

Agroterrorism Workshop

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Agroterrorism Workshop: Engaging Community Preparedness

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ABSTRACT. *Introduction:* Agroterrorism is the deliberate tampering with and/or contamination of the food supply with the intent of adversely affecting the social, economic, physical, and psychological well-being of society. Testimony before the Government Affairs Committee of the U.S. Senate has suggested that agriculture is an area that has received comparatively little attention with regard to terrorism.

Methods: In February of 2004, the National Institute for Occupational Safety and Health (NIOSH) Southwest Center for Agricultural Health, Injury Prevention, and Education developed a workshop on agroterrorism designed to engage local community leaders in a process to prepare for and respond to a terrorist event involving the food supply. The workshop was an effective collaboration between NIOSH Agricultural Centers, the state department of health (Texas), a school of public health, and the Texas Agricultural Research and Extension Centers in five urban and rural locations with substantial agricultural production. In order to reach a diverse and geographically widespread audience, the workshop was conducted by synchronous two-way interactive televideo (nine geographic sites). The audience of 155 participants was comprised of numerous stakeholders. The workshop format involved separate modules addressing food and fiber, livestock and poultry, food distribution, and emergency preparedness, with participants developing priorities for

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future consideration within their communities to address all phases of an event from preparedness to follow-up debriefing. There were 13 additional individuals (for a total of 168) who participated in the workshop subsequently through use of a video.

Results: Workshop evaluation components included pre- and post-workshop objective assessment of factual information presented (tests), and follow-up for implementation of priorities developed by conference participants. Statistically significant improvement was noted in knowledge acquisition. The six-month follow-up demonstrated implementation of preparedness planning priorities.

Conclusions: This is an effective method of reaching a geographically widespread and diverse audience of community members who will be on the "front lines" of an agroterrorism event. An attempt was made to enhance communication and collaboration among involved groups for effectively detecting and addressing such an event. This workshop can serve as a model for use in other communities. [Article copies available for a fee from The Haworth Document Delivery Service: 1-800-HAWORTH. E-mail address: <docdelivery@haworthpress.com> Website: <<http://www.HaworthPress.com>> © 2005 by The Haworth Press, Inc. All rights reserved.]

KEYWORDS. Agroterrorism, agriculture, terrorism, workshop, food, fiber, livestock, poultry, distribution, emergency preparedness, participatory, community, model

INTRODUCTION

Agroterrorism is the deliberate tampering with and/or contamination of the food supply with the intent of adversely affecting the social, economic, physical, and psychological well-being of society. Testimony before the Government Affairs Committee of the U.S. Senate in November of 2003 suggested that agriculture is an area that has received comparatively little attention with regard to terrorism.¹ "While many gaps remain, investments in preparedness, training and response have helped with the development of at least nascent incident command structures that have incrementally begun to span the gambit of potential terrorist attacks, from conventional bombings to more 'exotic' biological, chemical, radiological and nuclear incidents." However, agriculture "is a relative latecomer to the national security and defense structure and presently lacks sufficient visibility and influence to champion greater Federal attention to countering biological attacks."

Protection of the agricultural infrastructure of the United States is critical; it requires a preventive approach to accurate assessment of threats and consequence management. There are a number of key considerations, paramount of which are: (1) the protection of human health from potential deliberate threats; (2) access to a steady supply of safe food products; and (3) the psychological implications engendered by fear.

Additionally, the economic and social impacts would be substantial given that, in 2001, agriculture constituted in excess of a \$1 trillion industry in the United States representing 13% of the Gross Domestic Product.² In that same year, 25.6 million individuals were engaged in food and fiber production and in the farm sector. United States agricultural exports were \$52.8 billion and imports were \$39 billion. Clearly, given the scope of the industry, its cottage elements, the number of involved individuals in a largely rural sector, scientific advancements in food production, the ease of modern movement, and numerous geographic access points into the United States (land ports, sea-ports, international airports, common borders), the potential for terrorist threats is a reality. Creating awareness of these circumstances at a local level is considered key to recognizing and managing the response to such threats.

In 2003, the National Institute for Occupational Safety and Health (NIOSH) Southwest Center for Agricultural Health, Injury Prevention, and Education at The University of Texas Health Center at Tyler was awarded a conference grant from the Centers for Disease Control and Prevention to develop a workshop on agroterrorism designed to engage local community leaders in a process to prepare for and respond to deliberate contamination of the food supply. A one-day workshop was held on February 12, 2004 with the following objectives:

- Establish awareness of the wide range and entry points for terrorist acts in agriculture.
- Understand the importance of reporting and surveillance activities at the community level.
- Recognize the role of information dissemination, collaboration, and emergency planning for risk recognition and reduction at the local level.
- Be able to role-play scenarios that might arise related to agroterrorism.
- Retain knowledge and access information for future application to the preparedness process.

