



# Evaluation

# Report Synopsis

The 4th International Symposium on Managing Animal Mortality, Products, By-products and Associated Health Risk was held in Dearborn, MI, from May 21—24, 2012. There were 147 participants from 8 countries (United States, Canada, Australia, New Zealand, South Korea, United Kingdom, Vietnam and Nigeria). Attendees from the United States came from 27 states and the District of Columbia, and those from Canada represented five provinces. Seventy-nine (79) evaluations were turned in at the end of the conference, representing a 53.7% response rate! The following report is based on those 79 evaluations.

# Evaluation Report Synopsis

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## PARTICIPANT DEMOGRAPHICS

The majority of participants (59.2%) were government employees, followed by those affiliated with an educational and/or research institution (27.6%). Others were affiliated with the private sector or a Non-Governmental Organization (NGO) and one person indicated that he/she was a student. Fifty-three (53) of the 79 survey respondents (70%) indicated that this was their first Mortality Symposium while five had been to all four.

## PRE-SYMPOSIUM INFORMATION – VERY USEFUL

Sixty-two (62) percent of the 67 attendees that rated the usefulness of pre-symposium mailing/advertisement had the

Table 1: Usefulness of pre-symposium mailing/advertisement and information posted on the web (% of answers)

Rating	Pre-Symposium mailing/ advertisement		Pre-Symposium web information	
	#	%	#	%
1 (not useful at all)	1	1.5	0	0.0
2 (slightly useful)	6	9.0	3	4.2
3 (useful)	18	26.9	19	26.4
4 (very useful)	24	35.8	29	40.3
5 (extremely useful)	18	26.9	21	29.9

opinion that it was very to extremely useful, with an average of 3.8 on a 5-point Likert scale (Table 1). In addition, the information posted on the web received an average usefulness score of 3.9. Comments made by those who rated the pre-symposium information slightly useful included “Useful, but poorly organized. Schedule not easy to follow unless printed”, “Need more specific detail earlier,” and “Information could be e-mailed to participants sooner.”

## PAPER AND POSTER SUBMISSIONS AND REGISTRATION – EASY TO DO

The ease of submitting posters and/or papers to the symposium, rated an average of 4.4 by 31 attendees (Table 2). Almost half of them indicated that the process was very easy to do, however one of them said that they “could do with clearer guidelines on the paper - length, format, style, etc.” Six vendors indicated that it was easy and 4 said it was very easy to register as a vendor. The average rating for the ease of Symposium registration was 4.4. One attendee, who indicated that Symposium registration was very easy, said that it was much harder to register for the hotel.

Table 2: Ease of submission and registration (% of answers)

Rating	Submit papers/posters		Register as a vendor		Register for the Symposium	
	#	%	#	%	#	%
1 (very hard)	0	0.0	0	0.0	0	0.0
2 (hard)	0	0.0	0	0.0	1	1.4
3 (neither hard or easy)	2	6.5	1	9.1	4	5.7
4 (easy)	14	45.2	6	54.5	31	44.3
5 (very easy)	15	48.4	4	36.4	34	48.6

## LOCATION, HOTEL PRICE AND QUALITY, AND FOOD PROVIDED - SATISFIED

Attendees were on average satisfied with Dearborn, MI as a location for the Symposium (average rating of 3.8), the price and quality of the DoubleTree (4.0) and lunches and food at the Symposium (4.1). Table 3 shows a breakdown of the responses. None of those who were completely dissatisfied with any of these gave a comment as to why they were not satisfied, but one of the attendees who rated food a “2” stated that “Tuesday breakfast was disappointing. Wednesday breakfast was on target”. The only other comment indicating dissatisfaction was about the price of the hotel; “the hotel was somewhat expensive, otherwise good.”

Table 3: Satisfaction with the location, price and quality of the hotel, and the food provided (% of answers)

Rating	Dearborn, MI (n=75)		DoubleTree Price & Quality (n=68)		Lunches and Food (n=74)	
	#	%	#	%	#	%
1 (completely dissatisfied)	0	0.0	0	0.0	0	0.0
2 (dissatisfied)	0	0.0	0	0.0	1	1.4
3 (neither dis or satisfied)	2	6.5	1	9.1	4	5.7
4 (satisfied)	14	45.2	6	54.5	31	44.3
5 (completely satisfied)	15	48.4	4	36.4	34	48.6

### ESTABLISHED CONTACTS, GAVE IDEAS TO SHARE, ADDRESSED AND SHOWCASED TECHNOLOGY – HIGHLY RATED

Table 4 shows that over 90% of those returning surveys agreed or strongly agreed that the Symposium helped them establish personal and professional contacts and gave them ideas to share with colleagues (average rating of 4.5 and 4.3, respectively). One evaluator indicated that “the networking component of this conference was the best of any conference I've attended,” and six others agreed with this sentiment using similar verbiage.

How well the Symposium addressed the latest developments in managing animal mortalities, products, by-products and associated health risk and how well it showcased the effective use of current and emerging technology was also rated highly. These received an average rating of 4.3 each, but there were no specific comments about either.

Table 4: Agreement with the statements that the symposium helped establish contacts, gave ideas to share, addressed the latest developments and showcased technology (% of answers)

Rating	Established contacts (n=76)		Ideas to share (n=76)		Addressed developments (n=74)		Showcased technology (n=74)	
	#	%	#	%	#	%	#	%
1 (strongly disagree)	0	0.0	0	0.0	0	0.0	0	0.0
2 (disagree)	0	0.0	1	1.3	2	2.6	1	1.3
3 (neither dis or agree)	6	7.9	4	5.3	7	9.2	7	9.3
4 (agree)	25	32.9	30	39.5	30	39.5	36	48.0
5 (strongly agree)	45	59.2	41	53.9	37	48.7	31	41.3

### SYMPOSIUM SPACE AND ORGANIZATION - SATISFIED

Over 90% of respondents indicated that they were satisfied or completely satisfied with both the symposium space (general session and breakout rooms/registration area, etc.) and symposium organization giving an average satisfaction rating of 4.2 and 4.5, respectively (Table 5). One evaluator who indicated dissatisfaction with the Symposium space said that it was “too cold” and there was a “thin wall between Michigan and Huron rooms.” The other evaluator did not give a reason. Five other evaluators also felt that the rooms were too cold, although they gave Symposium space a rating of 4. Another commented that “loss of internet was a HUGE problem” and three people indicated that it was sometimes hard to hear speakers possibly due to improper placement of lapel microphone, accents, crowd over-talk and lack of decorum. The person who indicated that he/she was dissatisfied with the Symposium program organization commented that “parallel sessions could be better aligned.” This statement was also inferred by two others that were satisfied and completely satisfied with program organization:

- “Would love to attend more presentations. Shuffle topics more or shorten?”
- “Moderators need to do a better job of keeping talks on time so that people can move from breakout to breakout.”

Concurrent sessions caused problems in missing many sessions. Don't know exactly when 2<sup>nd</sup>, 3<sup>rd</sup>, or 4<sup>th</sup> presentations started to enable jumping from sessions to session. Voices from one session heard in others.

There were five additional comments made by people who were completely satisfied with the organization of the Symposium program organization:

- “Receptions are not useful. Compress meeting to 3 days and not 4.”
- “Excellent job – wonderful experience. I appreciate the amount of work and planning to get this Symposium off the ground.”
- “Very informative and interactive meeting, offering excellent international perspective and involvement.”
- “Well organized conference; wide breadth of topics; great to have so many international speakers.”
- “Excellent meeting; lots of opportunity for networking; the facility is well set up for meeting and is convenient.”

Table 5: Satisfaction with the symposium space and program organization (% of answers)

Rating	Symposium space (n=73)		Symposium organization (n=73)	
	#	%	#	%
1 (completely dissatisfied)	0	0.0	0	0.0
2 (dissatisfied)	2	2.6	1	1.3
3 (neither dis or satisfied)	9	11.8	5	6.6
4 (satisfied)	34	44.7	28	36.8
5 (completely satisfied)	31	40.8	42	55.3

### ATTENDANCE AT TUESDAY AND WEDNESDAY'S SESSIONS

Table 6 shows the number of people in attendance at each of the sessions on both Tuesday and Wednesday. There was excellent attendance for most of the sessions, but only 50% of those filling out evaluations indicated that they attended the poster sessions and most of those that attended on Wednesday (29 of 41) had also attended on Tuesday. Between 5 and 13% of evaluators attended parts of sessions that ran concurrently even though, based on the comments made previously about concurrent sessions, it was hard to do. More people may have done so if presentations within each session had been timed to start and end together.

Table 6: Attendance at each of the sessions on Tuesday and Wednesday (% of surveys returned)

Tuesday Sessions	#	%	Wednesday Sessions	#	%
Klingborg Keynote	75	94.9	Ahn Keynote	71	89.9
Flory Plenary	75	94.9	PBB Plenary	67	84.8
S1: Emergency Response and Policy	41	51.9	S5: Animal Mortality Composting	30	38.0
S2: Alternative/Mechanical Disposal	42	53.2	S6: 3D/Disinfection and Recovery	48	60.8
Both S1 and S2	5	6.3	Both S5 and S6	5	6.3
Reyes Plenary	59	74.7	Glanville Plenary	53	67.1
S3: Environmental Effects of Disposal	41	51.9	S7: Policy and Education	39	49.4
			International Panel	34	43.0
S4: 3D/Disinfection and Recovery	42	53.2	S8: By-products/Foods of Animal Origin	21	26.6
Both S3 and S4	10	12.7	Both S7 and S8	4	5.1
Poster session	41	51.9	Poster session	36	45.6
Both Tues and Weds Poster sessions	29	26.7			

## OVERALL SATISFACTION

When asked, “Would you recommend this Symposium to your colleagues,” the resounding answer was “Yes”. Seventy people (94.6%) indicated they would recommend this Symposium to their colleagues, one person said it was “not related to our business”, another gave it a “B+,” and two other people said that they didn’t know if they would or would not. There were three specific comments about the Symposium that summed up the success of its content and why people would recommend it to others:

- I am really impressed by the content of the conference. I look forward to participating in future conferences.
- I think that this Symposium is getting better and better with time by including research/results on destruction, movement restriction, transportation of carcasses, decontamination, bio-containment and disposal, of course.
- The organizers have done a great job in covering different areas.

