

**The Washington Animal Production
Food Safety Outreach Partnership
Project Report**

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Background

This project, “the Washington Animal Production Food Safety Outreach Partnership,” is in response to the July 1999 request from USDA’s Food Safety and Inspection Service (FSIS) seeking the involvement of State agencies for producer outreach. The project requires multiple experts at the state and county level working cooperatively to deliver uniform information to small producers to increase their understanding of what can reasonably be done to assure safe food from animals supplied for processing. In developing and completing this project the Washington State Department of Agriculture (WSDA) has partnered with Washington State University (WSU), Washington Agricultural Statistics Service (WASS), and a number of other stakeholders concerned with the implementation of food safety/quality assurance (FS/QA) initiatives from farm to table. See attachment 1 for the list of partners. Discussion between the partners verified that large scale livestock producers, and the poultry industry have extensive exposure to FS/QA initiatives. Therefore, our efforts targeted small producers of cattle, swine, and sheep, including 4-H students and leaders, FFA project members, and “livestock advisors.” Since Washington is a relatively large dairy state that contributes significantly to meat products in the state, the dairy producers were also included.

Volunteers in the WSU Cooperative Extension Livestock Advisor (LA) Program provide guidance to livestock producers in several Western Washington Counties on raising, breeding, and housing livestock using the best farm management practices. The LA’s are required to have extensive training that includes FS/QA materials. See attachment 2 for information on the LA Program. Their participation in the survey to assess the effectiveness of several existing livestock producer food safety initiatives was particularly helpful.

Goals

The primary goal of the Washington Animal Production Food Safety Outreach Partnership was providing educational opportunities on Hazard Analysis Critical Control Point (HACCP) based concepts concerning animal production food safety to small livestock producers. The secondary goal was to determine small producers’ understanding of quality assurance, residue avoidance, and pathogen reduction practices. This was approached with an extensive questionnaire-based survey assessing the success of existing outreach programs and identifying areas requiring additional education efforts.

These goals were accomplished through development and implementation of the following objectives:

1. Development and mailing of educational materials geared to promote FS/QA programs to producers and large animal veterinarians.

2. Organization and provision of speakers on issues of FS/QA to meetings of producers.
3. Installation and servicing of literature stations at livestock sale yards, veterinary practices, and other locations where livestock producers may pick up material on quality assurance programs and other food safety information.
4. Provision of educational programs for adult and youth producers, including the current “Quality Assurance – Animal Care Youth Education Program” for education of extension and vocational personnel on animal production food safety and quality assurance concepts.
5. Development and distribution of a questionnaire-based survey to determine individual understanding of food animal production as an integral part of the food safety chain. The survey provides information assessing the effectiveness of several existing livestock producer food safety initiatives.

Methods and Results

1. Development and mailing of Educational Materials

The tri-fold handout “Food Safety and Livestock Production” developed by WSDA describes factors that influence and heighten awareness about the safety of our food supply. It also addresses good “on the farm” management practices reducing food hazards and increasing consumer confidence. This, and other FS/QA publications from livestock industry organizations were mailed to the 465 large animal veterinarians identified in the state, and to livestock producers, either directly, or through their industry organizations. These publications were also distributed at sale barns and meetings of veterinarians and of livestock producers (see Goal 2 below).

Dr. Jan Busboom, Jean Smith and Darla Marks, all from Washington State University/Washington Cooperative Extension System developed a four-fold brochure “Food Safety is Your Business: Washington Food Safety and Quality Assurance Program”. This publication emphasizes “livestock producers ARE food producers”. It provides important reasons producers should implement on the farm FS/QA programs, and emphasizes essential aspects such as good record keeping, proper handling of feeds and additives, and proper use of animal health products. Correct administration of medications is also emphasized with detailed guidelines for giving injections. This brochure also provides contact information and encourages livestock producers to join state and national QA programs. A remarkable amount of valuable information is available in this small handout. It was mailed to half (1,184) of the recipients of the questionnaire-based survey discussed under Goal 5, and continues to be widely distributed post-survey. Four thousand copies were printed and distributed in December 2000 and 4,000 additional copies have been printed. It was distributed to the 465 practicing large animal veterinarians and displayed at sale barns, county fairs and other livestock meeting areas. The brochure has also been posted at the website, <http://pubs.wsu.edu>.