The workshop was an effective collaboration between two NIOSH Agricultural Centers (Southwest Center and Great Plains Center), a state department of health (Texas Department of Health), a school of public health (the University of Texas Health Science Center at Houston School of Public Health), and the Texas A&M System Agricultural Research and Experiment Stations in five urban and rural locations with substantial agricultural production. Local Area Health Education Centers participated in a facilitative role for the workshop, which was subsequently distributed by videotape with instructions for asynchronous use by the Texas Association of Local Health Officials (TALHO) in other localities.

METHODS

Program Design

In order to reach a diverse and geographically widespread audience, the workshop was conducted by synchronous two-way interactive televideo (nine geographic sites) with speakers from around the state and across the nation. The workshop format involved separate modules addressing: (1) food and fiber production; (2) livestock and poultry operations; (3) food distribution; and (4) emergency preparedness/readiness, hazard communication, and planning. Each 70-minute module included hand-out materials, a didactic component centered around a case scenario, breakout discussion

sessions, and “round-robin” reporting of priorities developed for future consideration by local communities. Priorities were to address all phases of an event including pre-event factors, event investigation, post-event evaluation (debriefing, psychosocial issues, future planning, etc.), and resource identification.

The workshop design was intended to offer a community-based model to prepare for an agroterrorism event that could conceivably occur at multiple points along the continuum from production to distribution of agricultural products. Food, fiber, and livestock were selected because of the scope of their potential health, social, and economic impact. Didactic presentations were built around case scenarios to enhance participant recall and likelihood of incorporating information into practice. Modules included specific detail related to potential agroterrorism events. For example, the food and fiber module discussed the introduction of a parasitic plant (witchweed) and its economic implication for select foodstuffs. The livestock and poultry module emphasized prevention of disease transmission through sanitary techniques (disinfecting foot wear) and the proper handling of animal carcasses. The application of careful record-keeping and tracking methods to investigate food contamination was illustrated in the distribution module using a scenario of watermelons injected with a pesticide. The emergency preparedness module focused on the planning process.

A unifying or overarching, but fictitious case scenario (see Appendix A), was developed to summarize issues for preparation, response, recovery, and evaluation in order to consolidate key priorities for follow-up within the local communities (Preparedness Planning Priorities). Groups such as TALHO, who utilized the program videotape as an enduring material, were encouraged to apply a similar format or design within their local communities. Workshop evaluation components included pre- and post-workshop objective assessment of factual information presented, qualitative participant feedback on content and workshop design, and actual implementation of priorities generated by conference participants.

Participants

The audience was comprised of numerous groups including extension agents, public safety personnel, veterinarians, sanitarians, health care providers, and other public health officials (see Appendix B). There were 155 participants in the original workshop, four at the origination site in Tyler, Texas, and 151 at the five extension service sites strategically located throughout Texas (Amarillo in the Texas Panhandle, El Paso in far West Texas, Lubbock in West Central Texas, Overton in East Texas, and Weslaco in the Rio Grande Valley region of South Texas). These sites were selected given the breadth of agricultural production they represent. There were 13 additional individuals (for a total of 168) who participated in the workshop subsequently through use of a video.

Collaboration with the NIOSH Great Plains Center was initiated based upon its interest in agroterrorism issues as well as the desire to demonstrate the application of uniform preparedness principles in spite of regional differences in the agricultural enterprises (e.g., corn

and pork in Iowa versus watermelon and beef in Texas). Similarly, collaboration with The University of Texas School of Public Health in Houston engaged the expertise of that facility along with input from another major urban-based center (see connectivity map, Figure 1).

Each site in the live, interactive workshop (including breakout sessions) was facilitated by a trained local representative of either the Area Health Education Center or public safety staff. Advance materials were provided as outlined in the Materials section below. Table 1 demonstrates the relative distribution of participants by urban versus rural location and by professional category.

The workshop was publicized through the Texas Veterinary Medical Association, public health electronic lists, and brochures mailed to targeted populations. No registration fee was charged and interested parties were encouraged to register via electronic mail or postal service. Every attempt was made to obtain an e-mail address for each registrant. Pre-conference materials including detailed agenda, map

FIGURE 1. Agroterrorism Workshop (February 12, 2004) connectivity map illustrating the collaborative and innovative nature of the conference.

