Planning for Bioterrorism

Behavioral & Mental Health Responses to Weapons of Mass Destruction & Mass Disruption

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July 14 - July 16
2000

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This monograph includes an edited transcript and an executive summary from the conference, *Planning for Bioterrorism: Behavioral and Mental Health Responses to Weapons of Mass Destruction and Mass Disruption.* The conference was held July 14-16, 2000. The conference addressed the history, nature, and threat of biological agents. Agents were described to better appreciate the behavioral implications for illness, disease, prevention, and vaccination. Community and individual responses to potential bioterrorist events were described. Future approaches to the management and treatment of behavioral and mental health issues following exposure to biological agents and bioterrorism were discussed. The conference concluded with recommendations for policy, communication, education and training, and research.

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PREFACE

Biological agents are the New Millennium atomic concern. Agents - bacteria, viruses, prions - can create chaos and national disruption. Future management of bioterrorism requires a multidisciplinary approach to understanding the effects of these agents on nations, communities, families and individuals. In preparing for bioterrorism and other weapons of mass destruction there is an understandable disparity between priorities of the nation and those of individual communities. While experts believe that it is highly likely that there will be an attack using weapons of mass destruction somewhere in the nation, the risk of such an event in a given community is quite low. A swift and effective response by public officials to a bioterrorist attack can prevent negative consequences (e.g., panic, stigma and scapegoating) and promote responsible behaviors by citizens.

Local, state and federal leaders will shape individual and community expectations, beliefs and behaviors through their comments and actions. Specifically, the management of the acute situation will set the tone for societal responses. The accurate portrayal of ongoing efforts and successful forecasting of predictable events will enhance the credibility of authorities and diminish negative outcomes such as panic and chaos. A well-developed and well executed communication strategy is the cornerstone of this effort.

Because the medical community are "first responders" in a bioterrorist attack, a broad-based educational plan for this group is essential. Hospital response plans must incorporate mental health and behavioral interventions at all levels. Medical care for infected/injured people as well as for those people who fear they were infected must be based on proven psychological and behavioral principles.

The mental health and behavioral consequences of bioterrorism will be the most significant, long-term, and most costly of the effects of a bioterrorist attack. Future management of bioterrorist events requires a multidisciplinary approach to understanding the behavioral, social, and mental health effects of these agents on nations, communities, families and individuals. This very real threat and its psychological and social

consequences have not been adequately dealt with from the perspective of individuals living in communities around the world. Scientists, health care responders and national leaders must work together to assure health, order and continuity of government. The purpose of this publication is to raise awareness and identify solutions to the behavioral and mental health issues of bioterrorism.

The idea of infection caused by invisible agents is frightening. It touches a deep human concern about the risk of being destroyed by a powerful, imperceptible force. These beliefs activate emotions that are extremely difficult to direct with the tools of reason. The response of specialists in medicine, epidemiology, infectious disease, molecular biology, nursing and emergency medical services can bring some discipline and rationality to this situation. To be effective, the response must be well organized and communication must be made in terms that the public understands. Multiple organizations with conflicting and overlapping goals and responsibilities (e.g., health care, law enforcement, school systems, and social welfare) may increase the confusion and anxiety for the individual and community.

The novelty of biological weapons in combination with the activation of deeply rooted fears predict that strong psychological, behavioral, and social responses will occur. In order to develop primary interventions and treatment we must gain a better understanding of the behavioral and social implications of such agents for individuals, communities and nations. Multiple research methodologies must be used to address psychological and behavioral consequences of bioterrorism. These include empirical, historical, observational and qualitative studies. The findings from these studies will be critical for policy making and interventions.

This conference addressed the history, nature and threat of biological agents. We described agents to appreciate the behavioral implications for illness, disease, prevention, vaccination. We examined terrorists to better understand the impact on the community and the effect of media on individuals and communities. We examined community and individual responses to potential bioterrorist events. We discussed future approaches to management and treatment of behavioral and mental health issues following exposure to biological agents and bioterrorism. The conference concluded with recommendations for policy, communication, education and training, and research.

EXECUTIVE SUMMARY

The most significant, long-term, and most costly effects of a bioterrorist attack will be its mental health and behavioral consequences. However, despite these consequences for the community, society, and government, few resources are expended to address the mental health and behavioral sequelae of bioterrorism. In response to this oversight, distinguished international and community experts from many disciplines were assembled for a consensus conference on, *Planning for Bioterrorism: Behavioral and Mental Health Responses to Weapons of Mass Destruction and Mass Disruption.* These scientists, community, and government leaders examined existing information on the topic and developed recommendations for policy, communication, education, training, and research.

In preparing for bioterrorism and other weapons of mass destruction (WMD) events, there is an understandable disparity between the priorities of the nation and those of individual communities. While experts believe that it is highly likely that there will be a WMD attack somewhere in the nation, the risk of such an event in a particular community is quite low. Also, do we prepare for a low probability/high consequence event, such as smallpox, or a high probability/low consequence event with a less contagious, less lethal organism? In the event of an attack, the allocation of resources by federal and state governments carries a meaning well beyond those resources.

A swift and effective response by public officials to a bioterrorist attack can prevent negative consequences (e.g., panic, stigma, scapegoating) and promote responsible behavior by citizens (e.g., staying away from contaminated areas). Local, state, and federal leaders will shape individual and community expectations, beliefs, and behaviors through their comments and actions. Specifically, the management of the acute situation will set the tone for societal responses. The accurate portrayal of ongoing efforts and successful forecasting of predictable events will enhance the credibility of authorities and diminishes negative outcomes, such as panic. In contrast, lies and secrets will likely have disastrous consequences. A well-developed and well-executed communication strategy is the cornerstone of this effort.

Bioterrorism preparation is best framed as one hazard in an "all hazards" program; this underscores its relevance and assures continuity in preparation and training. The benefits

of preparation are multiple. The infrastructure necessary to respond to a bioterrorist attack is the same as that needed to respond to naturally occurring epidemics, such as the 1917 influenza pandemic. Preparation minimizes the psychological and societal consequences of WMD and fosters rapid recovery. It also increases the likelihood of the continuity of government and community. In addition, preparation may serve as a deterrent because it diminishes the effectiveness of WMD attacks.

Psychological and behavioral interventions need to be broad-based and targeted to the mental and physical health as well as the continuity of society, community, and government. Education and training are important interventions before and after a bioterrorist attack. They shape realistic expectations for what will occur and maximize the likelihood of a successful response. Interventions are needed for special populations and across cultural groups. For example, technological disasters show that mothers are especially worried after toxic exposures about damage to their children and future offspring. Those receiving congregate care and immunizations also represent special populations for intervention. Critical questions arise - What circumstances, if any, would warrant quarantine and how would it be carried out? The decision to quarantine creates two special populations, those included and those excluded from the quarantine. Difficult decisions must be made, such as a policy to address whether unexposed parents can join their infected children in quarantine.

Because the medical community are "first responders" in a bioterrorist attack, a broad-based education efforts for this group is essential. Hospital response plans must incorporate mental and behavioral health interventions at all levels. Medical care for the infected/injured and those who fear they were infected must be based on proven psychological and behavioral principles. Specially, medications would play a limited role in the management of psychological casualties. In the acute phase, anxiolytics may help acutely anxious individuals who do not respond to reassurance and education. In the chronic phase, medications would be used for the treatment of severe psychiatric symptoms that do not resolve and for expectant casualties.

Multiple research methodologies must be employed to address the psychological and behavioral consequences of bioterrorism. These include empirical, historical, observational, and qualitative studies. The findings from these critical studies can guide policy and interventions.

To date, the major thrust of WMD initiatives has been the training of first responders. The Consensus Group strongly supports the allocation of additional critically needed funding to identify and develop policies, communication programs, health care and mental health practitioner training, community intervention programs, and research on the behavioral and mental health effects of bioterrorism.

The recommendations that follow are grouped under 4 headings: policy, communication, education and training, and research. Due to the intrinsic relatedness of these areas, there is overlap. Resources must be allocated to all four areas to ensure that preparation and response to bioterrorism is effective and coordinated.

Policy

1. Provide immediate funding for research, education, and training on the behavioral and psychological effects of bioterrorism, in particular, and WMD, in general. To date, funding has been negligible.

2. Establish a Research Advisory Committee to receive, review, and recommend studies necessary to fill in gaps in our understanding. This committee should evaluate studies for scientific merit, as well as agreement with established research priorities.

3. Immediately develop policies on the distribution of limited resources, such as vaccines and antibiotics. Research and ethical review should inform such policies. If policies are perceived as inequitable, the government will lose credibility.

4. Arrange for real-time consultation with experts during a bioterrorist event. Because the expert pool is small and already committed during a bioterrorist event, redundancy in the experts pool is essential. The development of this national resource will lessen the burden on state and local communities to cultivate and sustain this expertise.

5. In developing policies, take into account the emotional impact of a bioterrorist attack on leaders. During extreme crises, public officials tend to come to decisions prematurely (e.g., terrorist attacks on the Atlanta Olympic Games and the Murrah Federal Building in Oklahoma City). Policies must guard against premature decisions that could have catastrophic consequences.

6. Hospitals should be required to have epidemic disaster plans which address mental health and behavioral issues. These plans must address the use of supplemental assessment and treatment protocols for mass populations, as well as alternative facilities for overflow.

7. Develop dedicated private communication lines to hospitals, public health officials, government officials and other essential data sources, and decision makers in the event of crises (e.g., the red phone in the White House). Regular phone lines will likely be unavailable due to heavy usage during a crisis.

