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Development and Evaluation of an On-Line Educational Module for Volunteer Leaders on Bio-Security in Washington State 4-H Livestock Projects

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Abstract: A module on disease prevention was created for 4-H volunteer leaders who work with livestock projects in Washington to better prepare them to teach youth about bio-security and its importance in 4-H livestock projects. Evaluation of the module and usage statistics since the module's debut were collected and evaluated. The module increases awareness of disease prevention and provides practical approaches to implementation of bio-security, but is underused by the target audience, possibly due to leaders' lack of computer access, time, or awareness of the module. Promotion of the module and incentives must be explored to increase module usage.

Introduction

4-H livestock projects present disease transmission risks that can potentially have negative impacts on both livestock and public health (Amass, Schneider, & Kenyon, 2004). Raising, transporting, and comingling livestock for exhibitions present risks for spreading diseases such as contagious ecthyma, ringworm, and infectious pododermatitis. Additionally, more serious diseases, such as bovine viral diarrhea, porcine circovirus, and zoonotic diseases such as *Escherichia coli* O157:H7 and *Cryptosporidium* species have the potential to spread (National Association of State Public Health Veterinarians, 2009). Livestock disease outbreaks and zoonotic disease transmission episodes remind us of the need for more aggressive disease prevention strategies to be implemented in 4-H livestock project commingling situations.

Disease transmission among livestock and to people can be reduced by implementation of bio-security practices. These practices are preventive measures taken to minimize the risk of introducing infectious disease to an animal population and to protect human consumers from disease-causing agents. Within Extension, 4-H youth development programs depend heavily upon adult volunteers to provide hands-on instruction, support, and guidance to youth (VanWinkle, Busler, Bowman, & Manoogian, 2002; Singletary, Smith, & Evans, 2006). There are many sources for information on these bio-security practices targeting producers, veterinarians, and others (Moore, Merryman, Hartman, & Klingborg, 2008), but none designed specifically for 4-H volunteer leaders who work with livestock projects (Stevenson et al., submitted for publication).

It is increasingly evident that propagation of livestock disease is detrimental to modern food production practices and presents health problems at the interface between animals and humans (Otte et al., 2007). Implementation of preventive practices by those who work closely with livestock is essential for containment of diseases in high-risk situations such as 4-H livestock activities. The goal of this project was to develop, deliver, and evaluate the effectiveness of an on-line educational module for volunteer leaders on the topic of bio-security. This project aims to educate leaders about bio-security and its importance in 4-H livestock projects, facilitating education of youth involved in livestock projects.

Methods

A three-part needs assessment for an on-line educational module about bio-security designed specifically for 4-H volunteer leaders who work with livestock projects was completed prior to development of a module (Stevenson et al., 2011). The Washington State University Institutional Review Board determined that this needs assessment satisfied the criteria for exempt research (IRB # 10453). The prospective audience for which the module was developed owns livestock and is between the ages of 36 and 55, with the highest academic degrees reported as a high school diploma or bachelor's degree. This was the most represented demographic of statewide volunteer leaders obtained in the needs assessment.

The most important attributes of an on-line module mentioned by leaders were interactivity, ease of use, and usefulness as a resource for teaching youth. Extension faculty and staff identified hand washing, boot disinfection, vaccinations, limiting contact between animals from different locations, limiting contact between animals and the public, quarantine of newly acquired animals, and insect and pest control as topics to include in an educational module. The on-line module was therefore designed around these attributes and topics.

The first draft of the module entitled "Disease Prevention in 4-H Livestock Projects: Ensuring the health of people and livestock by implementation of bio-security practices" was created based on the results of the needs assessment and target audience. The curriculum consists of an introduction and sections on livestock diseases, bio-security practices and implementation of bio-security, activities for youth, a summary, and a self-test. It was designed in PowerPoint (2007) with the Adobe$^{\hat{A}®}$ Presenter add-in and published using Adobe$^{\hat{A}®}$ Acrobat$^{\hat{A}®}$ Connectâ ¢ Pro. The draft of the module was reviewed in full length, which is approximately 1 hour, by a nine-member committee formed specifically for the development of this module (authors of this article).