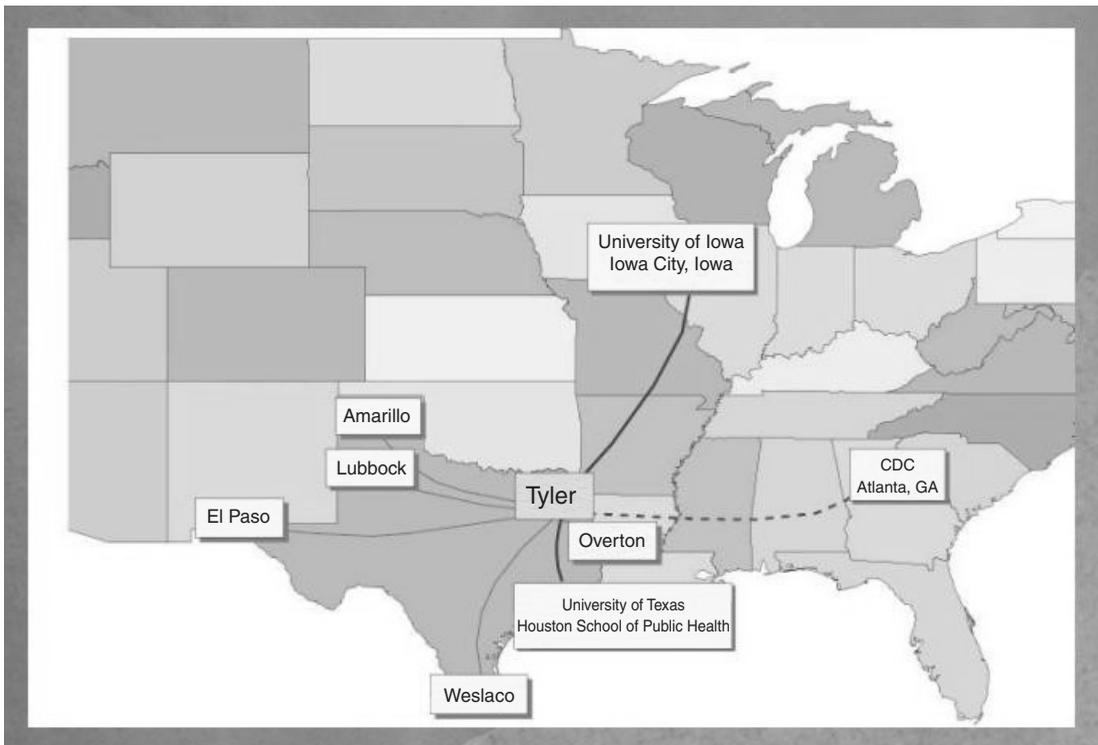


TABLE 1. Distribution of Agroterrorism Workshop Participants by Location and Professional Category

Location*	Percent Distribution	Professional Category**	Percent Distribution
Urban	44.6	Veterinarians	10.4
Rural	55.4	Emergency Medical Services	13.3
		Local agricultural organization	20.7
		Sanitarians/public health	40.7
		Other	14.8

* 168 participants in ITV or video workshop

** 135 responses to professional category (80% response rate)

and directions, and workshop objectives were sent at least one week prior to the workshop.

Materials

A series of curriculum planning teleconferences was held with both workshop speakers and the extension service sites. Didactic presentations and supporting materials, as well as pre- and post-test questions were obtained from each instructor and included in the manual of materials provided to each participant. The workshop presentations, manuals, and evaluation materials were distributed well in advance of the conference both in hard copy and electronic formats (back-up). Prior to the workshop, interactive televideo connections were tested and the format of the modules, as well as content of the manuals, were reviewed with the facilitators.

Special attention was given to the provision of resources for the module on emergency preparedness. Pre-conference planning included a review of educational materials and assets currently available for incident preparation and resource identification. A number of states and agencies have created needs assessment tools and developed materials to address their unique situations. The sources considered for construction of the course materials on preparation and planning are listed in Table 2. Information pertinent to the general development of an agroterrorism plan was identified either for inclusion in the didactic materials of the workshop or provision to the participants in their course notebook. One example is the American Veterinary Medical Association's publication, "Disaster Preparedness and Response." Although it deals strictly with animals involved in disasters, it does contain useful information for the planning of animal care in the event of an agroterrorism incident including extended care, quarantine, euthanasia, and how to proceed when a foreign animal disease is suspected in a herd or flock.