The same WSU Extension team also developed a 16-page booklet, also entitled “Food Safety Is Your Business: Washington Food Safety Quality Assurance Program”. It provides detailed information on the topics covered in the four-fold brochure, and includes other management considerations, environmental concerns, special considerations for Youth Show Exhibitors, an extensive glossary, and references. It was mailed to participants in the survey who returned a request for additional FS/QA information. It is also being widely distributed along with the four-fold brochure at sale barns, producers' meetings and through area livestock specialists/agents.

2. Organization and Provision of Speakers on Issues of Food Animal Quality Assurance at Producer Meetings

a. Jean Smith presented FS/QA concepts to 112 adult and youth beef producers at a steer carcass evaluation program on October 4, 1999.

b. Dr. Jan Busboom presented FS/QA concepts at the WSU Fall Swine Day, October 23, 1999.

c. Dr. Robert Mead presented the current status of FS/QA initiatives by WSDA, and Dr. James Hermes presented “Basic HACCP Principles in Poultry Production” at the WSU Poultry Institute Program on November 4, 1999.

d. Jean Smith presented FS/QA concepts to 167 adult and youth sheep producers at a lamb carcass evaluation program on November 18, 1999.

e. Jean Smith presented HACCP principles and FS/QA concepts to FFA advisors and 4-H livestock project leaders on November 29, 1999.

f. Dr. Dan Jemelka presented three lectures on FS/QA at the Cattlemen’s Winter School in Mt. Vernon, WA on February 19, 2000.

g. Jean Smith presented HACCP principles and FS/QA concepts to 4-H livestock project leaders on May 8, 2000.

h. Dr. Jan Busboom, Jean Smith, and Jerry Newman presented FS/QA information to 127 show managers at the 2000 Pacific NW Show Management School on June 15, 2000.

i. Jean Smith presented FS/QA concepts to 105 adult and youth beef producers at a steer carcass evaluation program on October 2, 2000.

j. Dr. Dan Jemelka presented FS/QA and foreign animal disease lectures at the Pork Producers Fall School on October 28, 2000.

k. Jean Smith presented FS/QA concepts to 158 adult and youth sheep producers at a lamb carcass evaluation program on December 4, 2000.

l. Jean Smith presented HACCP principles and FS/QA concepts to 4-H livestock project leaders on December 11, 2000.

m. Dr. Dick Dougherty, Dr. Don Dixon and Dr. Jan Busboom presented eight HACCP training classes to livestock slaughter and meat processing personnel in 1999 and 2000. These courses were

presented to assist the meat slaughter and processing facilities in preparing for the mandatory USDA HACCP program in these facilities.

3. Installation and Servicing of Food Safety/Quality Assurance (FS/QA) Literature Stations

Foam-core (10) and laminated logo posters (25) as well as display racks (70) to display literature and other pertinent livestock, FS/QA information were displayed in 13 sale barns throughout the state, at two veterinary conventions, and at five livestock producer meetings. A tri-fold exhibit was also developed for presenting FS/QA at the meetings listed above (photo included in the Dec-Mar 2000 quarterly report). Material distributed included handouts on the sheep, dairy, and swine industry organizations' quality assurance programs, the WSDA/WSU four-fold "Food Safety is Your Business", and WSDA handouts, "Food Safety and Livestock Production," and "Protecting the Health of Washington Livestock".

Education Centers were established in veterinary clinics that volunteered to display and distribute the FS/QA literature. Some clinics sent the four-fold brochures to clients in their monthly billing. Display racks were provided to approximately 30 veterinary clinics.

4. Educational Programs for Adult and Youth Producers

The Quality Assurance and Animal Care Youth Education Program is being revised. The authors conducted conference call planning sessions and drafts from all authors were received April 2, 2001. Updated FS/QA provisions will be incorporated in the revision.