Following suggested revisions and upon approval of the project committee, the module was published on the World Wide Web and is currently maintained on Washington State University's server. The module was announced in 4-H Tuesday e-news (a statewide electronic announcement list accessed by 4-H program participants and university faculty and staff) and through a statewide 4-H animal science list serve and can be accessed through WSU Extension's 4-H Youth Development Program website <http://4h.wsu.edu/volntr/elearning.htm> or through WSU Veterinary Medicine Extension's website <http://vetextension.wsu.edu/programs/4-H/index.htm>.

Evaluations of the on-line course were conducted at Staff Program Days at which 4-H Youth Development Program staff were able to access and familiarize themselves with the program, enabling them to present the module as a tool to volunteers in their county. Evaluations conducted at these events asked participants to indicate their agreement with statements concerning the module, evaluate module attributes, and provide written feedback.

Access to the on-line module requires a brief registration requiring an email address and Adobe$^{\hat{A}®}$ Acrobat$^{\hat{A}®}$ Connectâ ¢ Pro password set-up. Module usage tracking was established to collect each participants name, county, the amount of time they accessed the course, and their self-test score. The tracking data collected during registration can be used to document leaders' completion of the course. This feature provides verification for individual clubs or counties who decide to require participation by their leaders and is provided because faculty and staff interviewed during the needs assessment felt that making the module mandatory would motivate leaders to participate (Stevenson et al., 2011).

Although the purpose of creating an on-line module was to provide an educational tool that could be accessed from leaders' homes or other internet sources, it was recognized that some leaders would not have

Internet access. Therefore, a limited number of CD versions of the module were distributed throughout Washington as an alternative to accessing the module on-line.

Results

Module evaluations completed by 4-H staff indicate the module effectively increased awareness of the importance of disease prevention for 4-H livestock projects (23 out of 24 evaluators agreed) and understanding of livestock disease transmission projects (all evaluators agreed) (Table 1). The course provided practical approaches to disease prevention (all evaluators agreed) and promoted implementation of bio-security practices (all evaluators agreed). Most important, all evaluators agreed (n=24) they would take this information to youth in their county.

Table 1.
Staff Agreement with Statements Regarding Knowledge or Competencies after Completing the Disease Prevention Module (n=24)

	Responses				
As a Result of this Module:	**Strongly Agree**	**Agree**	**Disagree**	**Strongly Disagree**	**No Response**
I am more aware of the importance of disease prevention for 4-H livestock projects.	12	11	1	0	0
I can list three diseases that we can prevent by improving bio-security.	4	19	1	0	0
I better understand how livestock diseases are transmitted.	10	14	0	0	0
I am more confident in my ability to assess animal health.	5	13	6	0	0
I am better prepared to teach youth about disease prevention.	7	16	0	0	1
I can better identify where disease risks occur.	9	15	0	0	0
I can list three practical approaches to disease prevention.	11	13	0	0	0
I will make better decisions about reducing the risk of disease	10	13	0	0	1

transmission.					
I will implement bio-security practices in 4-H livestock activities.	11	13	0	0	0
I am more motivated to learn other steps in disease prevention.	6	17	1	0	0
I will take this information to youth in my county.	13	11	0	0	0

Overall the course was ranked as excellent and good for the attributes that it attempted to achieve (Table 2). An area noted where improvements could be made was in the level of interactivity.