As mentioned, materials were used either in the creation of the presentation slide sets or added to the collection of appendix materials in the course notebook. The decision as to inclusion of a particular resource was based on the content of the document. Those documents that offered specific planning items or specific scenarios were chosen over materials that were overly broad or clearly nascent in their development. Materials were selected or chosen to provide the participants with either checklists

TABLE 2. Resources for Emergency Planning for Agroterrorism

Government Agency/Professional Association	Web Address
American Veterinary Medical Association	http://www.avma.org/
Texas Department of Public Safety Division of Emergency Management	http://www.txdps.state.tx.us/dem
Texas Homeland Security	http://www.texas homeland security.com
State of Hawaii	http://www.hawaiiag.org/
State of New York	http://www.nysemo.state.ny.us/
State of Wisconsin	http://www.datcp.state.wi.us/
State of South Dakota	http://www.state.sd.us/aib/
State of Louisiana	http://www.loep.state.la.us/homeland/
State of Minnesota	http://www.mda.state.mn.us/
U.S. Senate Government Affairs Committee	http://www.senate.gov/~gov_affairs/

(for assessment) or templates (for agreements/policies) that could easily be incorporated into their own planning efforts. Ease of use as a criterion was intended to reduce the lag time between the workshop and incorporation of the materials into community preparedness efforts. Although several very good documents were not chosen for inclusion in the workshop, those selected represent a very diverse cross section of issues to be considered by community leaders.

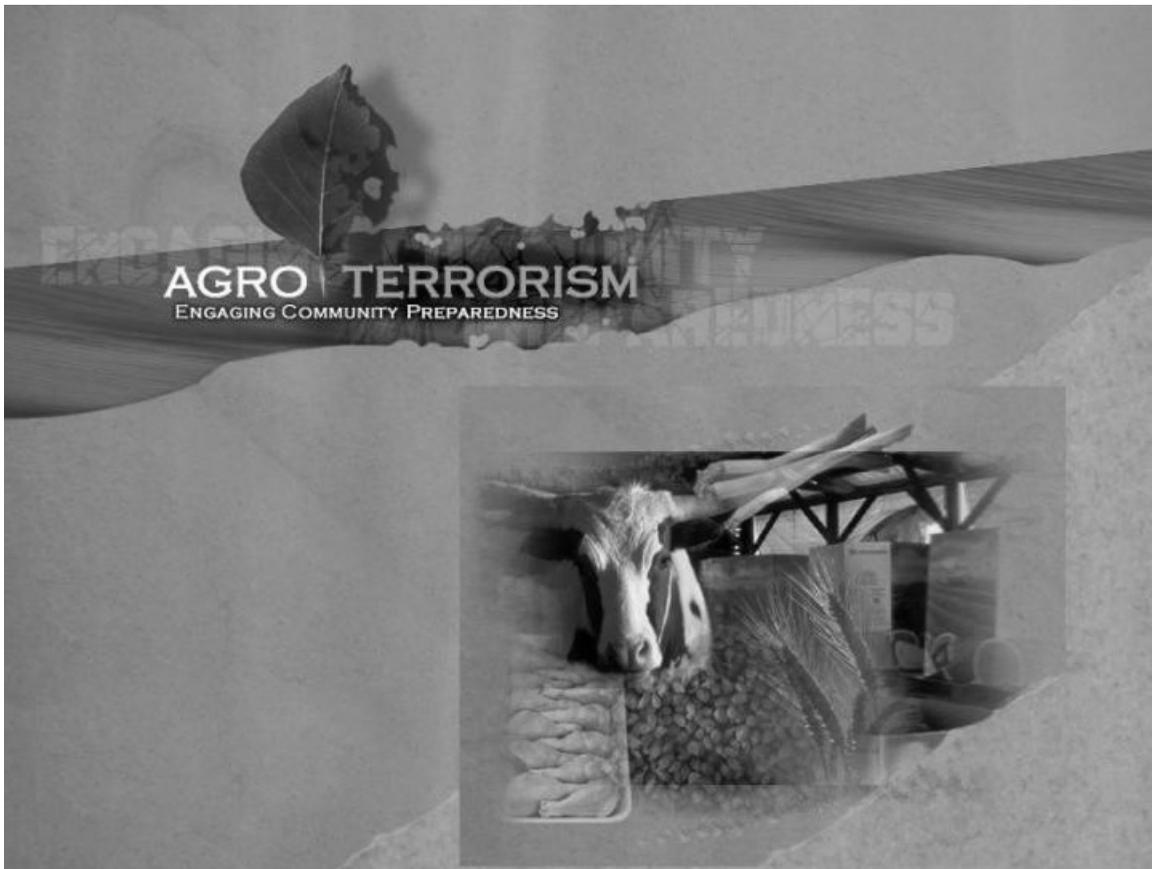
A value-added item from the workshop was a videotape recording of the four module presentations. The videotape also included portions of the group discussions and prioritization exercises. Intended as an enduring record of the workshop, the tape became an educational resource. Following requests for a second workshop, the videotape became a mechanism to asynchronously deliver content without a real-time connection to each of the presenters.

