

Appendix 1—Evidence for Documented Need

While raising and showing animals have an overall positive impact on youth and the community, many zoonotic diseases can affect exhibitors and spectators, especially when people have close contact with animals. Several animal related disease outbreaks, such as variant influenza A virus of swine (H3N2v), or enteric disease outbreaks caused by pathogens such as *E. coli* and *Campylobacter*, have been associated with fairs within the past few years. In many instances, these events resulted in severe illness in youth. Younger children are at an increased risk for complications of zoonotic disease infections.

Youth livestock projects can also present disease transmission risks to animals due to the comingling of various animals and animal species from different locations, further emphasizing the importance of biosecurity practices in all livestock activities. While many commercial farms implement biosecurity measures to reduce the risk of disease among animals, youth animal agriculture projects are generally reared on a smaller scale, involve closer contact with the animals, and have an increased opportunity for comingling of animals or sharing of equipment (Smith 2012). Subsequently, many national and state agencies, organizations, and institutions have identified biosecurity for animal agriculture settings as a subject of high priority.

Understanding disease risks and preventive measures is critical to reduce the occurrence of zoonotic diseases among youth associated with animal agriculture. Awareness of these risks can help youth to understand the importance of disease prevention for themselves, their animals, and the public. Additionally, teachers, volunteer leaders, and parents should understand the same disease risks to further reinforce measures needed to prevent zoonotic disease transmission (Stevenson 2011).

While programs addressing issues of food safety (e.g., Quality Assurance Programs) are currently available and often required for youth in agriculture, programs directly targeted at youth that address the link between biosecurity, animal health, and zoonotic disease risks are very limited. Providing web-based education can produce engaging results, with the advantage of ease of access and availability. Additionally, with the growth of 1:1 technology in school systems, web-based modules can be easily incorporated into the animal or human health topics of current agriculture or science curricula.

References

Smith MH, Meehan CL. Assessment of Bio-Security Risks Associated with 4-H Animal Science Exhibition Practices in California. *Journal of Extension*. 2012 June; 50(3). Available at <http://www.joe.org/joe/2012june/a10.php>. Accessed on 26 Jan 2016.

Stevenson JL, Moore DA, Newman J et al. Assessing the need for an on-line educational module for volunteer leaders on biosecurity in Washington State 4-H Livestock projects. *Journal of Extension*. 2011 June; 49(3). Available at <http://www.joe.org/joe/2011june/a9.php>. Accessed 26 Jan 2016.

Appendix 2—Evidence for Research-Based

The Center for Food Security and Public Health (CFSPH) at Iowa State University's College of Veterinary Medicine and the Iowa Department of Public Health collaborated to develop the "Excellence in Exhibition: Preventing Disease in Animals and People" online course. Agencies and associations that reviewed and approved the content of the course include the

- Iowa Department of Agriculture & Land Stewardship,
- Iowa State University Extension and Outreach,
- Iowa 4-H,
- Iowa FFA Association, and
- National Pork Board.

Additional content review and financial support were provided by the Council for State and Territorial Epidemiologists and the Centers for Disease Control and Prevention.

Several of the partner agencies and associations have participated in and led national zoonotic disease educational and policy development efforts.

Dr. Garvey, State Public Health Veterinarian and Deputy State Epidemiologist with the Iowa Department of Public Health (IDPH), was a member of the national committee, led jointly by the National Association of State Public Health Veterinarians (NASPHV) and National Assembly of State Animal Health Officials (NASAHO), that developed guidance on measures to minimize influenza transmission at swine exhibitions (available at http://www.nasphv.org/Documents/Influenza_Transmission_at_Swine_Exhibitions_2016.pdf). She also co-chaired a national committee that developed recommendations for prevention and control of *Coxiella burnetii* infection among humans and animals (available at http://www.nasphv.org/Documents/Q_Fever_2013.pdf).

Partner agencies and associations have a history of collaboration on zoonotic disease outreach and education. In response to the H3N2v cases in 2011 and development of national guidance, partners conducted joint outreach for exhibitors, fair boards, and local public health officials.

Beginning in 2009, the Iowa Department of Agriculture and Land Stewardship (IDALS) has organized an annual meeting with their department, the Iowa Department of Public Health, and the Iowa State Fair Committee. At the annual meeting, procedures for influenza surveillance at the State Fair are reviewed. Since 2009, any animal meeting the established case definition is immediately isolated and tested for influenza. Owner information is immediately provided to the Iowa Department of Public Health who interviews the animal owner to identify human illness; this interview occurs concurrently with animal testing to ensure that appropriate human testing can be completed without delay.

