
Impact Assessment		Tissue Residues & Antibiotic Resistance		Nutrition (animal & human)	
Habitat Conservation		Emerging, Zoonotic & Regulatory Diseases		Organic Chemistry	
Sustainable Agricultural Practices		Threats to Food Availability		Parasitology	
Poverty and Food	Food & Society	Animal & Plant Production	Food Production	Pharmacology	
Susceptible Populations		Genetically Modified Organisms		Plant Biology	
Agronomics		Workplace Safety		Sociology	
		Animal Welfare		Statistics	
		Ecosystem Contamination		Toxicology	
		Ecosystem Services	Ecosystem	Virology	
One Health Core					

Fig. 1. A curricular framework for food safety and security education and training that incorporates principles of One Health.

food sanitarians, producers, manufacturers, researchers, teachers, and policy-makers.

2. Curricular framework design

During the design phase, brainstorming exercises were conducted to identify subjects, issues, concepts, and/or ideas related to food safety and security when viewing these subjects in the broadest-possible context. The identified subjects, issues, concepts and ideas were subsequently categorized into 3 tiers: basic sciences, food safety/security foundations, and food safety/security leadership & management. Suggested foundational sciences include traditional sciences as well as social sciences (see Fig. 1). Education and training in the food safety/security foundations (lower tier) is designed to provide awareness-level knowledge in a variety of different topics. Food safety/security leadership & management (upper tier) education and training will provide more in-depth understanding of problems and their related causes such that learners gain knowledge and skills needed to develop solutions to complex problems surrounding with the provisioning of

safe and secure food supplies amidst finite resources. The importance of sustainability of planetary resources for food production is stressed throughout this framework through topical material in ecosystem health and sustainable farming practices.

Food safety/security foundations contains 5 major topics: (1) local and global food and feed supply and safety; (2) food- and waterborne illnesses: sources and prevention; (3) food security; (4) food production; and (5) ecosystem. Major topics in food safety/security leadership & management are: (1) core; (2) food & feed; (3) agriculture & ecosystem; and (4) food & society. Subtopics within each of these major topics are arranged according to subject matter.

Concept statements accompany each subtopic within food safety/security foundations and food safety/security leadership and management (see Tables 1 and 2); these succinctly describe what a student should know following learning within the listed subtopic. For example, the concept statement associated with 'Food- and Waterborne Illnesses' in the major topic of 'Food- and Waterborne Illnesses: Sources & Prevention' is: "Students know the causes of food- and waterborne illnesses in different food types, and resulting public health impacts."

Download English Version:

<https://daneshyari.com/en/article/8497571>

Download Persian Version:

<https://daneshyari.com/article/8497571>

[Daneshyari.com](https://daneshyari.com)