There were also three specific suggestions for the next one:

- Two respondents felt that there more African participants should be sponsored to attend training in this very important area and that future Symposia should be subsidized to enable them to attend.
- Please have the Symposium in an international location, preferably the UK.

## SYMPOSIUM CONTENT

The 4<sup>th</sup> International Symposium on Managing Animal Mortalities, Products, By-Products and Associated Health Risk: Connecting Research, Regulations and Response was a three-day long conference with a full day of pre-conference tours. There were four tours offered on Monday 5/21/12, but one was cancelled due to low registration. Tuesday and Wednesday, May 22nd and 23rd, were devoted to a morning keynote and plenary, two concurrent breakout sessions in the morning, an afternoon plenary during lunch, two concurrent breakout sessions in the afternoon, followed by poster presentations during an evening reception. For each day of the Symposium, participants were asked to give an overall rating of that day on a 5-point Likert scale with “1” being poor and “5” being excellent. Based on all four days’ answers from the 79 survey respondents, the information provided at the whole Symposium rated an average of 4 with a median of 4.2 (Table 7).

Table 7: Overall average rating of the information provided at the Symposium

Overall average rating	Number of people
0 to 2.9	0
3.0 to 3.4	4
3.5 to 3.9	9
4.0 to 4.4	37
4.5 to 4.9	19
5.0	10

### TOURS - MONDAY 5/21/12:

- **Tour A – A Trip Across the Border – Animal Inspection Procedures and Routine Mortality Disposal Methods – 33 participants, 22 evaluators**
- **Tour B – Obtaining Value-Added Products from Rendering and Managing On-Farm Mortality Effectively – 22 participants, 11 evaluators**
- **Tour C – Capturing Energy in Mortalities, Disease Diagnostic, Emergency Planning and On-Farm Mortality Management – 26 participants, 20 evaluators**

### OVERALL RATING OF TOURS – ABOVE AVERAGE

Table 8 below shows that 77, 91 and 90 percent of those who filled out evaluations felt that the overall rating of tour A, B and C was either above average or excellent with an average rating of 3.9, 4.2 and 4.2, respectively. Unfortunately, there was only one comment made by those who rated the tours as average or below to understand why they were

Table 8: Overall rating of the information provided in each tour (% of answers)

Tour	1=Poor		2=Below average		3=Average		4= Above average		5= Excellent	
	#	%	#	%	#	%	#	%	#	%
A	0	0.0	1	4.5	4	18.1	14	63.6	3	13.6
B	0	0.0	0	0.0	1	9.1	7	63.6	3	27.3
C	0	0.0	0	0.0	2	10.0	12	60.0	6	30.0

rated as they were. A participant in tour A stated that the “dairy farm and landfill were not worth the trip”. Other participants on tour A also expressed similar feelings on the dairy farm and/or landfill:

- Overall was a good informative, well organized tour but it would have been more interesting to get more detailed information
- Greater understanding of border issues and how a dairy farm is operated but did not get an increased understanding of how routine mortalities are handled.
- The stops at the dairy and landfill really only had a very peripheral connection to carcass management. Could have been tied together better.

It was suggested by one participant that lectures should have been given on the bus ride and portable loudspeakers should have been used at the sites.

Comments from people on Tour B indicated that it was an excellent tour, our MSU Extension Guide was great and lunch at the fairgrounds was excellent. One person said that the farms should have been surveyed first to see how composting was being done because the swine farm wasn’t doing a very good job of it and it might give the wrong idea to those that didn’t know much about composting. One participant, who gave the tour a rating of excellent, said it would have been nice to see the rendering facility in production. Another suggested that there should have been a power point slide show of each tour for the other people to experience all of the tours.

There were only 2 comments from tour C: “The diagnostic lab was interesting,” and “I think your research is good.”

### KEYNOTE, PLENARY, BREAKOUT AND POSTER SESSIONS – TUESDAY 5/22/12 AND WEDNESDAY 5/23/12:

- Tuesday – 77 people evaluated these sessions
- Wednesday – 73 people evaluated these sessions

### OVERALL RATING OF TUESDAY AND WEDNESDAY’S SESSIONS – ABOVE AVERAGE

Table 9 shows that attendees thought Tuesday and Wednesday’s sessions were above average, giving Tuesday an average rating of 4.3 and Wednesday an average rating of 4.4. All ratings were “average’ or above. Individual comments made by participants on Tuesday and Wednesday’s sessions can be found in Appendix A. However, there were some comments that were made by several people and bear mentioning here.

- Twelve individuals stated that Dr. Ahn’s keynote address on the 2010 FMD Outbreak in Korea was excellent and they thanked the committee for bringing him here.
- Five people stated that the international panel provided great information and was an excellent way to compare policies and experiences from other countries, but one of these was disappointed that there was not a representative from Africa on the panel.
- Three people mentioned that they had trouble understanding international speakers/participants. One person suggested that having an international speaker’s paper beforehand would aid in better understanding of the oral presentation and allow him/her to be able to ask questions.

Table 9: Overall rating of the information provided during Tuesday and Wednesday’s sessions (% of answers)

Session	1=Poor		2=Below average		3=Average		4= Above average		5= Excellent	
	#	%	#	%	#	%	#	%	#	%
Tuesday	0	0.0	0	0.0	7	9.1	42	54.5	28	36.4
Wednesday	0	0.0	0	0.0	2	2.7	40	54.8	31	42.5

## CROSS-BORDER FMD RESPONSE DISEASE SIMULATION WORKSHOP AND DEMONSTRATIONS – THURSDAY 5/24/12:

- **Cross-border FMD Workshop – 60 people evaluated the workshop**
- **Demonstrations – 41 people evaluated these sessions**

### OVERALL RATING – ABOVE AVERAGE

Table 10 shows that attendees thought the cross-border FMD workshop and demonstrations on Thursday were above average, giving the workshop an average rating of 4.2 and the demonstrations an average rating of 4.6. The Cross-Border FMD workshop was rated below average by one participant, but that person did not give a comment as to why it was rated that way. Other ratings were “average’ or above.

Session	1=Poor		2=Below average		3=Average		4= Above average		5= Excellent	
	#	%	#	%	#	%	#	%	#	%
FMD Workshop	0	0.0	1	1.7	5	8.3	34	56.7	20	33.3
Demonstrations	0	0.0	0	0.0	3	7.3	11	26.8	27	65.9

Comments made by participants on the workshop included six people who felt it was a good exercise with great discussion and the following individual comments:

- “I have attended many of these and appreciated how this one was set up.”
- “Jim Clark was at my exercise table and I learned much from him. The exercise should have included a recovery component.”
- “Industry needs to be actively involved in these activities and therefore our seminars.”
- “I think that if the organizers divide the workshop into about 4 groups, it is better than many groups.”
- “While the table provided during the workshop was useful it didn’t provide the detail needed to appreciate similarities and differences.”

Comments made by participants of the demonstrations also included 6 people that indicated the demonstrations were excellent and the following individual comments:

- “Need more time for demonstrations.”
- “Nice setting to host the demonstrations.”
- “Excellent chance to inspect equipment and talk with operators.”
- “Great cattle composting, great grinder.”
- “I am less concerned regarding composting as a disease spread risk (i.e. whole carcass). Have to operationalize protocols for mass use however.”
- “Use of hydrogen peroxide for milk tanker decontamination was good demonstration and also may be effective and economical way.”

Table 11: Overall change in knowledge of the topic(s) provided at the Symposium

% Overall change in knowledge	# of people
-20 to -4%	5
0% (no change)	5
4 to 16%	19
20%	23
24 to 40%	22
45 to 54%	5

### KNOWLEDGE GAINED

For each day of the symposium, participants were asked to rate both their knowledge prior to attending the symposium that day and after attending. Answers were also based on a 5-point Likert scale with “1” being poor and “5” being excellent. The difference between new knowledge and previous knowledge was then calculated for each participant. For example, if the respondent’s previous knowledge was “below average” (2) prior to attending the session, but was “above average” (4) after attending the session, then a difference of 2 was calculated. Two points, on a 5 point scale would represent a 40% increase in knowledge. Based on all four days’ answers from the 79 survey respondents, the information provided at the whole symposium rated an average (and median) increase in knowledge of 20% (1 point)

(Table 11).

### KNOWLEDGE GAINED ON TOURS – INCREASE IN KNOWLEDGE

Tour attendees were asked to rate their knowledge of the topic(s) presented on the tours prior to attending and then asked to rate their new knowledge of the topic(s) after having taken the tour. Tour A showed the greatest increase in knowledge (30%), but also had the most participants with average and below knowledge of the topics prior to taking the tour (Table 12). On average, all of the tours did impart new knowledge, with those having poor or below average knowledge beforehand feeling they now had average and above average knowledge of the topic(s).

Table 12: Average percent change in knowledge gained from attending tours A, B and C

Previous Knowledge	# of people	Tour A		# of people	Tour B		# of people	Tour C	
		New Knowledge (# of people)	Avg % change		New knowledge (# of people)	Avg % change		New knowledge (# of people)	Avg % change
1: Poor	4	3: Average (2) 4: Above average (2)	50	0			0		
2: Below average	7	3: Average (1) 4: Above average (6)	38	1	4: Above average (1)	40	3	3: Average (1) 4: Above average (2)	34
3: Average	6	4: Above average (4) 5: Excellent (2)	24	4	4: Above average (4)	20	8	4: Above average (8)	20
4: Above average	4	4: Above average (2) 5: Excellent (2)	10	5	4: Above average (2) 5: Excellent (3)	12	7	3: Average (1) 4: Above average (3) 5: Excellent (2)	-8
5: Excellent	1	5: Excellent (1)	0	1	3: Average	-40	2	2: Below average (1) 3: Average (1)	-50
Overall average difference			30			12			5



**Tour B – Obtaining Value-Added Products from Rendering and Managing On-Farm Mortality Effectively**  
**Tour attendees at Darling International.**

**KNOWLEDGE GAINED FROM TUESDAY AND WEDNESDAY'S SESSIONS – AVERAGE GAIN OF 20%**

New knowledge from attending Tuesday and Wednesday's sessions was on average 20% higher than participants' previous knowledge (Table 13). After attending these sessions, all respondents felt their new knowledge to be average or above, even if they had poor or below average knowledge beforehand.