5. Understanding of Food Development and Distribution of a Questionnaire-based Survey to determine Individual Animal Production as an Integral Part of the Food Safety Chain

In cooperation with the Washington Agricultural Statistical Service and WSU Cooperative Extension Service, a survey was developed to provide information assessing the effectiveness of existing livestock producers' food safety initiatives.

The questionnaire was designed to test the baseline knowledge of livestock producers (cattle, swine, sheep and dairy), volunteer livestock advisors, 4-H leaders and 4-H members. As an educational tool, half (1,184) of the recipients also received the brochure "Food Safety is Your Business: Washington Food Safety and Quality Assurance Program" and were asked to review it before completing the questionnaire.

The survey asked respondents nine demographic questions regarding their operation and their animal health practices. The participants were then asked 14 cognitive questions, which consisted of seven yes/no questions and seven multiple-choice questions. Participants were also given an opportunity to comment and provide feedback at the end of the survey. Participation in the survey was voluntary. Protection of individual responses was maintained through the assignment of identification numbers. Comments were made available to WSDA through the identification numbers. WSDA did not receive any individual responses to questions contained in the questionnaire.

The population of this survey targeted seven groups within eight selected counties. The names of these individuals were provided to WASS through WSDA, WSU, LA Extension office and producer organizations.

The eight counties selected in this survey were determined by the 4-H Extension Program and the Livestock Advisor Program. There were two counties in Eastern Washington that had progressive 4-H programs and two counties in Western Washington that had active LA programs. These counties and two comparable control counties on each side of the state were used in the survey. The livestock producers in the same eight counties were used in the survey as well.

Survey Summary

A total of 2,369 questionnaires were mailed, with 357 returned for an overall response rate of 15 percent. Summary results of the responses are included in attachment 3. The lowest response rate was from the 4-H members and the swine producers. The highest rate was from the cattle and sheep producers. The higher rate of return was probably attributed to the two producer group presidents submitting a letter promoting the project.

The outcome of one question supported our goal of educating and testing the small producer. The majority of respondents raised less than 25 animals per year.

A large percentage of each group indicated they used the extension service for nutrition and management information, whereas veterinarians are used for health and reproduction concerns. It was not unusual to see that veterinarians were used to learn how to administer medication, but a large number relied on personal experience from watching others give medication.

A very high percentage had an annual vaccination program.

Herd health records on each animal were maintained by a relatively large percentage of producers. Producers that raised animals with multiple animal births, such as swine, did not indicate individual records were kept.

A large percentage of producers used permanent means of identifying their animals. This is an important factor in the HACCP slaughter program for identification and traceback.

The cognitive questions were used to determine the producers' knowledge of livestock husbandry that affects end product food safety and quality. Overall, a high percentage of members in each group answered the questions correctly. As a whole, members who received the brochure answered more questions correctly than those who did not receive a brochure. Occasionally some livestock groups answered more questions correctly without the brochure. Evidently they did not read the brochure and depended on previous knowledge and experience.

There are four questions that stand out with the lowest response rate and lowest percent answered correctly with and without the brochure. The questions are: the definition of HACCP, the question on extra-label use of medical products, and two questions on how the tenderness of meat is affected by intramuscular injections. Since all questions were addressed in the brochure, it is evident all responders did not read the brochure thoroughly.

The average response to the question on the best method to control diseases transmitted by manure, was answered correctly with and without the brochure. Four of the groups answered this question correctly without the brochure than those with the brochure. Possibly this can be explained by the fact that the subject was not discussed in detail in the brochure. Only a statement was made to prevent fecal contamination of feed, but not why or how to prevent contamination.

The attempt to compare counties with the progressive 4-H programs and active LA program to counties that did not have strong leadership and activity was disappointing. The responses from the control counties were so low that it was impossible to assess significance. The budget did not allow for follow up phone calls or re-mailing surveys to those who did not respond.

