Journal of Extension
www.joe.org

February 2009
Volume 47 Number 1
Article Number 1TOT6

Return to Current Issue

Development of Interactive Multimedia Training Materials to Train Beef Packing Plant Workers in the Identification and Removal of Specified Risk Materials

R. D. Dewell
Post Doctoral Fellow
Department of Clinical Sciences, Animal Population Health Institute
Colorado State University
Fort Collins, Colorado
renee.dewell@colostate.edu

I. N. Roman-Muniz
Post Doctoral Fellow
Department of Clinical Sciences
Colorado State University
Fort Collins, Colorado
inromanm@lamar.colostate.edu

J. A. Scanga
Scientist
IEH Laboratories and Consulting Group
Seattle, Washington
jas@iehinc.com

A. D. Fails
Assistant Professor
Department of Biomedical Sciences, Neurosciences Division
Colorado State University
Fort Collins, Colorado
anna.fails@colostate.edu

L. R. Whalen
Professor
Department of Biomedical Sciences, Neurosciences Division
Colorado State University
Fort Collins, Colorado
rwhalen@lamar.colostate.edu

B. J. McCarthy
Research Associate
Animal Population Health Institute
Colorado State University
Fort Collins, Colorado
barbara.mccarthy@colostate.edu

T. W. Hoffman
Research Associate
Department of Animal Sciences, Center for Meat Safety and Quality
Colorado State University
Fort Collins, Colorado
travis.hoffman@colostate.edu

D. R. Woerner
Graduate Student
Department of Animal Sciences, Center for Meat Safety and Quality
Colorado State University
Fort Collins, Colorado
dale.woerner@colostate.edu

K. E. Belk
Professor
Department of Animal Sciences, Center for Meat Safety and Quality
Colorado State University
Fort Collins, Colorado
keith.belk@colostate.edu

G. C. Smith
Professor
Department of Animal Sciences Center for Meat Safety and Quality
Colorado State University
Fort Collins, Colorado
gary.smith@colostate.edu

M. D. Salman
Professor
Department of Clinical Sciences, Animal Population Health Institute
Colorado State University
Fort Collins, Colorado
m.d.salman@colostate.edu

Abstract: The meat packing industry plays an essential role in preventing potential BSE-transmitting tissues from being included in the human food supply. As part of a project funded through USDA:CSREES, researchers at Colorado State University collaborated with the beef packing industry to create teaching materials to assist beef packers as they train workers in identification, proper removal and handling of SRM tissues. Materials include computerized interactive multimedia training modules, plastinated specimens, and a full color visual reference guide. Materials were designed to accommodate the diverse educational backgrounds of slaughter plant workers, who may have limited formal education and English language skills.

Introduction

The meat packing industry plays an essential role in preventing potential BSE-transmitting tissues from being included in the human food supply. It is widely believed that humans who become infected with vCJD were probably exposed to prions via an oral transmission route (Bruce et al.; 1997; Cousens et al., 1997; & Will et al., 1996).

Following the first U.S. case of BSE identified in 2003, the USDA Food Safety Inspection Service added measures to ensure beef product wholesomeness. The most significant of these was an Interim Final Rule that was published on January 12, 2004 (and later published as a Final Rule with minor modifications on July 13, 2007) that called for removal of specified risk materials (SRMs) from food intended for humans. The term "SRM" refers to beef tissues that are thought to have the potential to transmit the BSE prion when they are fed to other cattle. Thus, these materials also represent a potential risk to humans if consumed.

SRMs have been defined as brain, skull, eye, dorsal root ganglia, trigeminal ganglia, spinal cord, and vertebral column from cattle 30 months of age or older, and the distal ileum and tonsils from all cattle regardless of age (Federal Register, 2005). It is imperative that packing plant workers are able to accurately identify and completely remove all beef SRM intended for human consumption. As a result of a USDA:CSREES grant, ″Compliance and training for specified risk material removal in beef meat products," teaching materials were created to assist beef packers as they train workers to identify, properly remove, and handle SRM tissues.

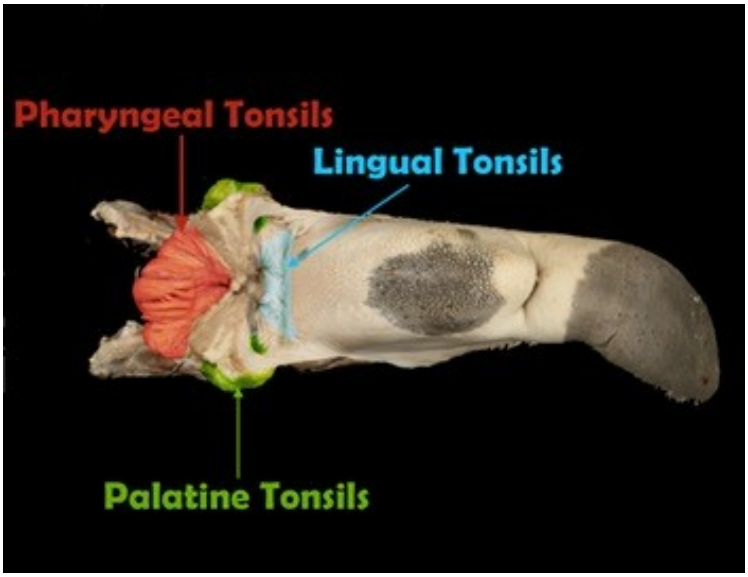
Development and Description of the Teaching Tools

Several educational resources were developed for use by beef packing companies as they train plant workers; materials include computerized interactive multimedia training modules, plastinated specimens, and a full color visual reference guide. Training materials were created after studying the USDA regulations regarding the removal of SRMs and obtaining input from research team members.