Table 13: Average percent change in new knowledge gained from attending Tuesday and Wednesday's sessions

Previous Knowledge	# of people	Tuesday New Knowledge (# of people)	Average % change	# of people	Wednesday New knowledge (# of people)	Average % change
1: Poor	1	3: Average (1)	40	4	3: Average (2) 4: Above average (2)	50
2: Below average	14	3: Average (4) 4: Above average (8) 5: Excellent (2)	38	13	3: Average (4) 4: Above average (8) 5: Excellent (1)	36
3: Average	29	3: Average (3) 4: Above average (25) 5: Excellent (3)	20	29	3: Average (2) 4: Above average (24) 5: Excellent (3)	20
4: Above average	28	3: Average (1) 4: Above average (13) 5: Excellent (14)	10	26	4: Above average (13) 5: Excellent (13)	10
5: Excellent	3	4: Above average (1) 5: Excellent (2)	-6	2	5: Excellent (2)	0
Overall average difference			18			20

**KNOWLEDGE GAINED FROM CROSS-BORDER FMD WORKSHOP AND DEMONSTRATIONS – AVERAGE GAIN OF 20%**

New knowledge from attending the cross-border FMD workshop and the demonstrations was on average 20% higher than participants' previous knowledge (Table 14).

Table 14: Average percent change in new knowledge gained from attending the Cross-Border FMD Workshop and the demonstrations

Previous Knowledge	# of people	FMD Workshop New Knowledge (# of people)	Average % change	# of people	Demonstrations New knowledge (# of people)	Average % change
1: Poor	4	2: Below Average (1) 4: Above average (2) 5: Excellent (1)	56	1	3: Average (1)	40
2: Below average	10	3: Average (3) 4: Above average (6) 5: Excellent (1)	36	8	3: Average (4) 4: Above average (2) 5: Excellent (2)	36
3: Average	26	3: Average (2) 4: Above average (20) 5: Excellent (4)	22	15	3: Average (1) 4: Above average (10) 5: Excellent (4)	24
4: Above average	19	2: Below average (1) 3: Average (1) 4: Above average (11) 5: Excellent (6)	4	10	4: Above average (5) 5: Excellent (5)	10
5: Excellent	1	2: Below average (1)	-60	6	5: Excellent (6)	0
Overall average difference			20			20

## HOW INFORMATION PRESENTED WILL CHANGE OPERATION CONDUCT

For each day of the symposium, as well as overall, participants were asked to comment on how the information presented will change how they conduct operations. Appendix B lists all of the comments received. The evaluation committee categorized the changes described; the number of comments in each category for each day is listed in Table 15.

Table 15: Number of comments on changes to be made to operations in different categories based on information gleaned at the Symposium

Category	Overall	Tours			Tuesday	Wednesday	FMD	Demos	Total Comments
		A	B	C					
No change		5	1	5	2	2	1	15	
Collaboration	13			1	9	1	5	29	
Depopulation					1			1	
Disinfection		1				4	1	6	
Disposal	6	3	7	5	10	4	2	37	
Education	12		2	2	2	2	6	30	
Emergency Response	3				7	2		12	
General Knowledge gained	6	1			6	4	11	32	

Overall (i.e. from attending the whole conference), collaboration and education were the categories in which most of the changes were expected to be made. For collaboration, 13 people indicated that the opportunity for new relationships and collaborations were key to this symposium. One participant stated “the networking component of this conference was the best of any conference I've attended. I will reach out to my new contacts often and especially for help with things for which I don't have the knowledge.” Twelve people indicated that they would use the information acquired at this symposium in their educational efforts through their university classes/curriculum, extension bulletins, etc.

When comments from all pages were added up, the category in which most changes were expected to be made was disposal. Of the 37 comments, 17 were about composting as a disposal tool, of which eight of them indicated that they would now consider the use of composting as a good means of disposing animal mortalities, but there was some concern about its use for mass mortality. Six of the comments were about anaerobic digestion as a disposal tool (four indicated “would use it” and two indicated digestion would not be used). The rest of the comments on disposal were as follows: three were about alternative technologies, two indicated that the “One Health” concept would play into their disposal decisions and another indicated that the availability of rendering should be looked at more closely in that person's state.

The areas of interest in which change was expected to be made included: (1) use of general knowledge gained in which people indicated that they would use all of the information and knowledge gained to fit their industry, or measure their achievements against; (2) use information for planning purposes; and (3) use information to further educational and/or research programs.

### CHANGE IN OPERATION CONDUCT FROM TOURS

The majority of those that commented on changes from taking the “Trip Across the Border” indicated that there would be no change, but that was because their work was not involved in border crossing, so the information learned was not applicable. On Tour B, it appears that the tour provided a better understanding of composting as a disposal tool, and tour C caused five people to change their perspective about the use of anaerobic digestion as a mortality disposal tool (three intended to explore it as an option and the other two decided it wasn't feasible).

### CHANGE IN OPERATION CONDUCT FROM TUESDAY AND WEDNESDAY'S SESSIONS

For Tuesday's sessions the majority of people indicated they would make changes in collaboration (share information,

consult with persons with experience, reach out to others) and disposal (concentrate more on composting options, use of One Health ideas in disposal, better understanding of challenges). Wednesday's sessions produced more comments on changes to be made in policy (mostly from Dr. Ahn's talk and relating to controlling the movement of vehicles for biosecurity) and research.

## CHANGE IN OPERATION CONDUCT FROM CROSS-BORDER FMD WORKSHOP AND DEMONSTRATIONS

The cross-border FMD workshop garnered varied comments, but mostly that the participants gained valuable knowledge about the complexities and details behind controlling a foreign animal disease. The demonstrations provided useful tools for participants to look into for their jobs, and as one participant stated, "Will cause me to want to buy big expensive tools."

## CRITICAL GAPS IN RESEARCH, OUTREACH, POLICY AND/OR RESPONSE CAPABILITIES THAT STILL NEED TO BE RESOLVED RELATED TO THE CONFERENCE

For each day of the symposium, as well as overall, participants were asked to identify critical gaps in research, outreach, policy and/or response capabilities that still need to be resolved related to the information presented and suggest how and by whom these gaps may be resolved. Appendix C lists all of the comments received. The evaluation committee categorized the changes described; the number of comments in each category for each day is listed in Table 16.

When comments from all pages were added up, three categories stood out as having the most gaps identified: research,

Table 16: Number of comments identifying critical gaps in different categories based on information presented at the Symposium

Category	Overall	Tours			Tuesday	Wednesday	FMD	Demos	Total Comments
		A	B	C					
No gaps		1				1	1	2	5
Communication/Collaboration	4	2	2	2	10	8	14	1	43
Education		2	1		8	4	3		18
Emergency Response	3		1	4	2	1	3	3	17
Industry Response					1				1
Planning	7	4	5	3	2	8	12	2	43
Policy	4			2	9	6	7	1	29
Research	10	2	3	5	16	17	6	6	65

planning and communication/collaboration.

### Research Gaps Identified

1. Disposal (33 people):
  - a. The majority indicated that the fate of viruses, prions, pathogens and/or pharmaceuticals in ALL disposal methods, but especially composting, burial and landfill leachate was a major gap in research.
  - b. Others thought there should be more research on mass disposal, such as the amount of space needed for composting, the carbon footprint of different disposal methods and identification of land sites/soil recommendations for disposal. One suggestion for covering the gap of finding information about appropriate land sites: ARS may be able to look at a national research project here in the US.
  - c. Risk analysis was identified by seven people as a gap saying that research needs to be done on aerosol production in composting and transport, as well as risk analysis of different methods.
  - d. Several people indicated that a knowledge base needs to be built on all disposal methods including the pros and

cons of each and microbiological research.

- e. Three people indicated that there needs to be more research on the use of digesters as a disposal method, including their ability to kill pathogens.
  - f. Movement of infected or contaminated carcasses (for off-site disposal) without disease spread. One suggestion for covering this gap: Biosecure transport options and regulations research by USDA.
2. Disinfection/decontamination and Recovery (14 people)
    - a. Pen-side tests FMD for food products to facilitate continuity of business
    - b. Returning to normal operations (rendering/composting facilities)
    - c. Wood and porous surfaces
    - d. Virus genera mapping for disinfectant susceptibility
    - e. Efficacy of economical, widely available, non-toxic disinfectants
  3. Depopulation (6 people)
    - a. On-site technology, especially for large animals
    - b. Humane methods of destruction-more research from veterinary/animal welfare community about euthanasia and mass culling techniques
  4. Prevention (2 people)
    - a. FMD vaccination research

#### Planning Gaps Identified

1. The majority of responses (26) indicated that lists or standard operating procedures should be written out to aid in:
  - a. Resource allocation was mentioned by 12 people including such things as mobile units, feedstock availability, capacity, companies/places that can assist in response (4 people specifically mentioned the use of renderers).
  - b. Seven people indicated that clear procedures should be written out for emergency situations for all aspects based on likely scenarios. Three of these people gave suggestions for covering this gap
    - i. Guidelines on: leaders of emergency response (federal, state, local) and database as well as a communication SOP.
    - ii. Continue similar sessions [cross-border FMD workshop] and work to develop more developed plans for the most LIKELY scenarios.
    - iii. Two levels of planning: (1) off-site planning steps - overall disposal strategy based on type of event (natural disaster versus disease) (2) on-site planning steps - based on farm location, species and options for disposal - matrix that can be applied on site.
  - c. Roles/responsibilities and skill sets of available people (4 people).
  - d. Depopulation procedures (3 people): i.e. best methods of welfare slaughter for each disease and/or species. It was **suggested** by one person that this should be done by veterinarians and another said it was a government responsibility.
2. Six people indicated that transportation and movement need better planning, including cross border movement.
3. Two people indicated that a secure milk (food) supply plan needed to be in place.
4. The rest of the people who indicated planning was a critical gap simply stated that preplanning and a lack of “next steps” were a big gap. One **suggested** we use lessons learned to plan.

#### Communication/Collaboration Gaps Identified

1. The majority of responses (15) indicated that no one entity should work alone. There needs to be more knowledge exchange and all parties that are involved should be included. There needs to be better understanding and communication/coordination between professional disciplines and government agencies (Health, Agriculture, Environment, Regulatory bodies), as well as industry and everyone else involved.
2. Eight people indicated that public perception is a very large gap. One person said that they hoped there would be proactive media releases after this symposium to highlight the beneficial and proactive work that is going on in preparation for a FAD.
3. Consistency in policies across borders regionally and nationally was a gap that was identified by ten people. They indicated that there is a need for better regional, cross state and cross country partnering.
4. Inclusion and relationship building with industry and law enforcement was mentioned by five people.
5. Five people indicated that sharing of events and collaboration with other countries is a big gap. This could be

mitigated by sponsorship of people from other countries to get expertise from everywhere.