Project Summary

The 1999-2000 Washington Animal Production Food Safety Outreach Partnership was very successful in producing educational literature and promoting food safety and quality assurance in livestock production. WSDA used the partners to provide numerous educational opportunities to producer groups, meat packers, livestock educational leaders, and youth members. The educational focus was to the small

producer, however it was inevitable that large producers would be involved as livestock organizational group member list were used for the questionnaire, and to coordinate lectures and presentations. In order to educate the small and sometimes novice livestock producer, 4-H members, 4-H leaders, and Livestock Advisors were included in the education and testing project. The survey questionnaire served as a means of educating and testing the knowledge of seven groups.

Overall, there is strong evidence that the brochure did serve to educate those who received it. However, there is also evidence it was not thoroughly read in all cases. It was gratifying to know that the majority of respondents were appreciative of our efforts and requested the results of the survey and the "Food Safety Is Your Business" booklet which is the expanded version of the brochure initially sent with the questionnaire. The brochures and booklet produced as part of this project are also included with this report.

Recommendation

It is recommended that efforts continue in educating the small producer through the 4-H and FFA Leaders, and the Livestock Advisor program. The LA program is located only in Western Washington, but is recommended in all counties where livestock are raised.

As noted in the survey results, education of the relationship between the slaughter HACCP program and livestock production should continue. Although food safety livestock production issues were frequently discussed in the literature and in presentations, the correlation to the packer's HACCP program was not always mentioned. The survey gave evidence that the majority of producers are aware of the requirements to produce healthy livestock. However, too few swine producers responded to the questionnaire to be significant and indicative of that group's knowledge and practices.

A recommendation to provide education and training at county livestock meetings was made by the Washington Cattlemen's Association. WSDA and WSU Extension agreed to be available to present food safety and HACCP training upon request from any county.

**Washington Animal Production Food Safety Outreach Partnerships
Proposal FSIS-7-W-99**

Partners

Washington Department of Agriculture

Food Safety/Animal Health and Consumer Services Division, John Daly, Assistant Director

Animal Health Program - Robert W. Mead, DVM, State Veterinarian

Animal Health Program - Kathy Connell, DVM, Assistant State Veterinarian

Public Health Advisor - Dan Jemelka, DVM, Project Coordinator

Consultant - Robert Whitney, DVM, Project Staff

Washington Agriculture Statistical Service (WASS)

Doug Hasslen, State Statistician

Jerry McCall, Deputy State Statistician

Michelle Fox, Agricultural Statistician

Wendy Owens, Agricultural Statistician

Washington State University Cooperative Extension and Department of Animal Sciences

Jan Busboom, PhD, Extension Meat Specialist

Jerry Newman, 4-H Livestock Specialist

Jean Smith, Interim 4-H Livestock Specialist/Area Livestock Agent

Nancy Mordhorst - State 4-H Coordinator

Michael Hackett, Area Livestock Agent

Darla Marks, Graduate student

Washington State University Department of Food Safety Human Nutrition

Richard Dougherty, PhD, Food Processing Specialist

Washington State University, College of Veterinary Medicine

Field Disease Investigation Unit –

Clive Gay, DVM PhD

Dale Hancock, DVM

United States Department of Agriculture, APHIS VS (WA-AK)

Gary L. Brickler, DVM, Area Veterinarian In Charge

Washington State Cattlemen's Association

Neil Kayser, President

Tip Hudson, Executive Vice President

Washington State Sheep Producers

Harvey Wallace, Executive Secretary

Washington Pork Producers

Darryl Bayes, President

Washington Dairy Federation

Jay Gordon, Executive Director

HOW TO BECOME A WSU EXTENSION LIVESTOCK ADVISOR

What is the WSU Livestock Advisor Program?

WSU Livestock Advisors are trained and certified members of a volunteer program that is sponsored by Washington State University Cooperative Extension. The program assists Cooperative Extension in providing information to livestock producers on raising, breeding, and housing livestock using the best farm management practices. The demand for such information has grown rapidly in recent years and the methods of delivery have diversified.

Who can become a Livestock Advisor?