8. Establish a central repository for information on chemical and biological agents. This repository must provide rapid, updated, and accurate information on bioterrorist agents to health care providers and be available 24 hours/day. The current Poison Control line, already a familiar resource with similar characteristics and mission, is a viable candidate.

9. Develop an assessment tool that rapidly and rationally evaluates the impact of a bioterrorist event on a community, e.g., the loss of life, contaminated facilities, loss of first responders, available resources and other useful indicators. This will serve both to organize thinking in a high-pressure setting and act as a guide for resource allocation.

10. Community, agency, and health care organization plans for bioterrorism should include written communication protocols and appropriate equipment. Pre-planning and practice are critical to ensure success.

11. Develop policies for monitoring evacuation and immigration into and out of contaminated buildings, communities, or cities.

12. Attention must be paid to the role of law and law enforcement in maintaining cultural continuity.

13. Review laws related to quarantine and vaccination; revise laws, when appropriate.

14. New policies are needed to address the long-lasting physical and psychological effects of bioterrorism and to clarify the government role in financing the treatment of chronic conditions, disabilities, unemployment, and indigent health care that result from such events.

15. Give careful thought to the societal implications of genetically altered produce and livestock. These practices may gradually erode the barriers to other biological alterations, including biological weapons. Similarly, the US government should consider the precedent established when using biological weapons against agricultural targets in other countries.

Communication

1. Risk communications experts, public officials, and infectious disease specialists must develop communication and information programs for each of the expected major biological threats. Risk communication after an attack is key in promoting healthy and constructive behaviors by the public and in reducing panic.

2. Communication policies are needed on who will inform the public and what specific actions will be recommended to citizens during and after a recognized bioterrorist event.

3. Develop specific communication programs for different groups. For example, following the Chernobyl accident, research in Norway revealed that urban and rural populations relied on different information sources and experts. Similarly, different health perceptions, health beliefs, and health practices of Hispanics, Asians, African Americans, and Caucasians require different communication strategies.

4. Communication materials and scripts must be culturally appropriate and translated into all languages found in the community.

5. Teach health care practitioners how to better communicate with patients about infectious risk, contagion, and prognosis. Physicians play an important role in shaping

the long-term reactions to a bioterrorist attack. As was seen in Chernobyl, the attribution of physical complaints to an event may increase disability and multiple idiopathic somatic complaints (MIPS).

6. Assist in the development of content and communications strategies for organizations, such as schools, municipal agencies, and charitable groups for use in the event of a bioterrorist attack. Protocols are needed for communicating with concerned friends and family members through the American Red Cross welfare inquiry system.

7. Establish a government-run emergency broadcast television frequency that is activated at the time of a national emergency, such as a bioterrorist attack. This would increase the probability that messages are delivered without sensationalism and that credible experts with excellent communication skills talk with the public.

8. Communication strategies for the public require a needs analysis, segmentation, and knowledge assessment. In addition, develop targeted messages (sound bites) for a variety of scenarios to communicate with the public before, during, and after a bioterrorist event.

9. Risk communication programs must include strategies about evacuation, quarantine, and immunization.

10. Communication strategies should incorporate the health-maximizing role of predictability, hope, and control, both at the individual and community level.

11. Include schools in community programs. School systems offer an avenue to educate parents, as well as students. Develop educational pamphlets for parents, in addition to age-appropriate materials for children. Particular programs that address parental concerns for children are needed.

Education & Training

1. Education and training programs are needed for community and national leaders on how to communicate effectively with the public in the aftermath of a bioterrorist attack. In particular, educate leaders on the factors that increase and decrease credibility.

2. Develop education programs for primary care providers on the relationship of anxiety, depression, and somatic symptoms to extremely stressful events. After a bioterrorist attack, particularly in the recovery phase, somatic symptoms are often misdiagnosed or over treated, and anxiety and depression missed and under treated.

3. Education and training programs for the medical community should include multidisciplinary programs (i.e., include ancillary support personnel), in order to diminish fear, maximize performance, and reduce absenteeism following an attack.

4. Assess all educational and training programs for efficacy, and effects on fear and sense of safety in order to improve future intervention strategies.

5. Develop small, laminated summary information cards for physicians, nurses, and physician assistants that lists the differential diagnosis of weaponized biological agents, to include routine pathogens, anxiety symptoms, etc.. Create the same information for medical "Palm Pilot" data storage.

6. Education programs for community, medical, and first responder leaders should include the management of vulnerability in individuals, groups, and communities. This community wide experience will differ in the pre-, during and post-event phases, and is often manifest by inappropriate behavior and resource use.

7. Create education and training programs in basic bioterrorism first aid, to include providing support and fear management. A successful model is Basic Life Support training; training could be provided by medical and community welfare agencies (e.g., Red Cross).

8. Prepare an educational campaign for the public about a bioterrorist attack. Research should guide its development.

9. Education and training programs for mental health providers must include the identification and diagnosis of medical illness in psychologically affected individuals. Observe individuals for physical signs and symptoms, as well as psychological findings.

10. Develop and widely disseminate model Acute Mental Health Intervention Programs (crisis intervention) to educate community practitioners. Mental health interventions are broader than the popular debriefing, which may have little or no role after a bioterrorist event.

11. Base education and training for mental health providers on sound principles of social psychiatry and risk communication.

12. Planning must include outpatient clinics and office-based medical practices because most care is outpatient based. During the Aum Shinrikyo attack, a large number of casualties sought care outside of hospitals.

13. Review medical protocols to ensure they include monitoring of behavioral, as well as the medical responses, to a biological agent.

14. As part of educating the public and diminishing fear, routinely drive HAZMAT trucks - with personnel attired in protective clothing - through neighborhoods to desensitize the community.

Research

1. Support research on the effects of communications upon mass behaviors. This research should examine the factors that propagate behaviors and those that extinguish them.

2. Research on mass behaviors is needed. Examine actions and settings which increase/decrease hysteria, evacuation, rioting, and panic, and identify the factors that alter these behaviors.

3. Study past public awareness campaigns that had unintended consequences and identify factors that precipitated and maintained unwanted consequences. For example, a recent education program on crime prevention had negative effects. Elderly living in low-risk crime situations developed unrealistic fears of crime and kept windows closed during extreme heat; this resulted in deaths from hyperthermia. Identify factors that motivate people to appropriate action with minimal fear and helplessness.

4. The relationship between "beliefs" about exposure and the subsequent development of Multiple Idiopathic Physical Symptoms (MIPS) requires study. These studies will have substantial impact on communication strategies. For example, studies could examine the governmental decision to remove silicone breast implants, in the absence of compelling scientific data, on the magnification of physical symptoms. Similarly, one could study past incidents involving suspected exposures to toxic substances and subsequent development of MIPS.

5. Complete a scholarly review of the literature that compares behavioral and psychological responses to bioterrorism with behavioral and psychological responses to natural disasters. This would include studying, for example, the relationships between individual response and resultant morbidity. It should also address the ways in which crisis counseling might differ in a bioweapons event vs. natural disaster, as well as the role of professionals vs. paraprofessionals in each type of event.

6. Study the behavioral and mental health effects of past infectious disease outbreaks to identify the effects and course on community, small group, hospital personnel, family, and individual responses. These should include outbreaks of anthrax and plague, Legionnaires Disease, West Nile Virus, Ebola, AIDS, and the 1917 flu pandemic.

7. Study previous bioterrorist hoaxes to identify the behavioral and psychological consequences on decision-making, communication, and interventions.

8. Test the behavioral impact of present and newly developed policies empirically using simulation exercises. For example, study decision makers and first responders to see whether or not they would report to duty if they were given antibiotics and immunizations but their families were not. Similarly, study the effects that worry about family has on performance and decision-making.

9. Comprehensively review past terrorism events using WMD (e.g. Tokyo sarin attack) and technological accidents (e.g., Chernobyl, Guiana) to learn more about the

psychological and behavioral responses of individuals, families, and communities. Pay special attention to actions that promote versus diminish scapegoating and stigma.

10. Study the SCUD missile attacks in Israel during the Gulf War to identify factors that contributed to the successful management of the fears of contamination and toxic exposure.

11. Research should assess, in real time simulation, the mental health "surge capacity" and its vulnerabilities. This work should also identify the level of training needed for various interventions, i.e., whom should paraprofessionals evaluate versus professionals; what skills are needed for various responsibilities?

12. Review previous DOD studies on the effects of simulated bioterrorist events to identify behavioral responses of individuals and groups, and how the dispersal patterns of the agent relate to fear and resource needs.

13. Research in simulation exercises should delineate the most effective methods of communication among large groups of top decision-makers. In the 2000 Denver TOPOFF exercise, conference calls with up to 100 people on line were unsatisfactory.

14. Study how to prepare the public to cope with the diverse, and often conflicting, information that is likely to occur during a disaster. For example, following the Midwestern floods residents were told to boil their water for various amounts of time by different government agencies. In the face of this confusion, how did people decide what to do?

15. Studies are needed to assess present perceptions of safety and security, and preoccupation with bioterrorism. This research should include group and individual differences.

16. Review the literature on panic and behavioral contagion/mass hysteria in order to develop strategies to reduce these responses to a bioterrorist event.

17. Explore the contributions of predictability, hope, and sense of control in communication strategies to positive outcomes at both the individual and community levels.

18. Research should identify the factors that diminish the probability of bioterrorist attacks and copycat events after a bioterrorist event. Research should also characterize how educational programs increase or decrease the probability of bioterrorism.