### **SUGGESTIONS FOR NEXT SYMPOSIUM**

In addition to gaps, or possibly to address gaps, five people gave ideas for the next symposium:

1. Great topic for next year: Presentations on the protocols/steps needed to take disposal options from a state of null ops to functioning in ops mode for FAD response (do for all disposal options) Example: Rendering: compare Null ops (routine) to non-zoonotic FAD (includes biosecurity and C/D) to zoonotic FAD (includes biosecurity, C/D AND human PPE).
2. One session could deal with traceability and its importance during disease outbreak situations (Canada and Australia could present).
3. Transportation's a challenge that is often addressed in moving equipment for process to point B. What is needed is how best practices of transport should work for various options available for disposal. For example, ways to work biosecurity of off-loading, etc. if transporting to rendering or landfill, etc.
4. Perhaps a session on animal welfare in stressful situations.
5. I would like to see a presentation on communication and how to communicate sensitive subjects to public, retailers, etc. with regard to animal disease management, disposal, etc.

## **APPENDIX A: COMMENTS MADE BY PARTICIPANTS ON KEYNOTE, PLENARY, BREAKOUT AND POSTER SESSIONS - TUESDAY 5/22/12 AND WEDNESDAY 5/23/12**

Twenty-five people wrote 33 comments on Tuesday's sessions and 31 wrote 37 comments on Wednesday's sessions.

### **Logistics**

1. Well organized conference; wide breadth of topics; great to have so many international speakers.
2. Excellent meeting; lots of opportunity for networking; the facility is well set up for meeting and is convenient.
3. Concurrent sessions caused problems in missing many sessions. Don't know exactly when 2<sup>nd</sup>, 3<sup>rd</sup>, or 4<sup>th</sup> presentations started to enable jumping from sessions to session. Voices from one session heard in others.
4. Plenary session room was cold for much of the day, otherwise a great facility and well set-up (2 people said this).
5. Audio for some presenters was inadequate because of improper placement of their lapel microphones.
6. Unable to comprehend some of the speakers; the cause was a combination of factors: thick accent, non-experienced microphone jockeys and crowd over-talk/lack of decorum.
7. Still cold in the Michigan Superior room; food was great.

### **Tuesday Keynote (Research, Regulations and Response) and Plenary (One Health)**

8. Some were better than others. Dr. Klingborg needs to update some information, not much new information presented by Gary Flory.
9. Gary Flory's talk was too basic.
10. I did not find the keynote or plenary session to be valuable.
11. Both keynotes were great.
12. Keynote lectures by Don Klingborg and Gary Flory were very informative emphasizing that collaborative efforts are required across the agencies to implement the One World One Health concept.
13. Future One Health lectures should include additional information that might be new material.

### **Session 1: Emergency Response and Policy**

14. Pollard talk was right on.
15. Breakout session 1 had good information but I need more lessons learned/recommendations as to how these experiences can be applied to the USA.
16. Ed Malek – great real-world example of handling on-farm poultry mortality management.
17. Dr. Brendan Pollard – great explanation of challenges with large scale animal mortality and need to consider all alternatives for disposal of carcasses.
18. Examples and plans appear well thought through with emphasis on common sense and flexible plans based on situation specifics.

### **Session 2: Alternative/Mechanical Disposal**

19. Researchers on gasification are too academic; it would be nice to simply run the system and answer the question "Does it physically work?"
20. Interesting UK bioreduction project.

### **Session 3: Environmental Effects of Disposal**

21. Really enjoyed session 3 because the topics presented were recent research and included information about new technologies.
22. On presentations by Dyan Pratt – possibly some of the research methodology could have been eliminated with more emphasis given on practical expectations of her results; Speaker is obviously well informed and was able to answer questions such as, "does bacteria (microbial) population move in the soil; what are her practical applications from her research?"

### **Session 4: Disposal, Depopulation, Decontamination/Disinfection and Recovery**

23. Whole house poultry gas presentation was very informative.
24. I have a better appreciation for the difficulties of mass depopulation of a contagious disease.

### **Wednesday Keynote (2010 FMD Outbreak in Korea) and Plenary (PBB's Continuing Impact on Michigan)**

25. Ahn presentation excellent and useful; had suspected transmission issues but good to hear.
26. Keynote address was very informative and I learned about the FMD in Korea; plenary session was boring and lengthy.
27. Thank you for bringing Heekwon Ahn in as a speaker; this was an eye opening talk; to see what happened and lessons learned during an actual outbreak was fantastic.
28. The keynote and morning plenary session were fascinating.
29. Understanding the actual occurrences in Korea FMD outbreak was eye-opening; changes in US stand/plans regarding an FMD outbreak was useful.
30. Excellent presentation from Korean representative.

31. Dr. Ahn's talk was very powerful; I appreciated the amount of transparency present.
32. The Korea experience was excellent; learning from their challenges is very important.
33. PBB presentation was sobering to say the least.
34. Dr. Ahn and Steve Halstead's presentations were both fascinating; excellent choices.
35. Excellent FMD presentation and true-scale information; excellent use of comparing policies and experiences from other countries.
36. Excellent presentations in S. Korea/PBB/HPAI in China and the efforts for continuous improvement; It is still required to learn from the past so that we don't repeat in the future.
37. Korean presentation was absolutely excellent – clear, frank and useful.

#### **Session 5: Animal Mortality Composting**

38. I have learned a lot about composting!

#### **Session 6: Disposal, Depopulation, Decontamination/Disinfection and Recovery Tuesday**

39. Excellent information by Lori Miller in session 6.
40. Decontamination results by Liz R. are great.

#### **Wednesday Plenary – Knowledgeable, Ready and Able**

41. Afternoon plenary was good.
42. I did not think the presentation by Tom Glanville was on track based on laws, policies, and generally accepted practices.

#### **Session 7: Policy and Education**

43. Excellent information by Lori Miller in session 7.

#### **International Panel Discussion**

44. International panel provided great information.
45. Loved the panel.
46. The international panel discussion did not capture African's perspective in terms of handling emergency situations and composting; I suggest that future symposium organizers should invite panelist from all the continents especially Africa to capture a global view of the problem.
47. Excellent session; international panel was great.
48. Excellent presentations from an international level.
49. Loved the International panel, great idea!
50. International speakers were very good; it helps to see how others deal with similar issues.

#### **Session 8: By-products and Foods of Animal Origin**

51. Nice summary of SMS by Pam Hullinger in session 8.

#### **Poster sessions**

52. Rethink the use of Prezi – did not work that well for “manned” displays.
53. Enjoyed the digital posters.

#### **General Comments**

54. I appreciate international speakers but I cannot understand their presentations.
55. Communication very difficult with Nigerian and Vietnamese participants/speakers.
56. I had considerable difficulty understanding the S. Korean; if I had the opportunity to read his report before his presentation, I may have better understood his oral presentation and been able to ask questions.
57. Measured response is where US is going and good to see others doing likewise.
58. Very informative and interesting; I learned something new from each session.
59. Good presentations; good interaction.
60. It is good information and I know about One Health.
61. Some presentations a little research heavy, but I was able to pick pieces out that were helpful.
62. Very informational sessions.
63. Breakout sessions seemed to have many speakers giving caveats that their talks weren't their areas of expertise or they were presenting for someone else.
64. There is need for a coordinated networking amongst the presenters at various sessions to help achieve a better result and understanding of the topic in their various countries.
65. Very useful information I could share and get during symposium.
66. Trials should be conducted in Africa.
67. I think it is important to help to control animal disease.
68. It is especially troubling that burial and “in-ground” disposal remains the primary method of choice for mass carcass disposal world-wide.

## **APPENDIX B: COMMENTS MADE BY PARTICIPANTS WHEN ASKED HOW THE INFORMATION PRESENTED WILL CHANGE HOW YOU CONDUCT OPERATIONS**

Seventy-two people indicated that information from at least one of the tours, Tuesday or Wednesday's sessions, the FMD workshop, the demonstrations, or the overall symposium would change how they conduct operations in one of the following categories: no change, collaboration, depopulation, disinfection, disposal, education, emergency response, general knowledge gained, planning, policy, research, specific action.

### **OVERALL SYMPOSIUM**

Forty-two people made 54 comments

#### **Collaboration**

1. Increase contacts and resources.
2. The networking component of this conference was the best of any conference I've attended. I will reach out to my new contacts often and especially for help with things for which I don't have the knowledge.
3. It has been a great meeting with a lot of information and excellent forum to establish new networks.
4. Planning with states for research/exercises and collaboration to save time and money.
5. I will focus on stranger communication and coordination with colleagues.
6. It allows me to focus my efforts in the right direction, using new contacts.
7. No immediate changes, but hope to use contacts.
8. I am much more aware of the research, groups, people that are involved in similar work. Contacts gained and networking were key to this symposium.
9. Sharing of information and knowledge. Mentoring/contacts for help.
10. New ideas, interacting with other states to see how they address disposal.
11. Much freer sharing of information and asking of questions of other countries. Will be discussing detail of resources, stockpile options and introducing new disposal options.
12. Networking was key. I will follow up with many new contacts after the meeting.
13. Provided contacts to pursue information and collaboration.

#### **Disposal**

14. Creation of awareness on the use of composting as a good means of handling/disposing animal mortalities.
15. I have learned a lot about disposal options especially composting. I will recommend composting to stakeholders.
16. Will be incorporating more composting options as opposed to burial.
17. Implement newer technologies related to disposal; improve current use of composting.
18. Will be introducing new disposal options.
19. Now aware of concerns and research that can aid in our disposal.

#### **Education**

20. As a University teacher, my attendance at this symposium has really helped me to improve my capacity in this area and properly position me to do more meaningful teaching and research.
21. I came to know different aspects of mortality management and I will disseminate that knowledge through Extension bulletins.
22. I will use the information for education on composting large animal carcasses.
23. Recharge energy to improve education and increase collaboration.
24. I will champion the inclusion of animal mortality waste management in university curriculum. (This person is also a lecturer at the University of Nigeria).
25. Enhance ability to conduct 3D activities to a higher standard.
26. A report will be written of what I learned and will be shared with my counterparts.
27. It is very useful for me to attend the Symposium after I apply in my countries I will share information and change my ideas about managing animal mortality, products and associated health risk.
28. Incorporate into educational efforts.
29. It helped me gain plenty of useful information I can apply to my master's thesis.
30. I will disseminate knowledge gained from this symposium through Extension bulletins.
31. I will use the information for education on composting large animal carcasses.