Table 2.
Staff Rating Regarding the Disease Prevention Module Attributes (n=24)

	Responses				
Module Attributes	**Excellent**	**Good**	**Fair**	**Poor**	**No Response**
Appropriateness of language for the audience (4-H volunteer leaders)	12	10	0	0	1
Ease of use	13	6	3	0	2
Level of mental engagement	11	10	1	0	2
Level of visual engagement	12	8	2	0	2
Level of interactivity	6	10	6	0	2
Overall module rating	12	10	0	0	2

The course usage report listed 108 attendees approximately 11 months following World Wide Web publication. Of these attendees, 76 were from counties in Washington (5% of the over 1,500 volunteers in Washington State enrolled as livestock leaders in the 2007-2008 4-H year). The quiz was completed and passed by 17 leaders, but was not attempted by 24. Thirty-five individuals failed the quiz or left it incomplete.

Discussion

Based on course evaluations, the on-line Disease Prevention Module effectively increased awareness of the importance of disease prevention for 4-H livestock projects and was found to be easy to use, mentally and visually engaging and to use an interactive format. Faculty and staff reported that they will introduce this to leaders in their counties and felt that it will be a great tool to prepare leaders to teach youth about disease prevention.

Review of the module usage statistics to date reveals that the module is being underused; only 5% of leaders in Washington have accessed it. When asked in the program needs assessment to identify barriers to using an on-line educational module, leaders most frequently mentioned lack of computer access and lack of time and that the module might be too difficult (Stevenson et al., 2011). This is consistent with a previous report that connectivity and the lack of competencies associated with technology are obstacles in using distance education (Dromgoole & Boleman, 2006). It is unknown whether these barriers solely contributed to the lack of use or whether other factors contributed. Leaders specifically reported that they were accepting of on-line training as a method for gaining new skills and that the strengths and advantages of on-line learning overwhelmingly outweighed the disadvantages and weaknesses (Kalson, Lodl, & Greve, 2005).

A possible explanation for the module's lack of use is that it was not adequately promoted to the target audience. A previous study indicated that several methods are required to reach the intended Extension audience including promotion through the newspaper, mail, Extension office, partner organizations, and word of mouth (Jones, Jacobs, Yarrow, & McPeake, 2008). Only an e-newsletter, a limited e-mail list serve announcement, and word of mouth were used to promote the disease prevention course. Effective marketing of educational programs requires the public be informed about the program, as well as provided information on how it can satisfy a need, where it can be purchased, and how much it will cost (Rohs, 1988). Potential opportunities to inform leaders about the course, explain why disease prevention is important, and direct them on how to access the module at no cost to them are currently being pursued.

Increasing usage of the disease prevention course may be possible through additional motivators. Rewards serve as key motivators for volunteer participation (Hiller, 1998). An example of a reward that could be used to increase leader usage of the module is the addition of a certificate generated upon completion of the module and a passing score on the quiz that could be printed by the leader. The desire for recognition is commonly used in volunteer leader programs; however, it can sometimes trivialize the gravity and sentiment of the award, making it less desirable (Fritz, Karmazin, Barbuto, & Burrow, 2003). Extension staff are therefore strongly encouraged to vary ways and contexts in which they recognize their volunteers (Fritz, Karmazin, Barbuto, & Burrow, 2003).

It is possible that a better motivator for completion of the module by leaders is the prospect that the leader will gain something from the module. In a study evaluating county-based recognition models, direct recognition from 4-H members was identified as the most meaningful recognition source for leaders (Culp & Schwartz, 1998). In our needs assessment, leaders reported they were motivated if the module would ultimately help youth or provide activities that they could do with youth (Stevenson et al., 2011). As a result, a section with activities for youth was included in the module, which will benefit leaders and youth alike. If leaders were made aware of this resource as part the module and how it can benefit youth and result in recognition by 4-H members themselves, they may be more inclined to access the module.

Conclusion

A learning module on disease prevention in 4-H livestock projects was created due to the potential disease transmission risks livestock projects present to animal and public health. The module reported here possesses many of the attributes identified as important to leaders who work with livestock projects for an on-line educational module. The module has been underused by the target audience since its introduction. Because of the low usage by the target audience of leaders in Washington, possibly due to inadequate promotion, efforts to increase exposure to and accession of the module will be pursued.

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