19. Research addressing the special needs of children is needed. The role of parents, such as the effect of mothers' anxiety on perceptions of child health (as was seen following Chernobyl) should be examined. Include the positive and negative effects of establishing special programs for children, families, and communities in such studies.

20. Studies should examine how certain societies were able to successfully ban feared weapons.

21. Studies about detection devices and protective equipment are needed. These include the effects of sensor alarms. For example, soldiers during training are told that chemical detectors warn of a gas attack. In theater during the Gulf War, however, they were often instructed to ignore detector alarms. Similarly, what factors cause individuals to wear protective gear when they have been told there is no need? What impact does this have on others without such gear?

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INTRODUCTION

Robert J. Ursano

DR. URSANO: The first task for this morning is for each of you to introduce yourselves and say a little bit about your background. We have approximately 30 people, and since I want to accomplish that in about 30 minutes, that means you have about a minute. I know that each of your CV's would take somewhere between 10 and 20 minutes to go through to really do them justice. Our goal is to get discussion going so actually the talks, presentations and panels are really quite constrained so there will be ample time for discussion afterwards.

DR. WEISAETH: I am a Norwegian citizen. I am a psychiatrist, Chief Psychiatrist of the Armed Forces, and I occupy a chair at the medical faculty at the University of Oslo in psycho-traumatology. Although I have a psychoanalytical background, I have been involved in traumatic stress research for about 25 years. I am very happy to be invited because this is very timely for us. Last week, Norway published a report on vulnerability in the Norwegian society, and biological terrorism actually occupied 20 pages in that report out of about 200 pages. I am very glad to be here. Also during this summer the World Health Organization (WHO) will revise its document, and I am involved in this work. As you know, the one from 1970 is now being revised, and I plan to convey to the annexes there on psycho-social response any ideas that come out from this meeting

MR. CORLESS: I recently retired as of two weeks ago from one of the local water utilities. The Washington Suburban Sanitary Commission serves about a third of the State of Maryland's water supply, and it is also about a third of the Washington Metropolitan area's water supply -- 1.5 million customers. I ran their water treatment, supply treatment, and distribution system. I have worked extensively with the consortiums of local areas governments and water utilities in emergency planning, and I have also worked with EPA and The American Water Works Association pretty extensively on looking at water quality. I'm very happy to be here.

DR. DEMARTINO: I am with the Center For Mental Health Services, which is part of the Department of Health and Human Services. Our agency is helping to put on this important conference. Two years ago I was asked to start a program within the department related to the psychological and behavioral consequences of weapons of mass destruction. Within the department the attention has turned mostly to biological terrorism.

MS. MONTGOMERY: I am the Supervisor of Safety with Montgomery County Public Schools, Department of School Safety and Security. I am the emergency and disaster representative for the school system to the Montgomery County Local Emergency Planning Council and the Emergency Management Group. We have over 135,000 students, 208 facilities, and approximately 20,000 employees, so we try our best to get prepared and be prepared for crises and disasters that can occur.

MR. JARBOE: I am the Deputy Chief with the Montgomery County Fire and Rescue Service. Among my many duties, I also serve as the WMD Coordinator for the department, and I have been involved with WMD Domestic Preparedness for over four years. Our department has been doing a number of things in the area of domestic preparedness. I have also served on the Maryland State Urban Search and Rescue Task Force since 1991. I was in Oklahoma City for nine days. I also serve as a member of the U.S. Soldier Biological and Chemical Command, SBCCOM as a member of the CWIRP, which is the Chemical Weapons Improved Response Program. I have been involved with that for over three years. I am also associated with the BWIRP, and I also serve as an instructor with the Domestic Preparedness Train The Trainer Program that trains the cities around the country.

DR. WISE: I am a psychiatrist, a consultation psychiatrist, and I have spent 25 years of my medical career working in general hospitals with medically-ill patients who develop psychiatric difficulties, so that is kind of my area of interest and expertise. And I spent 21 years in the military.

DR. MCCURRY: I have been on faculty at USUHS for about a year. I am a child psychiatrist, and I have been on the planning committee for this conference. In particular, I have been going out to various places within the community to learn about what is being done and to find experts for our panel.

MS. MORGAN: I am the manager of External Relations and Direct Services for the American Red Cross. I am a registered nurse, and up until the last year, I have been the lead for the development of the Red Cross Disaster Mental Health Program and have worked with a lot of the professional mental health associations, departments of mental health, CMHS, and then in the last few years have been involved with the Aviation Disaster Response activities which also can be related to terrorism.

DR. RADKE: I am the state medical director for the Minnesota Department of Human Services. I am a psychiatrist and an epidemiologist. My involvement in disaster response or trauma psychiatry began when I was the division psychiatrist for the 101st Airborne during the Gander plane crash in 1985. I have been interested ever since and

been involved in different activities with Bob Ursano. Currently, I am on the Disaster Response Team for The Department of Human Services in Minnesota, and I am on the Disaster Response Team for the Minnesota Psychiatric Society.

DR. CLIZBE: I am the vice-president of the Disaster Services for the American Red Cross and have responsibility for our domestic and our emergency international responses to disasters and a member of the Federal Catastrophic Disaster Response Group, or the CDRG, and several other letters that can be assigned. My degree is in Clinical and Organizational Psychology. Prior to joining the Red Cross I worked for about 30 years consulting with private organizations and companies on preparation for crises and crises management.

DR. NORRIS: I am a Community Psychologist and professor at Georgia State University in the Department of Psychology. My main areas of research is the epidemiology of trauma and the effects of disasters. Recently I have become interested in cross-cultural research. Currently most of my research is being done in collaboration with an anthropologist in Mexico, which has been very expanding as well as a great deal of fun. I do not have a background in bioterrorism, but that is part of what makes this very interesting. I can contribute a unique perspective given my research and background. One of the things that I am most interested in about disasters is how communities manage to mobilize and sustain helping over the months after the event. This perspective may be important when considering support provision in a situation of bioterrorism.

DR. BROMET: I am an epidemiologist and Professor of Psychiatry at Stony Brook. Around 1980 we got involved in a study of the Three-Mile Island accident which produced, from my point of view, findings that were very perplexing and surprising in a number of ways which I will share with you this afternoon. Since then I have conducted a similar study of Chernobyl. In addition I have been on several advisory panels for the Persian Gulf situation. I am particularly hoping that by the end of this conference we will arrive at some understanding of how one can intervene in this set of medically unexplained symptoms that occur following these events and just persist, and persist, and persist.

DR. ENGEL: I am a Lieutenant Colonel in the Army, a psychiatrist and an epidemiologist. I am also a Gulf War veteran. For the last four years I have been working with Gulf War veterans with medically unexplained physical symptoms after their Gulf War service. My research interests are services-oriented, health services research, particularly clinical trials of interventions for people who are post-military action of various sorts. And one of the important morbidities of these kind of events, often whether they occur or even in the situation where there is the threat of occurrence, is health consequences such as beliefs about health as well as medically unexplained physical symptoms. There are questions about what to do for these folks.

DR. LEHMANN: I am the Chief Consultant for Mental Health for the Department of Veterans Affairs. I have done work in the prevention and management of violence, suicide prevention, and PTSD. During the Persian Gulf War the VA geared up with the

help of DOD to establish training programs and provide some staff for debriefings and addressing the psychological consequences of disasters, both natural and man-made. My interests involve the education and training of clinicians, and in particular, the development of preventive approaches, e.g., ways we can work with the media to improve media management of these kinds of issues.

DR. HOLLOWAY: I am a Professor of Psychiatry and Neurosciences at the Uniformed Services University of the Health Sciences. Throughout my career I have been interested in human adaptation to extreme environments including environments characterized by extreme violence. My experience with terrorism goes back to initial work started in the mid-1960's, so I have been with this problem for some time and have been concerned about the issues, both of prevention, dealing, and rescue of various terrorist victims. Over the last few years, I have been working closely with the people at USAMRIID, (The Infectious Disease Institute), and the Army, to teach courses for physicians in these areas. I bring to this particular meeting the concern that a weapon, i.e., a dependent variable, bioterrorism, is beginning to dominate a discourse. Any time one allows a single dependent variable to dominate the discourse one runs the risk of playing into the hands of people who would do mischief, who then can choose a wide variety of other nasty things to do to you. I hope that we will have a very broad discussion in examining this particular area.

DR. SMITH: I am Professor of Medical History with the Uniformed Services University of the Health Sciences. My interests are mostly in how people think they know what they know in medicine, and why they think they know it, and avocationally, I guess I am a cynic well on the way to being a curmudgeon.

DR. MARLOWE: I am presently affiliated with the Department of Psychiatry here at the Uniformed Services University of the Health Sciences. The majority of my professional career was spent at the Walter Reed Army Institute of Research, where I was Chief of the Department of Military Psychiatry for over 20 years. Professionally, I am a social anthropologist. My primary interests are the consequences of exposure to combat on the part of soldiers, and importantly, the consequences of the sociocultural contexts in which this takes place and in which return takes place. I am interested in the ways these mediate outcome - both positive and negative. I was responsible for the assessment of stress and adaptation in the Gulf just prior to Desert Storm and for a large scale assessment of troops following return from Desert Storm. I was looking primarily at the psychological and health consequences in the soldiers. I have developed a very deep concern for a human being as an open system articulated to its contextual variables, and the impact of these on physiology, neurophysiology, and outcome.