#### **Emergency Response**

32. Better informed decision making for future emergency responses.
33. Better understanding of real world responses to events and how managed. Need for review and update to plans and

policies as well as need for better use of regular exercises and engagement of other entities (government, states, countries and industries).

34. The information here will help us continue to develop our emergency response plans and also add elements to exercises when we have an opportunity to drill.

### General knowledge gained

35. Open to new strategies/technologies.
36. Increased understanding of breadth of research that is being done.
37. Expanded knowledge. Generated ideas.
38. It will be shared with my peers in my field. We will take some information and modify this to fit our industry.
39. Renewed inspiration.
40. This has helped me define the status quo of my organization. It gives me a bar to measure my work achievements against and I am looking forward to measuring the change that will occur before the next symposium.

### Planning

41. Better understanding of more of the issue should improve planning and policy or regulatory recommendations.
42. Better base for future planning.
43. For planning purposes.
44. Good layout of info to place into plans.
45. Update protocols to improve response.

### Policy

46. Basically, I am going to learn a lot more about my state and local policies.
47. Operations will not change immediately. Information will be implemented to change some policies.

### Research

48. Incorporate into research efforts.
49. I came to know different aspects of mortality management and I will be able to apply knowledge gained from this symposium to my research.
50. Have new research ideas and implementation ideas.
51. I will use the information for research on composting large animal carcasses.
52. Help me focus some of my future research projects
53. Learn a good knowledge on the topic. It will also promote me to validate our technology as one of potential powerful "3D" application (funding is required).

### Specific Action

54. Change our sales strategy.

## TOURS

**Tour A:** Twelve people made 12 comments

### No change

1. Five (5) people indicated no change, but four of them commented that they now had a better appreciation and understanding of border control issues, opportunities and risks.

### Disinfection

6. I learned the importance of acquiring knowledge of disinfecting wood which is used even in the ultramodern Canadian facility. I need to make the APHIS FAD disinfectant list better known on the APHIS website.

### Disposal

7. Landfill information somewhat informs capacity for massive disposal.
8. Landfill procedures and policy is an option for animal disposal that needs to be utilized more effectively in Saskatchewan. Not THE answer but a part of the answer/solution.
9. The design of the landfill and practicability for engineering burial designs for carcass disposal.

### General knowledge gained

10. Allows me to look at ideas with new perspectives. It gave me a better understanding of how Canada looks at imports/exports. The best thing is that it is apparent both countries are working together and sharing information.

### Policy

11. I will look at how landfill sites are operated for animal carcasses.
12. Better appreciation of protocols from both sides of the border and more in-depth understanding of reasons for levels of scrutiny.

**Tour B:** Nine people made 10 comments

### No change

1. No change

### Disposal

2. Composting was shown to be an effective cost efficient option for animal disposal and can be considered a valid option in plans for dealing with emergencies that is relatively easy, low cost and effective. This will be viewed as a validated method of disposal in policy making.
3. I definitely learned a lot about composting and the practical approaches used by the farmers and about all the variables that come into play. I am motivated to learn about the local and state regulations in my area.
4. More and more convinced that composting works wonderfully on carcasses. I just need to bring it to a “massive scale”.
5. Provided me with additional information to educate others; potentially educate producers to implement these methods.
6. How to better use composting and rendering to handle large animal mortality.
7. I may look at simpler ways of constructing compost systems.
8. I will also check to see what rendering services are available in our state.

### Education

9. Provided me with additional information to educate others; potentially educate producers to implement these methods.
10. Based on the fact that both the dairy and the swine operation felt that they were composting properly but they were doing totally different things and the swine one was bet being done well at all, I think it would be a good idea to check on farms in our state to see how people are composting and maybe do some refresher courses.

**Tour C:** Seventeen people made 18 comments

### No change

1. Five (5) people specifically stated there would be no change but one indicated that it’s good to know research and improvements are on-going in spite of budget issues.

### Collaboration

6. Formalize relationships with companies involved in routine mortality management to use for emergency purposes

### Disposal

7. Anaerobic decomposition will be considered as a future disposal option.
8. Anaerobic digestion - will explore this within home context.
9. Consider anaerobic digestion for carcass disposal
10. Anaerobic digestion would be fine for routine mortality disposal. Animal carcasses may be used as co-digestion material for animal waste (manure) anaerobic digestion process. Due to the toxicity regarding NH<sub>3</sub> and the limited buffering capacity, anaerobic digestion for disposing animal mortality as major digestion material may not be a feasible method.
11. We had been asked to consider permitting anaerobic digesters for carcass disposal. I'm convinced it is not the best method.

### Education

12. Better able to advise farmers on composting of non-emergency mortalities.
13. It is important for me to know information. I hope I'll be sharing information with my college in my country.

### Planning

14. Better knowledge of composting which will carry over to future planning.
15. Encourage me to pursue increased event management capacity. Better understanding of lab capabilities.
16. Increase consideration for time of event disposal considerations. Provide a better understanding of analytical and diagnostic biosecurity.

### Research

17. Got some new ideas to possibly implement into our research.
18. Re-examine new potential research areas related to priorities identified on tour.

## TUESDAY'S SESSIONS

Forty-four people made 53 comments

### No change

1. The information will provide additional background for emergency response, but it will not change the operations at this time.
2. Nothing will be changed.

### Collaboration

3. I will try and collaborate with the group presenting on the changes to microbial populations beneath burial sites.
4. Amplifies the importance of collaboration and how different agencies should put aside individual agenda and work for a solution that is good for all i.e. compromise and work together.
5. Share information on disposal options with more regulatory agencies (currently work with environmental and agriculture, but not health).
6. Ability to consult research and guideline information and/or consult with persons with experience to be able to consider more options.
7. First, it gave me an area/forum to meet people related to the research I am conducting. Further, it gives me an area to find information about FMD and the eradication thereof.
8. Increased interaction with human health departments in communicable diseases. Disinfectants and sharing information with EPA to determine options in peacetime.
9. Presentations provide an incentive to reach out to others, network and pursue additional education on the subject matter. I hope to take advantage of these contacts.
10. New individuals to consult for deeper understanding.
11. I now know people whom I can contact for further information.

### Depopulation

12. Important validation that in-barn euthanasia of poultry with CO<sub>2</sub> is humane.

### Disposal

13. Will concentrate more on composting options.
14. Consider the use of compost in an event – new research is emerging.
15. I have learned that there is no disconnect between human and animal health and the environment. Thus, in response to management of mass casualties in the farm, I will consider disposal methodologies that are safe for human, animal and the environment.
16. Better understanding of one health and implications to disposal as all 3 [animals, humans, environment] impaired.
17. Better understanding of some of the challenges associated with various disposal options (example: leachate movement/bacterial population, difficulties associated with C/D rendering facility).
18. Would like to get the perspective and better understand the availability and capability of private companies that contract for disposal and decontamination efforts.
19. Correct procedures for composting large animal carcasses.
20. I will investigate alternative disposal systems, especially composting.
21. Increase efforts to continue development of new technologies and the implementation thereof.
22. Consider anaerobic digestion of carcasses.

### Education

23. Future education of producers.
24. I will introduce students in my university to the “One Health” concept.

### Emergency Response

25. More confidence in what we are already doing that is consistent with information presented.
26. Build better response and recovery plans for food and agriculture emergencies.
27. Greater awareness of the factors that need to be considered when responding to emergency response. Understanding that issues around emergency response are the same in my country.
28. Identified the need for more planning for emergencies in my state.
29. Our state is currently drafting an emergency response plan for FAD/disaster response. This session has been helpful in exploring options for mass mortality disposal.
30. Learned about FISMA from Juan Reyes which will allow me to recommend off label disinfectant use during emergency.
31. Now working on State Mass Carcass Disposal Group. This information gave me a broader knowledge on the issues surrounding mass carcass disposal and different methods.

### General knowledge gained

32. Excellent information that can be applied in my work setting. Have a better understanding of some of the methodology behind existing standards (i.e. methods, contact times, etc.).
33. Greater understanding related to impact of burial of carcasses and bio-reduction or mortalities.
34. Increased knowledge and awareness of subject.
35. Expanded my knowledge of all issues and the complex issues of all research that is being researched.
36. I am better positioned by virtue of the new knowledge acquired to appreciate methods of managing animal mortalities.
37. It was interesting to hear about the leachate amount leaving the compost site. I thought it was much more. So would like more information on that topic.

### Planning

38. For planning purposes and plan development.
39. Looking at international experiences relating to animal disease is very helpful in moving forward and using their lessons learned to an advantage. There were sessions presented that had not been identified in our disease management plans such as restoring rendering plants after
40. Better knowledge for planning.
41. It helps a lot for my research on policy and emergency preparedness plans.
42. Look into our disaster preparedness.
43. Drives home the importance of secure food supply plans to limit the need to euthanize and dispose of livestock.
44. Look more closely at prevention of disease. Better understanding of toll on human workers during emergency.

### Policy

45. Brings new science to my knowledge base that I can take to my administrators and Board for making policy and regulations.

### Research

46. I do research and I learned a lot about the data gaps and what is being done to address them.
47. Incorporated into research projects and educational programs.
48. It helped me realize why we had some of the issues we had with my thesis project and gave me some things to think about if I were to replicate my project.
49. The information presented in alternative/mechanical disposal session will be very useful for my future research in terms of alternative disposal method which can replace burial.

### Specific Action

50. I will check out decision trees of various places and EPA's I-waste tool.
51. Motivated me to learn more about my local and state ER response and motivated me to read the federal regulations
52. Helps our company tailor our product development and sales strategy.
53. The One Health concept will help drive the way I approach things in the future.

## WEDNESDAY'S SESSIONS

Thirty-six people made 37 comments

### No change

1. Little change, but provided better understanding of "overall" processes and issues related to an emergency. I already have a good understanding of process and issues related to "disposal" from an environmental perspective.
2. No change.