The CFSPH works to increase national and international preparedness for accidental or intentional introduction of diseases that threaten food production and/or public health. The CFSPH has been

developing online education since 2004. The CFSPH has a team of 14 veterinarians (most with Master of Public Health or PhD degrees) and 7 graphic design/IT specialists with years of experience developing and delivering online educational materials. The CFSPH is a well-respected authority on zoonotic disease education; the CFSPH has been developing zoonotic disease education for veterinarians and public health professionals since its establishment, with funding from the Centers for Disease Control and Prevention, in 2002. The CFSPH also works extensively with the USDA on infection control, biosecurity, and animal disease emergency response resources, as well as the management of the National Veterinary Accreditation Program. For more information about the CFSPH and to view other educational materials that the CFSPH has developed, please visit: <http://www.cfsph.iastate.edu>. The CFSPH was also named a World Organization for Animal Health (OIE) Collaborating Center for Day One Competencies and Continuing Education in May 2016.

All partners ensure content aligns with state and national guidelines and recommendations based on scientific research. Appropriately cited references for each lesson are included, and hyperlinked when applicable, at the end of that lesson.

Appendix 3—Evidence for Positive Youth Development Principles and Practices

The “Excellence in Exhibition: Preventing Disease in Animals and People” online course teaches the following life skills:

- Health—Living
 - o Healthy lifestyle choices
 - o Disease prevention
 - o Personal safety
- Head—Thinking
 - o Critical thinking
 - o Problem solving
- Head—Managing
 - o Planning/organizing
- Heart—Relating
 - o Communication

Youth must be **engaged in learning**. After completing the self-paced and self-guided interactive online course, they can apply what they have learned to their own animal projects at home and during exhibitions to build **a safe environment**. Youth also have an **opportunity for mastery** and may use elements of the course or supplemental material to teach other youth, leaders, or exhibition volunteers. Throughout the course, youth have the **opportunity to see themselves as an active participant in the future**, envisioning themselves doing the activities described with their own animal projects. They also have the **opportunity for self-determination**, and are encouraged to set goals for their animal projects as they learn best biosecurity practices.

Appendix 4—Evidence for Implementation, Accessibility

The Center for Food Security and Public Health (CFSPH) at Iowa State University’s College of Veterinary Medicine, in collaboration with the Iowa Department of Public Health and with support from the Centers for Disease Control and Prevention (CDC) and the Council of State and Territorial Epidemiologists created an online course to teach youth about zoonotic diseases, “Excellence in Exhibition: Preventing Disease in Animals and People”. The course is meant to encourage showmanship and animal involvement while keeping both animals and humans safe and healthy. The course is available to anyone free of charge at www.bluenotflu.org

Because of its online format, “Excellence in Exhibition: Preventing Disease in Animals and People” can be taken independently by anyone at any time, but is targeted at youth aged 13–18 years. The course is divided into six lessons. The first three lessons focus on specific zoonotic diseases, such as influenza, and ways to prevent transmission to humans and animals. Two additional lessons are presented as case studies, and the sixth lesson highlights agencies and career opportunities in One Health—the health of animals, people, and the environment. Estimated completion time for each lesson is 20–30 minutes. A certificate of completion with the student’s name, chapter or club, and county is provided at the end of each lesson. Additional resources are available to students and instructors on the course website, including

- Learning objectives for each lesson,
- Disease factsheets,
- Lesson worksheets,
- PowerPoints that contain the same information as the online course, and
- Biosecurity and disease prevention posters.

If the course is incorporated into a classroom or club setting with an instructor, additional material to aid in instruction is available. Included in the password-protected “club leader or instructor” area of the website are

- Learning objectives with answers for each lesson,
- Answers to supplemental worksheets, and
- A biosecurity and disease spread hands-on activity guide.

Learning objectives can also be used to help form questions for any exam if an instructor wishes.

The course was developed with software that aides in building interactive, responsive, and accessible e-learning courses.

Appendix 5—Evidence for Iowa Core Alignment

The content of “Excellence in Exhibition: Preventing Disease in Animals and People” online course aligns with the following Iowa Core Standards:

- Health Literacy 21.9-12.HL.1
 - o Demonstrate functional health literacy skills to obtain, interpret, understand and use basic health concepts to enhance personal, family, and community health.
- Health Literacy 21.9-12.HL.2
 - o Synthesize interactive literacy and social skills to establish and monitor personal, family and community goals related to all aspects of health.
- Health Literacy 21.9-12.HL.3
 - o Apply critical literacy/thinking skills related to personal, family and community wellness.
- Health Literacy 21.0.12.HL.5
 - o Demonstrate behaviors that foster healthy, active lifestyles for individuals and the benefit of society.
- Engineering, Technology, and Applications of Science HS-ETS1-1
 - o Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.
- Engineering, Technology, and Applications of Science HS-ETS1-3
 - o Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.
- Engineering, Technology, and Applications of Science HS-ETS1-4
 - o Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem.

References

Iowa CORE. Health Literacy. Available at <https://iowacore.gov/iowa-core/subject/21st-century-skills/10/health-literacy>.

National Health Education Standards, 2nd Edition. Joint Committee on National Health Education Standards. 2007. Available at https://sparkpe.org/wp-content/uploads/NHES_CD.pdf.

Next Generation Science Standards. Available at <https://www.nextgenscience.org/topic-arrangement/hsengineering-design>.