DR. BARBERA: I am an Emergency Physician. I have been at the George Washington University since 1993. Prior to that, I have worked at Jacoby Hospital, the primary trauma center in the Bronx in New York City. Currently I primarily teach emergency management and work part-time in emergency medicine. I have been involved with major disaster response since the mid to late 1980's. I was the point person for FEMA in developing the medical part of the Urban Search and Rescue System, and I have been a respondent for them for things like the Oklahoma City

bombing and for several of the earthquakes and other events, and for the Office Of U.S. and Foreign Disaster Assistance. At George Washington University, we are probably the hospital that sits in an area most vulnerable to terrorism in the United States, being just down the street from the White House, across the street from the metro stop for the State Department, with the new World Bank building right across the circle from us, the IRS building and all of these other things we worry about at different times of the year. In the district, we have worked hard at developing a mutual aid system between the hospitals to help each other out during an overwhelming event. At GW we have worked at developing a mass decontamination system because we expect that after a major event the first notification of it will be a patient showing up. I also had the interesting experience of being the emergency physician on duty the day the B'nai B'rith incident occurred with the petri dish and the overwhelming panic response and getting the call saying we might be getting 200 biologically-contaminated patients showing up from two blocks away. I have a perspective of this from both an academic and a personal, professional area, and I think with these sort of semi-unknown weapons like bioterrorism and exotic chemicals, the behavioral aspects of this is about half the ball game. The other half is the information and management aspect of it. The medical component is actually somewhat less, and the amount you have to do medically depends on the other two things I just mentioned.

DR. SHAW: I am a psychiatrist. I retired from the United States Army. My professional life in the Army was mainly concerned was an interest in the psychological effects of trauma and combat stress reactions. I worked with the body identification teams, and again aircraft disasters. I worked with child victims of war in Mozambique trying to develop a program for that country in terms of intervention strategies for the child victims. I am currently Professor and Director of Child and Adolescent Psychiatry in Miami, and I have worked very closely there with community response to hurricanes and specifically was involved with a long-term study of acute and enduring effects of psychological trauma of children in the aftermath of Hurricane Andrew. I currently run a trauma and sexual abuse clinic at the University of Miami.

DR. TINKER: I recently have joined the Matthews Media Group in Rockville, Maryland. They are a communications and public relations firm. My position there is Executive Director of Research and Risk Communications, and the area of risk communications is really what I bring to this discussion. Prior to joining the Matthews Group I was with CDC, ATSD in Atlanta where I worked primarily in the area of human exposures to hazardous substances, both in acute as well as chronic events. Over the last three to four years I have worked closely with the DOD and VA in Gulf War illness issues as well as the anthrax vaccine issue, and all of the risk communications issues that surround those issues.

DR. NORWOOD: I am an Army Colonel and Associate Chair of Psychiatry at the Uniformed Services University. I have been working on Dr. Ursano's trauma team for many years now and have been an active part of that. We have also both served on the American Psychiatric Association disaster committee, and recently Bob passed the mantle to me as chair. I have a long-standing interest in this topic.

DR. CULPEPPER: I am from the U.S. Army Medical Research Institute of Infectious Diseases (USAMRIID). I have been there for three years. I am a Preventive Medicine Public Health Physician in the Navy. You might wonder why USAMRIID, an Army institute, has a Navy physician working for them. As we found that we were doing a lot of work and interaction with all the services for education and training of military physicians and health care providers for how to medically manage casualties as a result of biological warfare, USAMRIID had hoped to bring in some physicians from the sister services, both Air Force and Navy, and that is how I came on board. I have been there for three years. I am the Assistant Chief for Operational Medicine area that is primarily responsible for education and training, and for liaison between the institute and all of the government agencies, both in our country and also internationally. I worked on several NATO committee meetings for biological warfare response as well as the MOU between the United Kingdom, Canada, and the U.S., again for biological warfare and now terrorism. Our mission at USAMRIID is to do research for biowarfare medical counter measures, but as you know, in the past several years we have seen a tremendous increase in the interest in bioterrorism, so we have seen our mission at USAMRIID even shift away from particular emphasis on biowarfare on the battlefield to how we protect our citizens here in the homeland.

DR. FULLERTON: I am an Associate Professor in the Department of Psychiatry at Uniformed Services University. I came to USUHS with a background in Child Psychology. I had worked at Chestnut Lodge Psychiatric Hospital for about 10 years studying adolescents and children in long-term psychoanalytically-oriented psychotherapy. I came to USUHS about 13 years ago to work with Bob Ursano on a grant to examine the behavioral and psychological effects of chemical and biological warfare. We participated in the operational testing of the SCPS medical unit in Dayton, Ohio. This is the underground chemically-hardened shelter designed to provide medical care and to function much like a hospital emergency room except for the decontamination operation. We examined the behavioral and psychological responses during a series of simulated surges. One of the important issues to come out of these training exercises was the special difficulties women have functioning in the chemically protective gear, i.e., Military-Oriented Protective Posture (MOPP) gear. Since then, I have been examining rescue workers following mass casualties such as disasters, plane crashes. We studied adolescents following Hurricane Andrew, and the families who were evacuated from Homestead Air Force Base. We examined the effects of traumatic relocation. My particular interest over the years has been in spouses of rescue workers and the special problems that are posed to spouses, adolescents and families.

MR. PARACHINI: I am with the Monterey Institute of International Studies. Although my Institute is in Monterey, California, I am based in Washington. Our Institute looks at all of the incidents where chemical, biological, radiological, or nuclear weapons have been used by terrorists. We interview the terrorists, read all they have written, look at all the primary source material in order to understand their motivations and behavioral patterns. We try and get a sense of what a terrorist incident using unconventional weapons would really be like, or has really been like in the past. This is a part of a policy process that is overlooked; we are speculating about a number of things that might happen in the future and always looking at the physical part of it, but

not really thinking about psychological dimensions and how they might be managed. I commend you for doing this meeting. I think it is very valuable.

MR. MCDEVITT: I am the Chief of Police for the Metro Transit Police and have been with the agency for 25 years. I serve on several committees through the regional Council of Governments here in Washington, D.C. on chem/bio planning in the event of catastrophic loss of life through a weapon of mass destruction.

DR. URSANO: Thank you all. This is a marvelous group, and I hope you each got a bit of a flavor of the people that are here and the diversity that is present. Clearly, there is a different piece of the elephant represented by each person, which means part of the task is to encourage you all to speak up, particularly when you do not hear your vantage point being spoken of. John Parachini and Tim Tinker, in particular, I wanted to be sure to invite, because they have a wonderful perspective on things such as risk communication, and who are the terrorists and why are they doing these things, and what do we need to know about that in terms of anticipating what an actual attack might be like. I look forward to our discussions.

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LET'S MAKE NEW MISTAKES: REFLECTIONS ON MASS CASUALTIES & CIVIL DEFENSE

Dale Smith

During the past generation when the Commander in Chief has ordered United States Armed Forces to strike another land he has almost invariably attempted to make a distinction between the people of the land and the leaders who have incurred the wrath of the United States. Thus in 1991, when Operation Desert Storm began, President George Bush made clear that it was not the people of Iraq that the attack was directed upon but on the war machine of Saddam Hussein. This concern for a people who are seen as the unwilling pawns of leaders who make war is hardly unique - medieval war was class specific and in the eighteenth century professional armies waged war, hopefully, without upsetting the productivity of noncombatant citizens. But this is not the only model of War making. In the second century before the common era, Cato the Censor led a campaign in Rome to destroy the city of Carthage and, in 146 BC, the Roman army under Publius Scipio Aemileanus burned the city to ashes, symbolically plowed under the rubble and salted the earth. The people were killed or enslaved. In the religious wars of the sixteenth and early seventeenth century, in Europe, whole towns were similarly put to the torch and the sword. "History has always shown that there is no greater stimulus to unlimited war than the injection of highly charged ideological and emotional issues,..."[1] Modern, unlimited war is often traced to the nation state-in-arms concept of the wars of the French Revolution. Certainly the revolutionary and Napoleonic armies were destructive of conquered lands, largely in an attempt to make war pay for itself. But it was an American, William T. Sherman, who most clearly articulated the concept of the civilian's role in supporting war and so the justification of the deliberate targeting of civilians in a democratic, industrial state as a means of spurring war's conclusion. After the 1864 March through Georgia, Sherman prepared to turn his army north into the Carolinas and noted, "We are not only fighting hostile armies, but a hostile people, and must make old and young, rich and poor, feel the hard hand of war..."[2] He further knew that he was moving beyond the accepted bounds of conduct. He explained his thinking in a letter to General Halleck, the Chief of

[1] Historical Division. Directorate of Plans. US Army Combat Developments Command. *Restraints and Limitations in Warfare: from Ancient Times to the Atomic Age*, Ft. Belvoir, VA, 1964, p. 83.
[2] *The War of the Rebellion,* The Official Record) XCII:799.

Staff, in Washington, "If the people raise a howl against my barbarity and cruelty, I will answer that war is war...If they want peace they and their relatives must stop the war." [1] Jefferson Davis, the President of the Confederate State of America, described Sherman as "The Atilla of the American Continent"[2] but to Sherman the destruction was the fault of the rebels; on the burning of one town, he commented, it "can't be helped. I say Jefferson Davis burnt them."[3] Sherman's argument was straightforward - in a modern state, where sovereignty is vested with the people, who determine policy through their franchise, responsibility for war and the support of war rest on the people. Sherman's opinion was by no means universally shared, as one historian noted, thirty years after the Civil War ended, "Military operations are not carried on for the purpose of inflicting punishment for political offenses".[4] However no consensus was forthcoming, in fact, after the war Sherman was promoted to command of the entire army and used the same philosophy against the remaining hostile Native Americans.