### Collaboration

3. Broader understanding and network to pursue additional knowledge.

### Disinfection

4. I will investigate the use of lime with carcass burial.
5. Looking for alternative disinfection products and procedures.
6. Many talks centered around C&D research which is great information to have. Gave me a new perspective on the importance of proper cleaning! Will help our department focus on training to identify proper methods. Apply disinfection practices.
7. Will need to flesh out and improve the C&D portions of our response plans. We need more detail and these talks have helped in that realm.

## Disposal

8. I will be looking at mass mortality disposal options as a mix of all various systems (render, landfill, bury, compost, etc.).
9. Learned a lot about composting. Have some new ideas on how to make it better.
10. The animal mortality composting gave good alternative ideas on how piles can be constructed differently and more aesthetically pleasing, also different methods on how to collect samples.
11. We don't know much about fate and transport of barbiturates so we need to be careful disposing of euthanized carcasses.

## Education

12. I will be taking back the lessons learned and policy changes/operational changes presented by Dr. Ahn, for priority discussion in my own organization and as further education for colleges and industry.
13. Policy and education is very critical in the fight against emerging animal disease and handling. From this symposium, it is my intention to include animal mortality waste management as part of my teaching curriculum in my university.

## Emergency Response

14. Rethink about how to act/respond quickly when the outbreak happens.
15. The information on the outbreak in Korea gave me new insights about what a potential response system could look like to be more effective.

## General knowledge gained

16. Sensitivity to broader potential for negative influences on the quality and quantity of food and feed.
17. The lessons learned from the PBB outbreak will carry through my practice in that I will focus on many details and take nothing for granted.
18. The topics are novel to me. I am beginning to build my capacity in the topics discussed.
19. The discussion by the international panel was extremely interesting and raised questions that I will be bringing back to industry.

## Planning

20. Added information for planning decisions.
21. Great information obtained from the lessons learned and will allow for more informed decision making.
22. This has allowed me to see where I should and should not ask questions. It has also allowed me to understand where politics and science cross, which can stop movement on a project or send it forward.
23. Very good understanding of the lessons learned in other countries. Can use this understanding to complement existing understanding and implement lessons into ER planning and response.

## Policy

24. Drives home the importance of secure food supply plans to limit the need to euthanize and dispose of livestock.
25. Utilize information from Heekwon Ahn to reinforce the need for industry to have good biosecurity and tracking, i.e. the large number of farms infected by truck movement. Dairy milk disposal info from Uruguay supports this.
26. Utilize the information from Heekwon Ahn lecture to reinforce the need of having good biosecurity practices for industry and traceability. Controlling the movement of vehicles.
27. These sessions provide a look at situations, experiences and research going on in various countries which will help to develop policies at regional/provincial and federal levels. We can learn the most from others' experiences and lessons learned.
28. I will investigate the discrepancies in regulations between different countries.
29. Should personal/hobby flocks be inspected periodically?

## Research

30. I will visit FAZD website to consider submitting a disinfectant study proposal
31. Focus on scale of disease control during an outbreak is an area of interest for research and I'll start including that in my research planning.
32. I would like to do research on large animal carcass composting and conduct educational programs.
33. Look for funding to do more pharmaceutical testing – enlist the help of a chemist to understand what's happening with breakdown and if breakdown products or other drugs used can interfere with breakdown of drugs.
34. Mortality composting session gave me a lot of ideas for designing future research project to apply composting technology to treat and dispose animal mortality, especially for emergency catastrophic animal disease outbreak.
35. Incorporate into research and educational efforts.

## Specific Action

36. Secure milk supply will help me tremendously with my work. Thanks to Pam H. for this work.
37. Changes how we approach various government agencies for use of our products.

## CROSS-BORDER FMD WORKSHOP

Thirty-three people made 34 comments

### No change

1. No change.

### Collaboration

2. Looking at sharing procedures with the regulatory agencies.
3. We will be much more aware of all the issues and differences when dealing with Canada and the US. We will try to improve communication on all levels to promote efficiency and consistency.
4. Enhanced communication and engagement of industry.
5. Review state plans, policies and arrangements. Need to confer with other states and determine how we would work together in an outbreak, particularly when factoring in changes to response plan modifications.
6. Will try to work more with state agencies and other stakeholders in preplanning to develop SOPs for emergency management.

### Disposal

7. Disposal Table A identified disposal methods based on jurisdiction. Very helpful in understanding roles of different disposal methods. Helped identify misconceptions about disposal options, especially composting.
8. More open to some of the alternatives after in-depth discussion from experts.

### Education

9. Refinement for detailed plans/exercise/training.
10. Tabletop exercises more frequently and conduct with industries so peacetime understanding and planning is optimized.
11. Will definitely learn more about ICS and my State's policies. Need to investigate federal regulations and I-Waste program.
12. Would like to develop an exercise from this to involve veterinary students – important to start disseminating information to vets at all levels.
13. Very interesting session. I will try and see how different our cross-border control strategy differs between those of US/Canada.
14. My operation doesn't fit into a lot of this, however, lessons learned here will be taken back and shared with my industry.

### General knowledge gained

15. I am better positioned to understand and appreciate issues concerning decontamination.
16. Kansas issues provide interesting perspective for those in US.
17. The options shared during the workshop could help me to consider many detail things behind animal disposal methods and systems, such as politics, regulations, international collaboration, etc.
18. I realize the expertise of the carcass disposal reports.
19. My understanding on how to handle FMD outbreaks has improved/advanced. Key discussions and control methods for FMD outbreak has been clearly understood.
20. Provided international and domestic perspectives along with identification of shared challenges and critical deficiencies.
21. Some different approaches on static problems that were not presented previously.
22. The discussion we had with our little breakout group was great and contributed to my better understanding of specific issues.
23. Widened horizons.
24. Better realization of the need for advanced planning and communication.
25. Promote greater preparation/digestion of operational information data from my state.

### Planning

26. Assist in planning
27. Broader scope of application; more planning.
28. Depopulation and disposal have advanced and will apply new advances to options and protocols. Crux of "how will you change opts" is that we still have some big pieces that need standardization, etc. to allow states to then train down to, especially true in movement control, etc.
29. Need to have better plan for depopulation and subsequent disposal – need teams in place and resources identified and located. Need to have a method identified to provide psychological support for workers perhaps tap someone from public health.

30. Planning purposes
31. Standard operating procedures for disease response and movement control.
32. This will allow me to plan for a more diverse outbreak, should one occur. It is definitely educational.
33. Focus on secure food supply plans.

### **Research**

34. Priorities will be added to list of items for potential research.

## **DEMONSTRATIONS**

Seventeen people made 18 comments

### **Disinfection**

1. New cleaners/sanitizers with limited environmental impact.

### **Disposal**

2. I will keep my compost pile drier.
3. Look more closely into alkaline hydrolysis.
4. The carcass shredder adds a possible solution to the problem of stabilizing carcass for transport.

### **Education**

5. Can consult with producers about on-farm composting options.
6. Can provide producers in my area with information about all the different composting options.
7. Adds to my body of knowledge to draw in when I am doing training and outreach work.
8. The entire process was quite interesting and will insure I include this practical training into my teaching curriculum.
9. Very informative and should be included in future meetings.

### **General knowledge gained**

10. Better understanding of which practice is "best" used based on scale, conditions and circumstances involved.
11. I have gained new capacity.
12. Gaps identified to begin re-focusing on specific areas after re-categorizing their importance.
13. I now have a clearer knowledge of some of these techniques observed from practical situations. I will be reading/reviewing information/protocols/guidelines with more detail now that I am aware.

### **Planning**

14. Excellent presentation on euthanasia will be very useful for future planning (gunshot/captive bolt).
15. Greater efforts to assure event preparedness.
16. It will provide a better basis for operational planning. I now am more confident of the gaps we have either being resource allocation or very basic knowledge as in scientific knowledge gaps and I can better drive R&D priorities.
17. Will work on better plans.

### **Specific Action**

18. Will cause me to want to buy big expensive tools.

## **APPENDIX C: COMMENTS MADE BY PARTICIPANTS WHEN ASKED TO IDENTIFY CRITICAL GAPS IN RESEARCH, OUTREACH, POLICY AND/OR RESPONSE CAPABILITIES THAT STILL NEED TO BE RESOLVED.**

Seventy-four people indicated that information from at least one of the tours, Tuesday or Wednesday's sessions, the FMD workshop, the demonstrations, or the overall symposium left gaps to be resolved in the following categories: no gaps, communication/collaboration, education, emergency response, industry response, planning, policy and research.

### **OVERALL SYMPOSIUM**

1. Twenty-four people identified 29 gaps

#### **Communication/Collaboration**

2. The largest gap is working alone instead of with other agencies/governments/countries and industry in developing permitting requirements.
3. Communication among primary stakeholders is key. These are the people who will help convey messages to the public - we need to continue to develop these relationships.
4. My feeling is that the biggest gap that needs to be resolved is public perception and support for the work we are trying to get done.
5. I would hope there are proactive media releases after this symposium to highlight the beneficial and proactive work that is going on in preparation for a FAD.

#### **Emergency Response**

6. Massive mortality from disease outbreak is a challenge to deal with. Disposal of the carcasses is not a goal. The goal is to disinfection of the pathogens and utilization of dead animal carcasses for value-added products. New technology development, knowledge exchange, education and industry involvement should be encouraged.
7. Overall logistics (start to finish) for an emergency including target timelines, bottlenecks and limitations.
8. Standard operating procedures for 3D, Business continuity plans; new data tools for capturing the disease information and for emergency preparedness.

#### **Planning**

9. Listing of available resources, mobile units, cost, availability, sources.
10. Broader engagement of all entities to identify roles, responsibilities and resources in light of changes to response plans to events.
11. Carcass transport Solution: CFIA/USDA
12. Response capacity and operational requirements for on-site and off-site mass mortality composting.
13. Specific vet decisions for mass depopulation or disease outbreak issues resolved by each disease case.
14. Better preplanning using lessons learned.
15. We need to better define, inventory and manage specific response resources and the distribution thereof during an event.

#### **Policy**

16. Consistency in policy (regionally).
17. Public funding for farms to implement state of the art mortality management systems.
18. Understanding of; consistence of; get all stakeholders here - politicians, government officials, vets and owners and hash some of the inconsistencies out.
19. Indemnity - government policy clarification.