Participants could still provide evaluation feedback to conference coordinators. The video, combined with the course manual, gives every community leader responsible for emergency management the opportunity to learn about and initiate planning for agricultural terrorism. There were 13 additional individuals who participated in the workshop through this method.

A second resource for conference attendees was a Web-based conferencing platform used for posting resource materials distributed during the workshop.

A third tool derived from the workshop and now available to interested parties is a compact disk (CD). The CD contains instructions, module presentations, and all of the resource materials provided in the original workshop training manual to easily guide local groups through the preparedness planning process. Community users of the CD are also asked to provide feedback to workshop coordinators as part of the evaluation effort. Figure 2 shows this tool, also an en-

FIGURE 2. Agroterrorism Instructional CD logo and disk cover.



during material produced as a result of the workshop. The CD is available at no charge while supplies last and can be ordered online at: <http://www.swagcenter.org/resources.htm>.

Evaluation

A single-answer, multiple-choice pre-test, comprised of questions provided by the module presenters, was administered to participants immediately prior to the start of the workshop. The questions were generally technical in nature, focusing on specific agents and entry points of agroterrorism or on processes such as surveillance, investigation, and planning. The same questions were administered (in different sequence) at the close of the conference. An evaluation tool, containing questions relative to format and content, was also distributed for completion by registrants. Six months following the workshop, the post-test was again administered to participants, initially via electronic mail and use of the World Wide Web for responses. Survey questions were included regarding implementation of any of the preparedness planning priorities identified during the workshop. This was followed with a mailed request to enhance response rates.

RESULTS

Preparedness planning priorities developed at the close of the workshop are listed in Table 3 by event phase.

TABLE 3. Summary Preparedness Planning Priorities for Engaging the Community (by event phase)

Event Phase	Priority
Pre-event	<ul style="list-style-type: none"> Identify existing emergency management plans and guidelines for agroterrorism and apply them at the appropriate geographic level
Response	<ul style="list-style-type: none"> Know what agencies and/or groups to contact should a suspected act of agroterrorism occur
Recovery	<ul style="list-style-type: none"> Evaluate effectiveness of event response Inform the public after an event
Resources	<ul style="list-style-type: none"> Access data sources that may lead to evidence-based policies and educational approaches Identify partners who will participate in managing an agroterrorism event

TABLE 4. Results of knowledge content tests

Parameter	Completed Responses/ Total Participants	Result*
Mean Pre-Test Score	147/168	13.76/20
Mean Post-Test Score**	146/168	16.57/20
Mean Six-Month Post-Test Score†	62/168	15.45/20

* Raw scores

** Statistically significant improvement for paired raw scores at $p < 0.001$.

† Statistically significant improvement for paired raw scores from both pre- and post-tests at $p < 0.01$.

TABLE 5. Results of surveys regarding implementation of preparedness planning priorities*

Workshop Format Survey Source	Completed Responses	Implementation of at Least One Priority
Live Workshop	61	57
Video	4	4
Unknown/Anonymous	15	13
Total	80**	74

* Includes results from workshop and one conference using videotape.

** Total evaluations returned of 168 participants; response rate = 48 percent.

This information was posted on the Web-based conferencing platform immediately following the workshop for the benefit of participants. In excess of 70% of workshop participants responded favorably to the workshop content and delivery format. Table 4 contains results of the pre-test, post-test, and six-month post-test. A statistically significant improvement was noted between paired tests administered on the same date ($p < 0.001$) and for six-month raw scores paired with both the pre-test and post-test ($p < 0.01$). Six-month follow-up response rate for the post-test was limited to 62 of 168 participants (37%) compared with the same day post-test (146/168; rate = 87%).