The European wars, which followed in the second half of the nineteenth century, were, for the most part, limited wars; neither civilian lives nor property was deliberately targeted. But they were increasingly industrial wars; railroads and factories were as important as traditional logistic trains and supply depots and so, some theorists argued, equally viable targets of attack. With the development of an air arm in the twentieth century the possibilities of targeting both the people who permitted the war and the non-combatants whose work supported war increased considerably. And in World War One, the Germans used lighter than air bombers to attack London.[5] In a war which saw machine guns, tanks, and poison gas this was just one more evidence of man's inhumanity to man but it did require the war government of the future to make allowances for attacks on the civil population. In October of 1917 Winston Churchill described what he hoped was a humane policy of air war:

> All attacks on communications or bases should have their relation to the main battle. It is not reasonable to speak of an air offensive as if it were going to finish the war by itself. It is improbable that any terrorization of the civil population which could be achieved by air attack could compel the government of a great nation to surrender. Familiarity with bombardment, a good system of dug-outs and shelters, a strong control by police and military authorities, should be sufficient to preserve the national fighting power unimpaired.[6]

Churchill had a keen understanding of the political role of popular opinion in war and even noted that "The combative spirit of the people was aroused, and not quelled, by the German raids."[7] But there were contemporary accounts which gave great support to the psychological effects of bombing on civilians. After the war the military historian and theorist, Basil H. Liddell Hart, noted the impact of the early German raids:

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[1] *Personal Reminiscences of General WT Sherman*, II, 111
[2] *The Rise and Fall of the Confederate Government* (1881), II:279
[3] *Marching with Sherman, Letters and Diaries of Henry Hitchcock*, (1927), p. 83.
[4] *Papers of the Military Historical Society of Massachusetts*, 1895, 10: 148-51.
[5] JFC Fuller, *The Conduct of War 1789-1961*, Rutgers, 1961
[6] *The War in the Air* ed HA Jones, 1937, Appendix IV, p. 19
[7] Ibid

> Witnesses of the earlier air attacks before our defense was organized, will not be disposed to underestimate the panic and disturbance that would result from a concentrated blow dealt by a superior air fleet. Who that saw it will ever forget the nightly sight of the population of a great industrial and shipping town, such as Hall, streaming out into the fields on the first sound of the alarm signals? Women, children, babes in arms, spending night after night huddled in sodden fields, shivering under a bitter winter sky. [1]

In the inter-war years strategists of air power, like G. Douhet and B. Mitchell, vastly overestimated the psychological effect of bombing because of these impressive early reports.[2]

Not surprisingly the interwar planners in England, and in other European states, began to consider how best to protect the civilian population from air attacks. The Committee of Imperial Defense adopted a disarmament example as the primary defense strategy in the years immediately after the First World War, but by late 1923, it was forced to face the extreme vulnerability of the British Isles, and London in particular, to air attack. So in January 1924 a subcommittee was established "to inquire into the question of air raid precautions". In various forms it would continue to study and plan for the eventuality of further air attacks until 1935.

In the 1920s the ability to deliver bombs was modest; official Royal Air Force estimates were that for every ton of bombs dropped 17 would be killed and 33 wounded. It was estimated that the first attack would drop at most 100 tons of bombs. The ability of an opponent to sustain bombing would drop off rapidly, by the third day, casualties were expected to decline by 50%, so that in a month of continued aerial attacks about 50,000 would be wounded, of which about 36,000 would require hospitalization. The Ministry of Health optimistically assumed that about 4000 acute care beds from London private voluntary hospitals would be available and about 12,000 beds from public hospitals. If 6,000 beds could be found in mental hospitals, the remaining 15,000 beds could be adapted in school spaces. It would be desirable to remove the wounded from London to make room for future casualties but there was a great shortage of ambulances. The ambulances that were available were not all interchangeable or coordinated. Attention for most of the next decade focused on planning first aid training and the transportation of the wounded. In 1935 the ability of air power had changed and in debates in the House of Commons the government was forced to concede that provision for defense had fallen to the point where it was ineffective.

In May of 1935 a new executive authority was established within the British government, The Air Raids Precautions Department, which was charged to be prepared by 1939. The program was initially advisory to local governments: preparing training material, making available specimen plans for first aid posts, and issuing suggested protocols for gas decontamination and casualty treatment. In 1936 it opened two

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[1] Liddell Hart, *Paris or the Future of War* (1925), p. 39.
[2] Melinger, *The paths of heaven*, (1997) p. 20

civilian anti-gas schools to train trainers for local government organizations. In 1937, legislation requiring local authorities to follow the suggestions of the central department was passed.

The Air Ministry announced in 1938 that it expected one millions hospital beds would be needed in the event of war and a hospital coordination plan was developed in the Ministry of Health. Only about half the needed beds were available, according to the best estimates. The advisability of any metropolitan beds was again questioned under the assumption bombing would continue in densely populated areas. The only way to meet the needs of the civilian population was to require the military to relinquish their call on 25 of the 29 Territorial Army (Reserve) General Hospitals. The War Office agreed to develop other plans.

As tensions in Europe grew through 1938, supplies for hospital expansion and first aid services were stockpiled. Plans for evacuating patients and for sending patients home early were reviewed. The medical profession was surveyed and, in coordination with the British Medical Association, plans for local emergency responses were developed. There was a peacetime shortage of trained nurses and efforts were begun to coordinate nursing services with trained nurses and others doing auxiliary work. In September of 1938 the diplomatic situation deteriorated and warning orders were sent to mobilize the emergency medical services but the Munich Agreement of 29 September relieved tension and warnings were withdrawn. The trial of the system, unplanned and real at the moment, revealed where the potential problems were in the plans and various authorities took remedial steps. [1] During late 1938 British planning went into an increasingly wartime mode and "the apathy which had previously impeded progress in civil defense was fortunately replaced by a widespread sense of reality...".[2] The RAF and the Air Raid Precaution Department both looked to the experience of the Spanish Civil War for new data on casualties. How many tons of bombs might be dropped was an unknowable variable - 700 tons daily seemed a sustainable value, since intelligence estimates give the Luftwaffe a total bomb lift of 2,500 tons. In fifteen years the potentially daily casualty total had increased from 3,300 to 35,000. The result was the realization that even with new construction and emergency training programs the ideal response would be impossible to achieve. In July 1939 a White Paper was issued to regularize the plans and means of paying for the services if needed and in September war was declared. The eight months of "phony war" allowed completion of many plans and during the Battle of Britain the Emergency Medical Services was fully in place and "although occasionally put to considerable strain, had adequately fulfilled its functions."[3] The idea of civil defense grew through the experience of the Second World War - terror bombing of Dresden, fire bombing of Tokyo, the final atomic bombing of two Japanese cities, as well as the British experience - all illustrated the potential for civilian casualties as a major factor in modern, unlimited, industrial war. But the war had hardly ended when the potential of future conflict with the US and the USSR began to be seriously considered. While peacefully resolved, the Berlin Crisis of 1948-1949

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[1] CL Dunn *The Emergency Medical Services, 1939-1945* London, 1959

[2] Ibid p.29

[3] Ibid, p. 124

clearly showed the potential for renewed war and the Soviet explosion of an atomic bomb in 1949 suggested that civilian casualties could be an even more important issue than they had been in World War II.

The questions which faced the emerging containment policy of the Truman administration, after the winter of 1949-50, were essentially questions of national will - could the American people exercise world leadership in a world where according to the National Security Council, "every individual faces the ever-present possibility of annihilation". George Kennan, the original architect of containment, did not think so. In a 1950 cross-country train trip Kennan found an America devoid of traditional values. Cities were corrupting traditional values and in California - the extreme example of the new urbanized America - Kennan saw a lifestyle "without the promise of maturity".[1]

To combat the moral apathy of the American people the leaders of the national security establishment decided to create a renewed civic ethic. The campaign would be in two interrelated parts - first a "scare campaign" to shock American citizens and then a "public information" campaign to help citizens conquer their fears and make the sacrifices connected with world leadership in the Atomic age. The responsibility to achieve this Herculean task was given to the new Federal Civil Defense Administration.

As early as 1947 the new Department of Defense had begun planning for war with the USSR and in such plans had outlined the presumptuous effects of an atomic bomb attack. The expectation was social breakdown and panic. Since panic was the result of fear and fear was combated by knowledge the solution to the problem of civil defense was both education of responsible citizens and training of law enforcement to "handle" panic situations"[2].

In 1951 a contract for evaluating the issues and problems as well as proposing solutions was let to an academic research company; Associated Universities. The contract became Project East River and published its conclusion in ten volumes in 1952. All the contract researchers had previously been involved in civil defense or related issues. They recommended that the atomic weapon be portrayed as simply bigger but still understandable weapons of war.

Physicist Ralph Lapp, veteran of the Manhattan Project, was enlisted to explain that the radiation was not as fearful as thought. Medical x-rays were long known and if someone were contaminated then a good shower would decontaminate them. According to the Strategic Bombing Survey the destruction of Hiroshima was just the equivalent of 220 B-29s. The March 1945 fire bombing of Tokyo had employed over 300 B-29s. There was therefore nothing unique or even particularly unknown about the problem.