Researchers also participated in an SRM-removal training session at a slaughter plant to identify the optimal format and delivery methods for training slaughter plant workers. The curriculum team designed storyboards to aid with the development of presentations in a "movie" format as well as using a PowerPoint platform. Training materials were specifically designed to accommodate the diverse educational backgrounds of slaughter plant workers who may have limited formal education and English language skills.

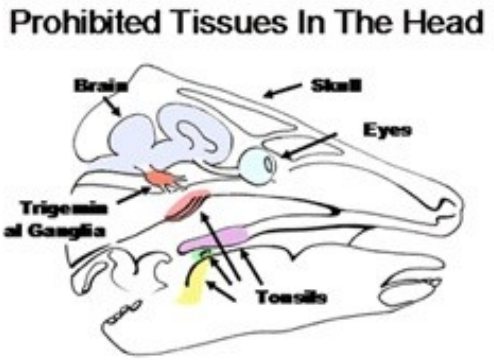
The training DVD in "movie" format was designed to teach packing plant workers in a manner likely to be comfortable and familiar to them. The focus of the DVD presentation is to instruct slaughter plant workers in the identification and removal of SRM. The choreographed DVD program, which was created using professional images (Figure 1) of all pertinent SRM, provides a brief background on BSE suitable for plant workers as well as labeled and detailed explanations of SRM. In addition, a PowerPoint presentation similar to the movie is incorporated in the DVD, and this presentation can be delivered to workers using an accompanying script or the presenter may deliver the PowerPoint using his/her own words. The DVD and PowerPoint presentations include testing sections to evaluate workers' understanding of presented materials. All materials may be viewed or presented in English and/or Spanish.

Figure 1.
Example of Materials Presented in the Training DVD



In addition to the movie and PowerPoint presentations, a visual reference guide (Figure 2) also was created to further illustrate and describe SRM. The full color 8 ½" x11" guide features professional photographs and detailed illustrations that provide labeled and very comprehensive training materials, as well as anatomical definitions for all SRM tissues. All pages are laminated, thus making it a useful training tool in all areas of the packing plant.

Figure 2.
Example of Materials Presented in the Visual Desk Reference



Bovine heads were preserved using a plastination process. Silicone plastination is a process by which biological specimens are impregnated with a silicon polymer. Specimens are fixed in low-concentration formaldehyde, then exposed to incrementally increased concentrations of cold acetone (up to 100% at -15 to -25°C) sufficient to completely dehydrate the tissues. Once fully dehydrated, tissues are ready for polymer exchange (impregnation). The specimen is submerged in a silicone polymer-catalyst solution under vacuum conditions and complete polymer exchange takes place over 3-5 weeks. The final step is to cure (harden and dry) the silicone.

Specimens prepared in this way are rendered dry and odorless and may be stored at room temperature indefinitely (von Hagens, Tiedemann, & Kriz, 1987). Such specimens are an important adjunct to other methods of instruction about anatomy (e.g., diagrams, photographs, and DVD instruction) because they are approximately normal size, retain normal shape, and can be handled by workers.

Applications and Recommendations

To date, more than 300 copies of the training materials have been distributed nationally and internationally. These resources have received positive reviews from the industry and can be effectively utilized in beef packing plants to train workers. Training materials have proven to be a valuable asset to the United States beef industry because they help demonstrate to the international community that the US is proactively involved in preventing contamination of meat products with SRMs. If you would like to obtain a copy of these materials, contact Dr. Keith Belk at <keith.belk@colostate.edu>.

References

Bruce, M. E., Will, R. G., Ironside, J. W., McConnel, I., Drummond, D., Suttie, A. L., et al. (1997). Transmissions to mice indicate that "new variant" CJD is caused by the BSE agent. *Nature*, 389, 498-501.

Cousens, S. N., Ziedler, M., Esmonde, T. F., De Silva, R., Willsmith, J. W., Smith, P. G., et al. (1997). Sporadic Creutzfeldt-Jakob Disease in the United Kingdom; analysis of epidemiological surveillance data 1970-1996. *British Medical Journal*, 315, 389-395.

Federal Register. (2005). Specified risk materials from cattle and their handling and disposition (9 CFR 310.22). Washington, DC: U.S. Government Printing Office.

von Hagens, G., Tiedemann, K., & Kriz, W. (1987). The current potential of plastination. *Anatomy and Embryology,* 175, 411-21.

Will, R. G., Ironside, J. W., Zeidler, M., Cousens, S. N., Estiberio, K., Alperovitch, A. S., et al. (1996). A new variant of Creutzfeldt-Jakob disease in the UK. *Lancet,* 347, 921-925.

This article is online at *http://www.joe.org/joe/(none)/tt6.shtml*.