Anyone with an interest in livestock and the desire and enthusiasm to learn, and then share their knowledge with the community, can apply to become a certified WSU Extension Livestock Advisor. The only limitation is the time available to the applicant and space in the class. The first time commitment is the 80 hours of animal science training. The second requirement is the 80 hours of volunteer time the new Livestock Advisor contributes to the program during the first year.

Commitments to continue as a certified Livestock Advisor after the first year are reduced to 35 hours per year (25 hours of community service and 20 hours of continuing education). Many Livestock Advisors considerably exceed the minimum. The time commitment makes the program more suitable to retirees, part-time workers, homemakers and others with job flexibility. Past experience has shown that, while full-time workers are welcome to apply to the program, they often have problems with scheduling sufficient time to this program.

Who started the Livestock Advisor Program?

In 1983, because of overwhelming need for information on basic farm and livestock management in Snohomish County, Mike Hackett, WSU Cooperative Extension Area Livestock Agent and now Department Head/Chair of the Skagit County Cooperative Extension Office, developed the training. It was designed to produce competent volunteers needed by the farming community. It is now being offered throughout western Washington.

What training is given the Livestock Advisors?

The training sessions cover a variety of subjects such as poultry, sheep, beef, swine, horse, rabbits, goats, vertebrate pest management, nutrition, water quality, and mud management. Other areas also taught are pasture management and organic farming.

The trainees receive a course outline and free extension publications as well. A take-home quiz is given on each major subject matter area to verify that the new Livestock Advisors are ready to serve as resource people in the community.

The 1999 training session for the new WSU Extension Livestock Advisors will be held in mid-to-late January and will continue through mid-to late March. Training is held one day per week from 9:00 a.m. to 4:00 p.m. Class size will be limited to 45 persons from Skagit, San Juan, Island, and Snohomish counties. Training is held annually.

Who decides what each Livestock Advisor will do?

Each Livestock Advisor Volunteer must complete a total of 80 hours of volunteer service in the first year. Each new Livestock Advisor spends a minimum of 8 hours helping at the Marysville Livestock Sale Yard extension field office answering livestock questions. Advisors will also spend 12 hours at the Evergreen State Fair in Monroe staffing the Livestock Advisor Foundation Petting Farm.

The remaining activity hours during the first year, and in subsequent years, are fairly flexible, as long as they are an accepted part of the WSU Extension Livestock Education Program. Activities for volunteers include writing and editing articles for our web page, giving talks and demonstrations to groups in the community, and staffing booths at fairs and civic events, making presentations at Small Farm Workshops, returning phone queries on livestock issues and making farm visits.

What is in the Livestock Advisor Program for me?

Serving the public through this program is very satisfying to most volunteer Livestock Advisors. Many of them stay with the program year after year providing depth and continuity to the program as well as keeping themselves up-to-date on the latest research and gardening information.

As a WSU Extension Livestock Advisor you will meet many other people who share a mutual interest in livestock, increase your public relations skills, and acquire information and develop abilities that will prove useful to you in a variety of situations. You will develop and increase confidence in your capacity as a livestock raiser and problem-solver. You will learn, and help others learn, practices that are safer for the environment. You will have access to all the latest research-based information pertaining to livestock management, too.

How do I apply?

For more information or an application, contact your local WSU Cooperative Extension office. In Skagit County our office is located at 306 South First Street, Mount Vernon, WA 98273. Our telephone number is 360/428-4270 or you can reach our livestock advisors program via e-mail at joanrd@co.skagit.wa.us. Space is limited, so please apply soon. Application deadline is December 31 each year.