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[1] George Kennan, *Sketches from a life* NY, 1989), pp 169-170. See also his *Memoirs 1950-1965* (Boston, 1972)

[2] *United States Civil Defense*, Washington, GPO, 1950, p 56

Perhaps most important of all was Yale University psychologist Irving Janis whose studies of the surviving victims of Hiroshima and Nagasaki, when compared with his studies of surviving conventional bombing victims, indicated nothing special about atomic bomb attacks - "a single atomic bomb disaster is not likely to produce any different kinds of effects on morale than those produced by other types of heavy air attack".[1]

In fact Janis became the chief theorist of the East River Project and evolved a doctrine of emotional management based on information and training to convince Americans they would survive an atomic attack. Janis advanced the idea of private, voluntary bomb shelters to help American manage their emotional concerns about the atomic threat. Not that he expected such shelters to make much difference in protection but rather to give Americans a sense of achievement, control and personal responsibility. It would also take attention away from the government inability to protect them.[2]

In October of 1957 *Colliers* magazine devoted an entire issue to "Preview of the War We Do Not Want". According to the hypothetical story the Soviets bombed American cities, destruction was phenomenal, but like London in the blitz, Americans pulled together to achieve victory and rebuild their shattered land. The participants in the effort were clearly designed to lend credibility to the story. Hal Boyle, Associated Press war correspondent; Edward R. Morrow, the radio voice of World War II in Europe, and Philip Wylie, popular novelist and author of *The Generation of Vipers*, provided the account of the rebuilding.[3]

There was some discussion in the ten volume of the East River Project report of efforts to take care of casualties and the problems of hospital beds and medical personnel (that occupied the British planners of the 1930s). These issues were vastly overshadowed by the public relations issues seen as essential to keeping the American public engaged in supporting government policy. In 1950, the conventional comparison was possible. The medical treatment of casualties, who surrounded the blasts, was thought to be reasonably straightforward. In November of 1952 the secret detonation of the first nuclear, thermonuclear, or hydrogen bomb changed that condition in profound ways. Some supporters of conventional civil defense abandoned their support, physicists, like Professor Lapp, were particularly concerned with quantitative differences in radiation production that seemed to them to make a qualitative differences. For eighteen months the details were kept secret and even when the details were revealed, the government neglected to discuss the problem of fallout. In February 1955 Ralph Lapp abandoned the government secrecy and preemptively announced the fallout problem in the popular and scientific press. [4]

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[1] Irving Janis, "Psychological problems of A-bomb defense, " *Bull. Atom Scientists* 6(1950)259

[2] I Janis, *Air War and Emotional stress* (NY, 1951), pp200-202

[3] *Colliers*, 27OCT51

[4] R. Lapp "Fallout - another dimension in atomic killing power," *New Republic* 14 Feb 55, p.8-12, idem. "Radioactive fallout" *Bull. Atomic Scientist*, 11: 45-51, 1955

Meanwhile the Civil Defense establishment was to continue its campaign of emotional management. Frederick Peterson, the Civil Defense Administrator, explained to Americans through the pages of *Collier's* in 1953 that they could been to overcome panic in the same way soldiers learned to overcome fear - routine training. Panic increased as intelligence and experience decreased therefore women, lacking experience were more panic prone, but even so 83% of men and 55% of women could be made "panic resistant"[1]

Philip Wylie's 1954 novel *Tomorrow!* illustrated the power of training in that the untrained are killed, panic, lose control of all civic virtue and become part of the problem. The heroes of the novel middle class Americans of the fictional Midwestern city of Green Prairie - respond as trained and life survives, essentially unchanged in its important national features. [2]

The Eisenhower administration, which entered office in 1953, inherited the emotional control civil defense program and continued it into the revelations of 1955 on the power of the H-bomb. The question was naturally raised as to whether it was working and so in 1954 a national test was planned - "Operation Alert". As Guy Oakes would describe them, "these yearly rituals enacted simulation of a nuclear attack in an elaborate national sociodrama that combined elements of mobilization for war, disaster relief, the church social, summer camp, and the county fair".[3]

The 1954 test involved forty industrial centers and selected Strategic Air Command bases and was designed to test the function of the local civil defense response team. In typical war game fashion time was compressed, with the multi-week nuclear exchange taking place in two days in June. Coordination between centers left much to be desired.

In 1955 the test was more public, with 92 city civil defense agencies being advised that their city was subject to attack. Fifty agencies were told their cities would be attacked, seven were surprised on the day of the exercise. In Washington, DC, the leaders of government were evacuated to camp sites in the surrounding country-side. Six weeks of public relation training preceded the June "alert". News coverage in the press and the electronic media was exemplary. The appearance of a careful, coordinated move of the government to an alternate location was presented to the American people. No communication problems were described, the economy was assumed to work smoothly despite the loss of major cities. Only in the private after action reports did the ugly questions of transportation, food distribution, and military logistics enter the experience. In those reports, severe questions were raised to which there were no obvious answers.

Eisenhower, the President, was also Eisenhower, the general, who planned and coordinated much of World War Two, and he quickly concluded, "we would be beyond

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[1] F. Peterson "Panic The Ultimate Weapon" *Colliers*, 21 Aug 53, pp. 99-107

[2] Philip Wylie *Tomorrow!* (NY, 1954)

[3] Guy Oakes, *The Imaginery War*, (NY,1994) p. 84

the point of keeping the nation together". By January 1956 Eisenhower was convinced that civil defense was essentially irrelevant to the course of nuclear war; "the limiting factor on the damage inflicted was not so much our own defense arrangements as the limitations in the Soviet stockpile of atomic weapons".[1] Over 60% of America would require medical care but most would receive none. The states would need to reconstitute the national government, the economy would be non existent. The mobilization of resources to assist stricken cities would be impossible because of damage to other cities and the transportation network. Secretary of the Navy Thomas Gates, at one point in discussion, voiced the hope that post-war Americans would enjoy the standard of living available to their 18th century founders. [2]

Eisenhower's best realistic hope was that similar planning by the Soviet Union would convince them that nuclear war was unwinable. But what of public policy - Eisenhower, and President Kennedy after him, continued civil defense planning and drills, because, as Vice President Richard Nixon observed in 1958, "the country demands it".[3] Of course, the "country" did not know. The clear understanding in the Cabinet and National Security Council was that deterrence was built upon a belief that America could, if it had to, win World War III. The concept of victory was built around the emotional management of people's reaction to the atomic and then nuclear bomb. No one wanted to take the risk of admitting that in the shift from atomic to nuclear weapons civil defense had become a propaganda "big lie".

To what degree the obvious failures of civil defense may have contributed to the next generation's distrust of government is essentially unknowable. As civil defense became emergency preparedness and adopted a wider mission, some improvement has occurred in the public perception. But some lessons remain. First, technology keeps changing - whether the delivery of bombs or the destructiveness of nuclear exchange the predicted need in one year is invalid just a few years later. Second, the planned best response is never possible, society is not organized to take care of extraordinary casualty events. Related to this is however the obvious result that there is some level of make-do in planning and, in the case of World War II Britain implementation. One of the differences between the British situation in the 1930s and the American situation of the 1950s was that the British actually planned to have their system function, after 1955 it is unclear that American leadership had such hopes. Finally, it seems that the very nature of the democratic sovereignty that puts people in the democratic, industrial society at risk, at least in the ideology of some planners, apparent means they will eventually know that which planners wish to keep secret concerning threats. People with adequate information have always responded better, to both threat and reality, than planners thought they would. A caveat to keep in mind as we plan.

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[1] DD Eisenhower. Diary Series, Box 12, January 1956, pp.1-2, Eisenhower Library, NARA.
[2] NSC Series, Box 13, 471st Meeting of the NSC, Dec 22, 1960, p11, Eisenhower Library.
[3] Ibid 360th meeting, 27Nov58

3

AGENTS OF BIOTERRORISM[1]

Randall C. Culpepper

I am with the United States Army Medical Research Institute of Infectious Diseases (USAMRIID) which is the Department of Defense's (DOD) lead medical research laboratory for developing medical countermeasures against biological warfare agents. We do the research to develop new and novel vaccines using a number of technologies including recombinant DNA technology, naked vaccine technology. We develop or do these studies to determine what antibiotics or therapeutics are best against the biological warfare agents. We do research on diagnostics, [both environmental and clinical]. For some of these biological agents, there is not much of a window of opportunity following exposure to have some sort of intervention where you can take care of the patients. That window of opportunity may be as short as minutes, may be as long as a couple of days. But the problem is, most biological agents present clinically the very same way. They have very nonspecific generalized symptoms, that do not lend themselves to a very rapid, readily-diagnosable situation. If you do not diagnose certain of these agents quickly enough, you will not be able to make any intervention once the patient becomes symptomatic, particularly severely symptomatic, before they die. It is important that we can have some kind of rapid diagnostic ability, both to detect the agent in the environment and to detect it clinically.

An issue that continually is brought up is, 'what about the mental health aspects?' When you think about the horrors of a botulinum attack, or a smallpox attack, or an anthrax attack, sometimes you forget about the really important mental health issues. What is bioterrorism? I am going to read you this quote, and I want you to tell me where it comes from. *"Whoever sought the latest unidentified female victim, whoever cut off her head, dismembered her and bagged her torso for disposal in the Virginia landfill may have been doing her a favor. She is called out to an even more horrific death scene. An inoffensive old woman on Tangier Island who seems to have died of smallpox. The earlier victim had signs of the same ravaging illness supposedly eradicated in 1977."* So who wrote this? It is Patricia Cornwell in the book Unnatural Exposure. I just bring this up because it highlights two issues. One--this is a great book because it uses a lot of the resources that we would

[1] See Appendix 1 for slides.

actually use in a real-life situation, e.g. our homicide squad, the state police, USAMRIID, FBI, CDC. But Patricia Cornwell is not alone in how much has been written in the past three to four years on the topic of bioterrorism.