#### **Research**

20. Large carcass destruction.
21. Still need a lot of work to address large volume mortalities!
22. Fate of SP and other compounds during composting.
23. More documented research needed for mitigation of FAD viruses as a result of composting, burial, rendering, etc.
24. Need more information/research on mass disposal.
25. Need research on farm side tests for bulk milk, pork for FMD detection to facilitate continuity of business.
26. Risk analysis is lacking. Because money is limited, where do you spend it for maximum impact/efficiency/safety.
27. Where does the pentobarbital in the water go when it leaves the compost site and in what form. Is the resulting form active/detrimental?
28. Prion research; "doable" C&D research.

## TOURS

**Tour A:** Ten people identified 11 gaps

### No gaps

1. One person specifically indicated that there were no gaps

### Communication/Collaboration

2. Consistency between border policies.
3. BFI and WM need to be at the table in reference to catastrophic carcass disposal.

### Education

4. Need for broader understanding among all affected of the process, procedures and regulations on cross border movement and import/export issues.
5. Producers need to know disease risks associated with moving (and raising) animals. They need processes that are understandable and easy to implement. Everyone has time management pressures.

### Planning

6. Method of welfare slaughter at site (multi species). **Solution:** Should be handled by government discussion - that is their responsibility.
7. Movement of MSW across border during an outbreak.
8. Cross border issues in an outbreak, i.e. livestock movement permit system when control and restricted areas in both countries. Documenting the actual logistics of how movement controls will occur.
9. US needs better system to ensure animals go to US import station and not potentially get lost and infect adjacent farms.

### Research

10. Determining the movement and persistence of pathogens (bacterial and viral) in landfill leachate is needed.
11. Need to know how to disinfect wood and cement and porous surfaces.

**Tour B:** Eight identified 12 gaps

### Communication/Collaboration

1. Possible lack of uniformity between composting regulations/guidelines between states. Would be a good idea to have national guidelines to on-farm mortality composting but probably very difficult to do.
2. There appear to be huge differences in how farms are being taught to compost mortalities (SOPs differ between MI and NY for instance). It would probably be good to standardize some of these so that composting is done properly.

### Education

3. Regular/frequent training of farmers on basics of on-farm mortality composting.

### Emergency Response

4. The advantages of in-vessel composting seem to be ignored or overlooked. The static pile is an improvement over burial for sure, but more attention and effort needs to go into the in-vessel composting.

### Planning

5. Darling International (and possibly other renderers) are very well set up to handle emergency disposal situations AND are perfectly willing to be part of that. Some sort of policy should be set up as SOP to include rendering as a first option in emergency situations.
6. Need encouragement and feasible options to help producers with carbon sources and bone grinding options for composting.
7. Relationship between renderers and livestock industry related to animal disease outbreak planning.
8. Rendering is essential for good mortality and by-product management.
9. How open would rendering be to use during FAD outbreaks?

### Research

10. Aerosol production when constructing compost piles/windrows needs to be "risk analyzed"/mitigated. Develop visual indicators/known time temp criteria when BHT is done of FMD positive carcasses. It would be very useful if a trial implicating bovine/swine massive composting be organized (n= 80 cows or n=500 sows): how big a footprint? How much substrate/carbon source? How high a T for how long? How long would Biological Heat Treatment (quarantine on premises) last?
11. Disinfection of rendering plants? Whether rendering industry would return to normal operations after FAD

processing.

12. Can we successfully decontaminate composting and rendering facilities after they process carcasses from FMD and other foreign disease?

**Tour C:** Fifteen people identified 16 gaps

### Communication/Collaboration

1. NRCS guidelines are very different from state to state.
2. Conveying research that is real world to stakeholders.

### Emergency Response

3. Composting has limited potential for mass mortalities but it is still another tool in the box.
4. Need to move anaerobic digestion to a more commercial application. Not suitable for disease outbreak situations and mass depopulation and disposal.
5. Surprisingly, anaerobic digestion technology has not been considered for disposal of mortality and decontamination of pathogens in US.
6. Understanding role of anaerobic digestion to be used as an emergency response mechanism or even a normal mortality management approach.

### Planning

7. Demo of planning process needed to provide suitable disposal sites/options for state/province/country. **Solution:** 2 levels of planning: (1) off-site planning steps - overall disposal strategy based on type of event (natural disaster vs disease). (2) on-site planning steps - based on farm location, species and options for disposal - matrix that can be applied on site.
8. Emphasize the finite nature of all event response resources and the prioritization of use and application.
9. Pre-existing agreements with companies that could assist in response - not clear what exists in this area (I am sure there's something but may vary significantly between states).

### Policy

10. Policy is probably the big unknown, what will really be allowed to happen when it happens.
11. Sometimes composting process does not kill all pathogens due to improper practices. Microbiological analysis of compost product needs to be taken into account. Records need to be kept. **Solution:** Farmer owners and/or DEQ can resolve.

### Research

12. Adding carcasses that will not disrupt digester performance.
13. Composting on large number of cattle.
14. Improved compost methods to enhance process so it can decompose prions and spore-forming bacteria; Evaluate throughput on anaerobic decomposition.
15. It would be beneficial to research anaerobic digestion of mortalities.
16. It would be helpful to have good research on pathogen kill via anaerobic digestion.

## TUESDAY'S SESSIONS

Forty-one people identified 48 gaps

### Communication/Collaboration

Better understanding and communication between professional disciplines and government agencies (Health, Agriculture, Environment, Regulatory bodies). **Solution:** Might be best done by emergency planners and coordinators. They understand the "scale" of potential risks and what the risks are while others are typically distracted by "day-to-day" work and pressures.

Gaps between Riverdale (Wash DC) and "real life". States are looking at same questions/problems - we do not hear from them and they do not ask what we are doing - work is being duplicated. Dr. Jon Zack could remedy some of this through talking to Area Emergency Coordinators (VS) stationed in all states - a good conduit.

I think one problem is in public perception. There is plenty of "need to know" information, however, there is also a fair amount of information that the public should know in order to build confidence in the public.

Need coordination between states and federal government to identify and share information on location of animal facilities (by type/species) in advance of animal disease emergency.

Need for greater sharing of policies and response capabilities. Greater community awareness of what needs to be done

during an emergency response.

No matter how much explanation or information is provided to allow people to understand the positions and policies of States/Provinces/Countries there never seems to be the ability to grasp the respective positions of each.

Public policy and risk communication.

There are few Nigerian participants in the Symposium indicating that human expertise in these areas of research is virtually absent. There is dire need to sponsor Nigerian/African participants to training in emerging disposal methodologies that they will disseminate to as many farmers as possible in the country. This when achieved will help reduce the human, animal and environmental risk that people are exposed to every day. There is need to form linkages/collaboration among professionals in these areas of research between participants from different countries that participated in the symposium.

Knowledge exchange is needed. Such as cross-communication with the areas of disinfection, other thermo-industries, environment and environmental microbiology.

Promote better regional and cross state partnering. Issues will occur at state borders when stop movement. Restrictions are put in place. Also some states do not have rendering plants so product (in disease response) may have to cross state borders.

### Education

As usual, communication and continued education are vital in solving these issues. In my state (MI) I would like to see an expansion of the extension services to help address biosecurity and proper disposal on farm.

Knowledgeable veterinarians that could assist with mass depopulation. **Solution:** Specific euthanasia training in veterinary schools for mass depopulation.

Outreach – increase producer awareness. **Solution:** Fact sheets (On-farm biosecurity – visitors, disinfectants) and education through extension, field days.

Outreach to the livestock producing public by animal health personnel regarding the reporting of disease (potential foreign diseases) and the proper disposal of non-emergency mortalities.

Education for industry and farmers, resident, local staff. **Solution:** Local schools supported by state and local agencies. ID and summarize the breadth of all topics that are being studied. The number must be large just from this convention

and number of different agencies and this is a strength of the cooperation of all.

Education of the public to UNDERSTAND the need for prevention of zoonotic disease through vaccines and other means that are under fire right now. Education of the public of options for disposal.

Training of swat teams (i.e. teams that are trained to go to areas of outbreak and work in a cohesive unit).

### Emergency Response

Coordination of efforts is the MOST important hurdle for emergency situations.

There are at least 16 technologies offering promise for effective disposal of carcass material, but in reality only 4 that can be implemented on short notice.

### Industry Response

Will renderers be willing participants?

### Planning

Environmental agencies/organizations need to be more tied in with emergency response planning. Great to see EPA here! Preplanning

### Policy

Consistency in policy

Legislation in many instances is far too restrictive/prescriptive and should be sufficiently flexible to allow for sound decision making.

Need to find ways to help farmers achieve better biosecurity through carcass disposal – funding support for new methods or construction/obtaining current methods.

Gap in rendering plants. Need to provide government subsidies for them. Also need to promote pre-incident FMD vaccine.

Need surrogates to use in disinfectant efficacy tests. EPA policy not using FAD-approved surrogates severely limits the number of EPA registered FAD disinfectants.

More funding and support for research and training programs.

More information on actual current USDA policy.

Policies that are consistent across borders.

Need for humanization of regulations and recommendations

## Research

To build the knowledge base and step up research in the area of animal disposal methods.

Aerosol particulates produced at distance "x" downwind from a farm where poultry composting pile construction is going on (and ventilators on). If we are to use mass mortality composting, we need to be able to document possible contamination associated with grinding/pile construction. More research needed in pathogen contamination of rendering plants (outside of "circuit" contamination).

Decontamination and disposal options for prions.

Examination of available on-site containment, destruction technology. This still appears to be a gap for on-going mortality management and catastrophic events implementation.

I'd like to see more information about appropriate land sites for disposal - burial, composting, etc. Is there research being done to address different soil types and recommended disposal options for each? **Solution:** ARS may be able to look at a national research project here in the US.

Large animal destruction methods that are humane and efficient. Radionuclear remediation efforts/methods.

More specific research on transport of infectious pathogens in soil, such as AI or FMD.

Need to have virus genera mapped for disinfectant susceptibility. Also, very little known about porous surface disinfection.

Mass mortality disposal. Disinfectant behavior on porous surfaces.

Need for empirical evidence as basis of recommendations for depopulation, disposal, decontamination and surveillance systems and lab diagnosis.

Carbon footprint/CCA comparisons of different disposal methods. There's a need for a whole nutrient budget approach that includes gaseous emissions and leaching.

Study of all disposal methods with clean cut pros/cons for decision making based on circumstances.