1. Survey response rate, all categories				
	Received Survey	Responded	Percent responded	
Livestock Advisors (LA)	108	21	19%	
4H members	953	90	9%	
4H leaders	250	49	20%	
cattle producers	398	89	22%	
sheep producers	108	39	36%	
swine producers	190	19	10%	
dairy producers	362	50	14%	
2. Response to Demographic Questions (Summary)				
Q-3A How many food animals do you raise annually?				
	1-5		32%	
	6-10		11%	
	11-25		14%	
	26-50		15%	
	51-100		9%	
	100+		19%	
Q-3A How many food animals do you slaughter annually?				
	1-5		36%	
	6-10		12%	
	11-25		15%	
	26-50		14%	
	51-100		9%	
	100+		13%	
Q3-B What is your primary type of livestock?				
	Dairy		14%	
	Beef		34%	
	Sheep		29%	
	Swine		14%	

		Goats	5%				
		Other*	2%	*poultry&rabbits			
		None	2%				

Q-4A Based on your primary operation, do you seek information on reproduction, management, health, nutrition, or marketing through extension service?

YES	Reproduction	Management	Health	Nutrition	Marketing	Do Not Use
Livestock Advisors (LA)	38%	76%	52%	71%	29%	10%
4H members	27%	39%	36%	46%	47%	13%
4H leaders	41%	53%	45%	59%	47%	4%
cattle producers	20%	30%	18%	33%	24%	19%
sheep producers	46%	62%	49%	54%	49%	10%
swine producers	42%	63%	37%	58%	42%	5%
dairy producers	10%	30%	10%	24%	18%	22%
Total	28%	43%	31%	44%	36%	14%

Q-4B Based on your primary operation do you seek informaiton on reproduction, management, health, nutrition or marketing through a veterinarian?

	Reproduction	Management	Health	Nutrition	Marketing	Do Not Use
Livestock Advisors (LA)	62%	43%	76%	48%	5%	10%
4H members	24%	21%	53%	28%	13%	11%
4H leaders	33%	18%	65%	31%	8%	0%
cattle producers	47%	12%	81%	35%	7%	3%
sheep producers	44%	28%	77%	41%	13%	0%
swine producers	26%	16%	74%	32%	5%	0%
dairy producers	84%	52%	86%	64%	10%	0%
Average	44%	25%	71%	38%	10%	4%

Q5 Where did you learn to administer animal health products, medications, etc (check all that apply)

all respondents:						
Feed store or co-op		27%				
Extension Agent/University Specialist		22%				
personal experience (parents, etc)		76%				
WSU (LA)		48%				

Veterinarian		81%				
Field day/workshops		43%				
4H/FFA leader		31%				
Other		27%				

Q-6 Do you maintain written herd health records on each animal you raise?

	% yes					
Livestock Advisors (LA)	52%					
4H members	71%					
4H leaders	63%					
cattle producers	40%					
sheep producers	74%					
swine producers	37%					
dairy producers	76%					
Average	61%					

Q-7 Do you use some form of identification on your livestock?

	permanent	temp	both	none		
Livestock Advisors (LA)	52%	5%	10%	24%		
4H members	80%	4%	4%	10%		
4H leaders	76%	2%	4%	16%		
cattle producers	83%	2%	9%	6%		
sheep producers	72%	5%	13%	10%		
swine producers	63%	0%	16%	16%		
dairy producers	76%	6%	14%	2%		
Average	76%	4%	10%	10%		

Q-8 Do you have an animal vaccination program?			
	% yes		
Livestock Advisors (LA)		81%	
4H members		66%	
4H leaders		82%	
cattle producers		99%	
sheep producers		95%	
swine producers		79%	
dairy producers		98%	
Average		85%	
3. Response to cognitive questions with and without brochure (summary)			
Q-9 If label gives a clear choice between IM and SQ injections, which method should be chosen?			
(Correct answer SQ)			
	with brochure		without brochure
Livestock Advisors (LA)	77%		75%
4H members	68%		47%
4H leaders	89%		58%
cattle producers	88%		85%
sheep producers	85%		10%
swine producers	88%		73%
dairy producers	80%		64%
Average	80%		70%
Q-10 The preferred location for IM injection is?			
(correct answer:neck)			
	with brochure		without brochure
Livestock Advisors (LA)	92%		13%
4H members	70%		49%
4H leaders	78%		68%
cattle producers	82%		89%
sheep producers	75%		79%
swine producers	80%		82%

Livestock Advisors (LA)		100%		100%			
4H members		98%		95%			
4H leaders		83%		100%			
cattle producers		94%		84%			
sheep producers		95%		89%			
swine producers		100%		91%			
dairy producers		96%		88%			
Average		95%		91%			

Q14 If a product label does not list an animal you want to treat, is it acceptable to use the product anyway provided you withhold the animal from slaughter for a longer period of time?