A six-month follow-up survey regarding implementation of preparedness planning priorities had a more favorable response rate of almost 50% (80/168; rate = 48%). This included a single group of video participants. Responses are reported in Table 5. It is interesting to note several key ways in which participants have implemented preparedness activities in their local communities (see Appendix C). Of the total survey respondents (80), nearly 93% (74)

had acknowledged implementation of at least one planning priority.

DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS

This workshop was an effective and innovative method for reaching a geographically widespread and diverse audience of community leaders and numerous other stakeholders who will be on the “front lines” of an agroterrorism event. An effort was made to enhance communication and collaboration among involved groups to effectively detect and address such an event. With adequate program promotion and preparation, participation rates at a grassroots community level can be significant as illustrated by this workshop. Technologic failures can be held to a minimum with pre-conference testing and back-up planning. The workshop also permitted the development of enduring materials (videotape and resource CD) that could be used asynchronously at the community level.

Standard evaluation methods illustrated positive feedback for both content and format design relative to achieving the objectives of the conference. Same day post-tests demonstrated statistically significant knowledge acquisition for paired tests ($p < 0.001$) as did more remote (six-month) follow-up post-tests, albeit at a lesser significance level ($p < 0.01$). Test participation at six-month follow-up (62/168; rate = 37%) was significantly reduced, making conclusions about overall knowledge retention for the group difficult. Additionally, there are inherent limitations in using a pre- and post-test evaluation design to assess the impact of this community-based workshop approach on knowledge acquisition and retention. This is particularly true given a relatively high mean pre-test score ($13.76/20 = 69\%$) combined with administering the same test questions as the post-test on the same date. The results of the six-month follow-up test might be construed to indicate effectiveness of the method for knowledge retention (significant improvement of paired scores at $p < 0.01$). However, this could have been influenced by the fact that test respondents had access to the materials from the

workshop at the time of completing the follow-up test.

Given the technical and process nature of the test questions previously noted, statistically significant improvement in scores would suggest at least partial achievement of the objectives established at the outset of the workshop (awareness of entry points, understanding reporting and surveillance, recognizing the role of planning, scenario recognition, and retention of knowledge/access to information). However, this conclusion can be drawn with only limited certainty in light of the small number of test questions in the tool, use of raw scores as a measure, and other factors as outlined above.

More importantly, participatory workshops of this nature are effective methods of engaging local communities to undertake preparedness planning critical to containing outcomes associated with emergency events. Identifying key priorities for preparedness planning through didactic education and role-playing as well as participatory feedback are essential elements for the success of this type of awareness activity. The present workshop serves as a model for this purpose. The remote follow-up survey conducted following this workshop (though lower in response rate than desired) is an illustration of the effectiveness of this awareness intervention for pre-event planning. Of the respondents to this survey, a high proportion (93%) indicated implementation of at least one planning priority. Sample methods outlined in Appendix C demonstrate actual implementation of preparedness steps.

Key lessons learned during this process also include recognition that, regarding agroterrorism, widespread planning is already taking place, but there seems to be limited communication and coordination between and among groups with considerable overlap of authority. The lack of a “one size fits all” plan makes involvement at the community level, where early and preventive interventions are key, a challenging but essential task. Additional participatory workshops will be an important strategic objective to engage the community—where successful planning of this nature begins.

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APPENDIX A

**Overarching Case Scenario
Applying the Process
for a Suspicious Event**

- A 25-year-old male rancher and his 24-year-old wife arrive at the Emergency Room of a local rural hospital complaining of fever, nausea, vomiting, and diarrhea.
- They are seen by a moonlighting physician who is an infectious disease fellow from a nearby urban community.
- They are astutely diagnosed with toxigenic *E. coli* food poisoning after admitting eating rare meat from one of their slaughtered heifers.
- The couple recovers only to discover several weeks later that a neighboring rancher, from whom they had purchased feed, had undergone a similar experience.

APPENDIX B

Participants

- Agricultural producers
- Cooperative extension agents and scientists
- Emergency medical services and first responders
- Veterinarians
- Public health workers and sanitarians
- Emergency care, disaster recovery, and other rural health providers
- Area Health Education Centers (AHEC)
- State agencies
- Local Councils of Government
- Local Media
- USDA and other federal agencies
- Universities
- Commodity groups and allied industries
- Others

APPENDIX C

**Sample Methods of Preparedness
Implementation Within Local Communities**

- Prepared emergency kits for home, business, and cars.
- Discussed need for agroterror annex as part of county emergency plan.
- Reviewed current plan (part of six-month job requirement).
- Made copies of sections from the workshop manual and sent to co-workers in other departments.