Richard Preston wrote a booked called, Cobra Event. He also wrote a book called The Hot Zone about 10 years ago, that chronicled the story of an outbreak of Ebola virus in Reston, Virginia in a monkey quarantine facility. His book, Cobra Event, is one of the books that President Clinton read and influenced him to take a heightened concern about bioterrorism. Cobra Event really brought a great deal of attention in this country, both politically and popularly to bioterrorism. The middle book is written by Ken Alibek. Ken is a Russian defector who came to the United States in 1992. Ken had been the number two man in the Russian biological warfare program, which was a huge program. We tried to learn as much as we could from him about the threat that the Soviet Union possessed and perhaps still possesses today. If you are interested in the Soviet program and what biological agents can do, read this book called Biohazard.

I want to highlight several issues that I believe have brought us here today to talk about bioterrorism. One, the Cold War has ended. Before there were two major super-world powers, the Soviet Union and the United States. These two super-powers did a good job of keeping the smaller third-world countries in check, not allowing them to proliferate in their development of weapons of mass destruction, or even conventional weapons. Having only a single super power in the world, the United States, third world countries have been trying to establish themselves as a dominant force in this world. And one way to do that has been through the proliferation in the use of/or the development of these weapons of mass destruction.

In 1993 the World Trade Center building in New York City, was bombed by a foreign terrorist. For the first time our country got a wake-up call to the threat of foreign terrorists coming on to United States soil and doing something as destructive as trying to topple both of these towers to the ground. That was the intent of the bomb. We are now concerned about foreign terrorists on US soil. In April 1995, Oklahoma City's federal building was bombed by domestic terrorists, resulting in a couple hundred deaths. In March 1995, the Aum Shinrikyo, a religious group in Tokyo, released a weak concentration of sarin gas on multiple subway trains as they converged on downtown Tokyo. Now we are talking about a terrorist group, using a weapon of mass destruction, in this case, a chemical weapon. They had the ability and indeed tried to use biological weapons in assassination attempts prior to this event. In June 1996, there was an attack on US military barracks in Dhahran, Saudi Arabia. How safe are we overseas, and how safe are we domestically to prevent attacks such as this? This should not have happened.

We have had to reexamine just how safe and secure our DOD security forces are overseas, and furthermore, how safe our embassy buildings are overseas following the embassy bombings in Nairobi and Dar-es-Salaam. These events have brought us together to talk more about bioterrorism than we have in the past.

What is bioterrorism? A good definition that is appropriate is the premeditated, unlawful use or threat of use of a biological organism. A terrorist does not actually have to release anthrax in the subway of downtown Washington D.C. to make their social or political statement. They can simply threaten to do so, as (at B'nai B'rith headquarters), when a petri dish was found that was mislabeled with anthrax, and there was nothing in it. But remember how that event impacted this city!

Biological warfare or biological terrorist agents do not have to kill you to be effective, all they have to do is disrupt society. We certainly know in the battlefield that it would be more effective to incapacitate 150,000 soldiers than to kill them. By incapacitating them we have to use up resources to take care of them. If I kill half of the room, the other half just marches smartly on through the battlefield. But if I incapacitate some of you, it will take all of these guys and three times as many to take care of them. In fact, the first weapon that the United States developed in our offensive biological warfare program was an incapacitating agent. It was not something to produce death.

We tend to think about the effect of bioterrorism on people, but it can be used very effectively against economic sources, such as crops, our food supply, etc. The reason that bioterrorists do this is to create fear and/or intimidate governments or societies, in the pursuit of political, religious, or ideological goals.

How do we protect people against this threat of biological agents, whether it is terrorism or warfare? In the battlefield we use a four-fold approach. We use intelligence, medical counter-measures, physical counter-measures, and education and training. If we have intelligence on what the terrorists have the capability of using, then we can prevent or protect against that particular threat.

If we know that terrorist Group A (such as the Aum Shinrikyo) is using anthrax or developing anthrax then we know that we could help protect our troops. We could stock anthrax vaccine, prophylactic medications, etc., against that threat. Thus, when we know what the threat is, we can develop the right medical countermeasures. We can vaccinate, we can develop the right antibiotics, the right antivirals, the right therapeutics and diagnostics.

Physical counter-measures do not apply much in the bioterrorism domestic arena. In the battlefield, of course, we all know that you can wear our Mission Oriented Protective Posture (MOPP) gear which is total head-to-toe protection. However, it is unlikely that similar protective suits will be used by civilian populations in the US. However, there are countries that do have that ability. For example, many Israeli families have gas masks hanging up on the walls of their home. There is always the threat of Saddam Hussein releasing one of his SCUD missiles filled with anthrax into the heartland of Israel.

Similarly, detection, another part of physical countermeasures, will probably not be used widely in the United States. I doubt that they will put one on every street corner in downtown Washington D.C. These aerosol detectors continually collect air samples which are analyzed by ELISA or PCR. This was done for the NATO Summit that was

held here last year. Education and training are our largest protection for bioterrorism, which is why USAMRIID has placed great emphasis on training civilian and military physicians. In the past three years, USAMRIID has trained 50,000 medical health care providers across the country.

The organisms used in bioterrorism are similar to those that every laboratory sees all of the time. Salmonella typhimuarium is a fairly common foodborne illness that was very successfully used as a bioterrorist agent in the 1980s when the Rajneeshis in Oregon contaminated multiple salad bars in downtown The Dalles, Oregon, to influence the outcome of a local election. Almost any organism can be used as a biological weapon. For example, they are easier and cheaper to procure, they are disseminated more easily as an aerosol, traveling long distances downwind, etc. Some of the biological properties of the agents themselves make them better biological terrorism agents.

I have listed some of the organisms we are most concerned about. Anthrax. Yersinia pestis causes plague. Tularensis causes tularemia. Q-fever. Some foodborne diseases like shigella, salmonella, and staphylococcal enterotoxins, a very common foodborne organism, and a very effective toxin if released an aerosol. Botulinum toxin a very, very lethal, very, very serious biological toxin. In fact, probably the most toxic biological agent known to mankind. A tiny bit that would fit on the head of a pin would be enough to kill half of downtown Baltimore. It is that toxic. However, there is no way that such a small amount could be distributed to half of Baltimore, but that is how toxic it is. Several viruses come to mind, smallpox, hemorrhagic fever, viruses, especially Marburg and Ebola. But didn't we eradicate smallpox from the world in 1980? Yes we did.

The World Health Organization (WHO) declared in 1980 that smallpox had been cleared from the face of the earth. This was truly the first public health miracle in the history of mankind. We eradicated a disease that was responsible for killing one out of three children and one out of eight adults in the 1700s. When small pox was eradicated, samples were stored in two laboratories in the world. One was the CDC in Atlanta, and one was a very similar laboratory in the former Soviet Union. I have fairly good confidence that the CDC has not bartered, exchanged, sold, or given away any of those frozen smallpox viral particles that are in deep freeze in some BSL-4 laboratory in the CDC. However, we do not have that level of confidence for the laboratory in the former Soviet Union.

We are concerned that some of the scientists involved in an extensive biological warfare program in Russia have defected to other countries and have taken some of that smallpox with them. The most likely candidates as being potential agents include anthrax, plague, tularemia, botulinum toxins, smallpox and the viral hemorrhagic fevers. Some of these diseases are especially challenging because we do not see them very often. I doubt that any of you have ever treated a smallpox case. Some of these diseases are spread person-to-person. So, if I infected a small group of people and they traveled by air to multiple countries around the world, these diseases would be disseminated world-wide. That clearly is a threat for smallpox. How many of you have been vaccinated in the past 10 years against smallpox? The vaccine is only good for

about eight to ten years and we stopped vaccinating civilians against smallpox in this country in 1972. Most of the world at this point is very immunologically naive against this organism.

Pneumonic plague is the other organism that is easily spread person-to-person. Plague presents in two different clinical forums. Bubonic plague and pneumonic plague. There is a septicemic form as well. Plague is endemic in the United States particularly in the southwest. The most common form that we see is Bubonic plague in which a person is bitten by a flea that is infected and then develop buboes (swollen inguinal lymph nodes). The patient generally recovers. We could not aerolosize plague in our offensive biological warfare program. We tried, but we were unsuccessful. The Soviets have done it, so we know that for a fact. When Yersinia pestis is aerosolized and you inhale, pneumonic plague ensues which is generally 100% rapidly fatal following onset of symptoms. Yersinia pestis is very difficult to aerosolize, however, the Soviets were able to do so.

Anthrax has biological properties that make it an incredibly successful weapon. It exists as a spore, which means that it can be weaponized and left for decades and yet it will still be viable. That cannot be done with Yersinia pestis or most other biological agents, because they simply die after a period of time. But anthrax exists for up to 80 or 90 years when stored out of sunlight. In fact, we just found some vials of anthrax that were put into the vials in the early 1900's. They were opened up and the spores were just as viable today as they were when they were put in the vials 80 years ago. When anthrax is made into a powder and released as an aerosol, it stays in the air rather than clumping together and dropping to the ground. It will go downwind a long, long, long distance. It only takes 8-10,000 anthrax spores to make 50% of the people exposed die (LD50). It only takes about 8 to 10,000 spores. That is only one deep breath full. The good news is that anthrax is not transmissible man-to-man. The bad news is when you inhale anthrax the pathogenesis is real fast. When you inhale anthrax, the spores go into your terminal alveoli, the deepest reaches of your lung. From there your body recognizes a foreign invader and activates the alveolar macrophage, white cells that are designed to kill foreign invaders. And so those white cells are not very successful at destroying and killing the spore, because the spore has a capsule around it to protect it. The next best thing this white cell can do is to take that spore somewhere else in the body that can do a better job of destroying it; so it takes it to the nearest regional lymph nodes.