It would be useful for someone to evaluate the size of constructed on-farm compost systems to help us evaluate the sq. footage needed per animal unit (i.e. are we building systems that are too big, too small or about right?). This needs to be done on a multi-state basis. In my state there are farmers who compost mortality for 5-10 years on the same site. Research says nutrients leach minimally but it is only for 1 composting event. What if I leave the piles on-site for 2-3 years (maybe stacked real tall maybe not)?

Energy use for in-vessel burial chamber in Wales. Aerosolization of pathogens during movement to treatment and disposal. What do we do with burial sites?

More microbiological research is needed on all aspects of disposal.

More solid information on using composting as a mechanism to inactivate FMD, CSF and ASF in carcasses and contaminated bedding & manure, etc.

## WEDNESDAY'S SESSIONS

Forty-two people identified 46 gaps

### No gaps

Lori's presentation seemed comprehensive about gaps and Tom, Dale and Don's presentations put forward a way of solving them. I cannot comment on who would be able to do the work - for industry to self-update their information on a website will require great encouragement initially and we can all contribute to that.

### Communication/Collaboration

Broader discussion needed among government, industry and academia is badly needed. Cross (state and national) border discussion and planning need to be reviewed and exercised regularly.

Realistic explanations of true options and size matters. Share large events with other countries.

Still need more collaborative research and more consistent policies between states – this would take all stakeholders to sit and speak – leaving egos at home.

Public perception needs to be heightened; they need to be made aware of what is going on in a non-threatening manner. Collaboration and linkages among professionals from all the continents of the world including Africa (Nigeria) would go a long way in helping to solve these global health and environmental issues.

USDA/States/other countries need to communicate ideas and procedures with each other to help encourage one another on how to disseminate this information.

Often repeated, but the lack of clarity around roles and responsibilities is a major stumbling block. Communication and relationship building between the decision makers and the entire industry (not only primary producers) needs to happen during peace time. Trust is the key.

Education and knowledge exchange is critical

## Education

Great lessons learned. Need one clearinghouse for these lessons.

More examples of how these results are being implemented/taught – Impacts.

I was intrigued by the project proposed by Tom Glanville to use the existing extension service to disseminate information and resources. Hopefully I can promote this at home. Information resources always seem to be lacking.

Need to provide producer/operator knowledge about biosecurity and emergency response planning. **Solution:** short courses, fact sheets, local training.

## Emergency Response

Truly appreciated the afternoon plenary session that addresses providing information for emergency response at a local level. This is a big gap - many of our local responders assume the state will take care of things. We all need to address local response and its importance.

## Planning

Depopulation procedures.

I thought the summary of federal research gaps were very useful to have compiled and should be a process for other plans going forward.

Logistical and capacity limitations – region (dependent on geology, climate, industry), scale and production systems, species and available infrastructure. Availability and mobility of “mobile” disposal alternatives.

Looking for creation of SMS plan for dairy industry.

Methods to securely document inspections/duties for the future.

Guidelines and planning documents for first responders.

Large scale composting response capacity across livestock industries and jurisdictions.

Plans for regional and county. **Solution:** Guidelines on: leaders of emergency response (federal, state, local) and database as well as a communication SOP.

Response capability would seem to be the most significant limiting factor for outbreak conditions. Current day-to-day practices evolve to meet “normal” needs. **Solution:** Continue similar sessions and work to develop more developed plans for the most LIKELY scenarios

## Policy

Encourage normal mortality issues and mass mortality issues for each state and separate the two.

The matrix used by policy-makers for “risk-based” and “incidence-based” regulations: i.e. how are regulations so different between countries if we’re dealing with the same topic?

Disease and influencing factors for disease and multi-hazard response are increasing faster than the diagnostic and response technologies and capacities. Prioritization and increased funding are needed to expand response capacity and diversity.

What disinfectants are approved and how the waste water needs to be handled.

Federal 9 FRR regulations may not be congruent with MSS permit.

Gaps in I/E regulations on maintaining export with FMD vaccination. Need to remove FMD by using routine vaccination in production herds

## Research

More research funding is needed to support validation of new technology and development of new approaches.

Tracking burial/incineration sites for future use, research or testing. How complete/extensive does decontamination need to be to insure 99% safety. Cost versus risk.

Consider whether better detergents to remove pathogens is more important than porous surface disinfectants.

Are there biodegradation products left from sodium pentobarbital? Is xylazene interfering with breakdown? What about other pharmaceuticals?

More research needed on the fate of prions when composting large animal mortality.

Need to know more about (1) disposal options, and (2) fate and transport.

Comparative analysis of various methods for animal manure disposal and costing for these methods; development of standard operating procedures for manure disposal.

Disposal of large numbers of stock.

It’s very important to determine efficacy of economical, widely available, non-toxic disinfectants. More studies in “real world” situations like 100 year old barn wood, stone foundation, several foot thick manure pack, pastures.

Need to know how the use of lime during burial affects carcass decomposition.

Need to know what will degrade prions. I know this is ongoing research.

Phenobarbital: effect of xylazine on chemical breakdown. Xylazine/ketamine in leachate? What does SP break down to chemically?

Research on burial of animals in different types of soils – clay/silt, alkaline/acidic - to determine where to bury in unlined on-farm situations.

Need information on the ability and feasibility of moving infected or contaminated carcasses to other locations without spreading the infection. **Solution:** Biosecure transport options and regulations research by USDA.

Many gaps exist with regards to risk. Feasibility studies should be performed on disposal options for intensive livestock operation areas.

Really need to resolve how mass disposal will occur.

Milk disposal methods during an FMD outbreak is a gap that needs to be addressed through research.

## FMD WORKSHOP

Thirty-two people identified 46 gaps

### No gaps

None identified

### Communication/Collaboration

Major communication gaps between state and province (for cross border) and perhaps within commodity groups. Need to continue discussions with industry - that is their responsibility. Need better communication between state/province and federal level.

Different countries should have critical understanding of the FMD control methods/policies practiced by their neighbors in order to have a firm understanding of FMD outbreak.

Communication with industry and local law enforcement. **Solution:** meet & have understanding of expectations and authority.

Need for international planning and understanding.

Agreements regarding response and notification of encroaching disease. What does a country do when FMD approaches a border?

Knowledge of ICS (Incident Command System) among non-governmental people (i.e. farmers, ranchers, etc.) needs to be enhanced through training. What to do if on-site disposal capability is exceeded. Not all states have emergency response plans to cover major animal disease incidents.

Better communications between federal government and states regarding disposal. Perhaps set in place more in advance of emergencies.

We need to ensure all players are participating and encourage them to attend because thorough conversations can take place.

State and province sharing common border/operations might need to consider having an MOU together for continuity of business (COB).

When do you initiate "public" response activities during suspected outbreaks without alarming the public or destroying the market?

Integration of agency and industry responses needs work.

Movement control agreements between states and countries.

In addition to what was discussed at the report out: Need to better integrate Tribal Nations and help attendees better understand the sovereignty of Tribal Nations/Tribal lands.

### Education

Need to have more response teams trained in principles and practical application of composting.

Science and databases of that science.

Pre education of producers in biosecurity measures in the event of an outbreak

### Emergency Response

Need to review plans and policies; conduct exercises regularly to address critical shortfall issues and verify responsibilities and roles in the event of an outbreak.

Transport of intended carcasses. Composting methods for infected carcasses (mixing/grinding/whole).

Movement control permitting. Standardized universally accessible systems. Indemnity and appraisal.

### Planning

Preplanning.

Transportation of carcasses.

Resource allocation – analyze best use of human technical skill sets (i.e. if I only have X people where is the best place to put them from the point of view of overall response?)

Response capabilities: inventory of resources, transportation, loading/moving equipment; alternative disposal resources and capacities, compost materials. List of experts regarding disposal.

Crucial pieces of movement: (1) Biosecurity - completion of secure movement efforts for species (2) proof status - we have to get to increased capacity and approve tests or we blindfold ourselves (3) permitting - standardize and develop event management software/programs that will accommodate permitting/surveillance programs.

Need to know who has disposal expertise in each geographic area and their desire to work on an ICS team.

International agreements between USA and Canada need to clearly outline that in case of FMD outbreak what things could be done to keep the border open.

Lack of next steps. We review all the issues and criteria but we are left hanging with no proactive plan or milestones in place.

In-transit animal handling - need designated sites other than rest stops (e.g. stockyards).

Need for farms to have emergency carcass disposal plans prepared by knowledgeable planners.

Better sense of state and local planning needs.

Focus on secure food supply plans.

What is lacking is a "to-do" list for preparedness. We are all aware of the giant problem, but what is the call to actions?

### **Policy**

Better policy decisions now to enhance planning.

Policies need to be more consistent.

Indemnification policy for US needs to be settled and communicated.

Better policy decisions now to enhance planning.

Government disposal policy cannot be a one-size-fits-all. Disposal options will vary from place to place based on local geography and availability of land for burial/composting, permitted landfills, renderers, etc.

● Non-uniform worldwide decontamination standards.

● Is money an issue after disease outbreak? Is this the best way to have people interact?

### **Research**

● Gaps remain in FMD vaccination research. This piece is critical to the eradication effort.

● Science of decontamination.

Effectiveness of various disinfectants.

More information on euthanasia.

We need better large animal depopulation methods. All anyone has is captive bolt. Need other depopulation units located strategically for use by whatever state needs.

Pen-side FMD tests to facilitate movement.

Assurance of infection kill and spot test.

### **DEMONSTRATIONS**

Fifteen people made 15 comments

#### **No gaps**

No gaps

None

#### **Communication/Collaboration**

Greater coordination and cooperation on response policy, asset allocation and resource management.

#### **Emergency Response**

Plans and policies need to be reviewed and evaluated and ensure that different practices can be utilized depending on the scale of the event(s).

Use of things like the portable alkaline hydrolysis unit for emergency management situations.

Mass disposal is still an issue. The composting is good for routine but not in an outbreak.

#### **Planning**

People still need to do regional assessments of compost feedstocks so that sources, quantities, trucking and general availability will be known before they are needed for an emergency.

Need liaison to provide psych support.

## **Policy**

Policy and how to resolve issues.

## **Research**

Need more research from veterinary/animal welfare community about euthanasia and mass culling techniques - particularly of swine.

New methodologies for 1-step captive bolt.

The likelihood of aerosolisation of prions and pathogens during grinding of cattle.

How can emissions from shredder be controlled so pathogens are contained?

Welfare issues associated with foam euthanasia.

Need large animal depopulation methods.