(Correct answer:no)							
		with brochure		without brochure			
Livestock Advisors (LA)		85%		88%			
4H members		87%		95%			
4H leaders		83%		90%			
cattle producers		100%		82%			
sheep producers		80%		84%			
swine producers		100%		100%			
dairy producers		92%		84%			
Average		90%		88%			

Q15 Can residue violation by a producer result in criminal prosecution?			
(Correct answer: yes)			
	with brochure		without brochure
Livestock Advisors (LA)	92%		88%
4H members	81%		70%
4H leaders	89%		81%
cattle producers	76%		62%
sheep producers	80%		79%
swine producers	100%		64%
dairy producers	80%		64%
Average	82%		70%
Q16 How does an IM injection impact the tenderness of meat in food animals?			
(Correct answer:decreases tenderness)			
	with brochure		without brochure
Livestock Advisors (LA)	85%		63%
4H members	57%		37%
4H leaders	67%		68%
cattle producers	74%		53%
sheep producers	75%		68%
swine producers	63%		45%
dairy producers	60%		60%
Average	67%		54%
Q17 Should you use a drug product or procedure that a veterinarian prescribed for your neighbor's animal if their animal has the same symptoms as yours?			
(Correct answer:no)			
	with brochure		without brochure
Livestock Advisors (LA)	100%		100%
4H members	96%		91%
4H leaders	89%		97%
cattle producers	94%		84%
sheep producers	95%		95%
swine producers	100%		73%

dairy producers		88%		92%			
Average		94%		90%			
Q18 Injection lesions are occasionally found in cuts of meat. If the visible lesion is trimmed, will the meat surrounding the trimmed area be as tender as the rest of the carcass?							
(Correct answer:no)							
		with brochure		without brochure			
Livestock Advisors (LA)		100%		75%			
4H members		77%		58%			
4H leaders		72%		68%			
cattle producers		74%		53%			
sheep producers		70%		63%			
swine producers		75%		49%			
dairy producers		56%		44%			
Average		73%		57%			
Q19 Which of the following is not given on a product label?							
(Correct answer: Extra label uses for the product)							
		with brochure		without brochure			
Livestock Advisors (LA)		92%		50%			
4H members		72%		63%			
4H leaders		67%		52%			
cattle producers		68%		65%			
sheep producers		75%		53%			
swine producers		63%		55%			
dairy producers		64%		76%			
Average		71%		61%			
Q21 Which is the BEST method to control diseases transmitted by manure (i.e. Salmonella)?							
(Correct answer: Prevent manure contamination of feed and water)							
		with brochure		without brochure			
Livestock Advisors (LA)		100%		100%			
4H members		91%		86%			

4H leaders		94%		97%			
cattle producers		88%		91%			
sheep producers		85%		95%			
swine producers		100%		82%			
dairy producers		88%		92%			
Average		91%		91%			

Q22 HACCP is:

(Correct answer: A science-based management system designed to prevent food safety problems before they occur.

It stands for Hazard Analysis and Critical Control Points)

	with brochure	without brochure				
Livestock Advisors (LA)	85%	68%				
4H members	62%	40%				
4H leaders	67%	58%				
cattle producers	65%	38%				
sheep producers	45%	47%				
swine producers	88%	36%				
dairy producers	52%	40%				
Average	62%	44%				

End Cognitive Questions

4. Comparison of each group's correct responses to cognitive questions

	with brochure	without brochure				
Livestock Advisors (LA)	91%	74%				
4H members	77%	55%				
4H leaders	80%	75%				
cattle producers	82%	71%				
sheep producers	78%	79%				
swine producers	86%	70%				
dairy producers	75%	70%				
Average	81%	70%				