When you get a cold you get swollen lymph nodes up near your neck or maybe behind your ears. You have got those all over your body. The spot nearest to the terminal alveoli are in the mediastinal space, the space between your lobes of your lungs. That is where these spores end up. Once they go there these hard capsulated spores, then begin to germinate and replicate. The lymph nodes expand to such a degree that they burst and start bleeding into the mediastinal space. This produces very characteristic finding of a whitened mediastinum on chest x-ray.

Anthrax also produces toxins that begin circulating through the body, causing bacteremia, septicemia, and death. But the time frame is very unique. The time frame –

the incubation period -- the time between exposure and the onset of symptoms is one to six days. Okay, I can deal with that, that is not so bad. The problem is that I become symptomatic and my first symptoms are going to be very nonspecific -- cough, fever, malaise, I feel like I have the flu. My doctor's first thoughts are going to be, "Randy, you have the flu," and that is what the other thousands of patients in Washington D.C. are being diagnosed with as well, the flu. Although they were just exposed two days ago in the Metro Station in downtown Washington D.C. So now we have all these patients with flu, that started this morning, Saturday morning. The problem is, they will be dead in three days. The time frame goes like this: The first 12 to 18 hours are characterized by nonspecific flu-like symptoms. You sometimes improve a little bit. So by tonight I may feel a little bit better for a few hours but by tomorrow morning I am going to wake up with a severe fever. I will be dyspneic, I can't breathe. I can't function. I can barely move because I am so sick. So what am I going to do? I am going to go back to my doctor I saw this morning, right? He is going to say, "Boy, you are really sick." I am going to agree. This is not a good thing. No matter what he tries to do to me at that point, no matter what antibiotics he gives, no matter what therapeutic intervention he tries, I will die.

Once the severe symptoms have started there is nothing you can do to save that patient's life with anthrax infection. If he had started me on antibiotics this morning, when I first presented, he had a chance of saving my life. But once the severe symptoms begin there is nothing you can do. That is the danger of anthrax. That is why anthrax is such an incredible biological weapon.

This slide is a picture taken surreptitiously on a visit to one of the laboratories -- or one of the production facilities in the former Soviet Union. This picture was taken from a briefcase so it is a little shaky, but you can see a row of ten fermentation tanks. There are 40 67,000-liter fermentation tanks. This is one of at least six known similar production facilities in the former Soviet Union. I do not know if you can grasp the enormity of this statement. The entire Iraqi production capacity in Iraq fits in one of these tanks. The Soviets had 240 of these tanks that were producing tons of anthrax, tons of Yersinia pestis and tons of other biological agents. One of their favorite biological agents to do research on was smallpox, developing tons of smallpox virus. I cannot impress upon you how enormous the former Soviet Union's biological warfare program was.

What is the future of biological agents? These are bugs, that for the most part are treatable by antibiotics, sometimes by antivirals. These are just normal everyday bugs. The fear is that no matter how fast we develop vaccines, and no matter how fast we determine which antibiotics and antivirals are most effective, that someone out there in a terrorist cell or a state-supported organization will be a step ahead doing genetic engineering on this organisms to: (1) Increase their virulence; (2) Make them resistant to the vaccines we have just developed; or (3) Create a brand new organism, a chimera or a binary biological one.

One of the interesting things that the Soviets tried to do was to take two biological agents and join them together, to create a new organism, a chimera. They did that by

taking smallpox and Ebola virus, joining them together. But what does that do? Ebola is not very contagious person-to-person, at least by aerosol. In fact it is probably not contagious person-to-person by aerosol, whereas smallpox is highly contagious person-to-person. Ebola has a pretty high case fatality rate, 85 percent. Smallpox does not. Smallpox is only fatal in about 30 percent of cases. So if you join those together, develop a new organism that maybe has the best of all of those properties, then you have got a hell of a weapon. You have got a tremendous, scary weapon. And they claim they did this. But the fact of the matter is most scientists readily agree that although I can create that in this glass, it will not last more than a second once it gets out of the test tube. So although the Soviets made this organism, it would be very difficult to weaponize. But that is the kind of research that was being done.

There are two types of bioterrorisms that need to be considered - announced and unannounced. The bioterrorism that is announced is probably going to be the most common type because the terrorists want you to know they did it, in order to get across their political, religious, ideological goals. So they are likely to announce the event. These attacks will be directed against public institutions. We heard about being downtown. Joe Barbera talked about his hospital being right near the IRS building, the World Bank, etc. That is a very big fear. Because those are prime targets. The State Department Building, the White House, Capitol Building. What prime targets for terrorists to release a biological agent. The unannounced attack, would be very difficult to manage. If you do not know that something has happened, the first thing you will see will be patients arriving at Joe's hospital, or at USUHS, or at hospitals across the country. People presenting with very nonspecific flu-like symptoms.

And what is Joe going to do when he treats the first patient in his emergency room? What we all would do. "Gosh buddy, it sounds like you have got the flu. Go home, drink some liquid, take some aspirin, get in bed. Come back and see us tomorrow." He did the right thing. He did what most people would have done, because he only had a small cluster of patients in his emergency room. And by gosh, it is November 15th, it is the flu season. What else would he expect but the flu? It would be only till the next day when Joe's emergency room, which normally has a census of maybe 100 patients (I don't know how many you have got, Joe) has now jumped up to 1,000 patients, ten-fold. Now Joe's going to start thinking to himself, Holy cow. I know what this is. This is not your normal flu season. This is not a normal event. This is not a natural epidemic. This is a most unusual cluster of diseases and I am not exactly sure what it is." So what is he going to do?

Hopefully he is going to call the local public health department in D.C. They are going to call the public health departments in Virginia and Maryland to find out if they are seeing an increased number of cases as well. And you know what Joe is going to find out? He is going to find out indeed they are. All the hospitals are experiencing incredible increased numbers of patients, presenting with very nonspecific flu-like symptoms. In fact, some have now started to come in with this rash that we have never seen before. Looks like chickenpox. What is going on? By the way, this was two weeks after the July 4th event on the mall in downtown Washington D.C. where everybody

watched the fireworks. It is two weeks later. Now we are seeing patients present with this very strange pustular rash on their body.

You know what chickenpox is. If you have had kids, you have all seen chickenpox. Remember how those pustules are in different stages of development, they are all over the body? This rash is very different. What we are seeing with this rash, right now today, two weeks after the 4th of July fireworks, all these pustules are at the exact same stage of development. And furthermore, they are mostly of the hands, the arms, legs, and the face, not so much centrally. Do you know what that is? That is smallpox. That is smallpox. Joe's less informed emergency physicians diagnose those initial cases as chickenpox, because they have never seen smallpox before. So they sent them home. And while they were in the emergency room waiting to be seen, on the way home, playing with friends at school, before they have even developed that rash they have infected everybody else in their classroom as well. The disease would spread like wildfire if indeed it was a smallpox virus that was released.

How likely is a bioterrorist attack? I do not know. The FBI says it is probably not an issue of if it is going to happen, it is an issue of when its going to happen. And that might be true. I do not know. Has there been recent bioterrorist activity? Is there anything that has happened so far? Yes, there has been quite a bit happening. There has been an increased interest, but very few, verified events. The FBI has labored for the past two years, under a tremendously increased number of hoaxes across our country. It began with the B'nai B'rith anthrax scare that Dr. Barbera was intimately involved with here in Washington D.C. It has become the threat "du jour", in which someone sends an envelope to an abortion clinic in downtown Alabama. The secretary opens it up. It says, "You have now been exposed to anthrax" and there is some powder in the envelope. That scenario has probably happened 300 or 400 times in the past couple of years. As a result, this country has become very aware of how to react to those kinds of hoaxes. Our response still needs to improve, however. We are still doing some things like we did in the B'nai B'rith headquarters event several years ago which was handled disastrously.

For example, that incident they told Dr. Barbera they were sending hundreds of people to his hospital because they had been infected or exposed to anthrax, when all that happened was that one postal worker opened up the petri dish that did not actually have anthrax. Even if there had been anthrax in the dish, he may have been the only one exposed, not everybody else in that building.

So far, biological threats have far outnumbered the chemical threats. Where do the terrorists get this information from? Multiple sources. Type in "bioterrorism" on your Internet search engine some day and find out what you can learn.

Are there terrorist organizations in this country or this world? Yes. There are many. This slide shows a small smattering of terrorist organizations in the world. Just a small smattering. All with the capabilities - I am not saying they are -- but all with the capabilities of doing things like we are talking about today. These are some of the groups that have expressly had an interest in biological warfare agents or terrorist agents. I have already mentioned the Aum Shinrikyo and Bhagwan Shree Rajneesh in

Oregon. The Aum Shinrikyo. I mentioned the March sarin gas attack on multiple subway in Tokyo on which little bags of sarin were placed by the door. The terrorists poked holes in them and walked out of the subway. The fumes of the sarin wafted up into the air and began affecting people. Some 5,000 people went to Tokyo hospitals that day. Joe Barbera, what would that do to your hospital?

DR. BARBERA: With 600 people presenting in the first hour to the nearest hospital, I usually will have to call in back-up personnel.

DR. CULPEPPER: Emergency departments would be overwhelmed. There is no way that we could handle in any emergency management situation the result of a large-scale bioterrorism attack, probably not even a small-scale bioterrorism attack. We would clearly be overwhelmed. The Aum Shinrikyo organization was multi-million dollar funded and performing research on biological as well as chemical agents. In the Tokyo sarin attack, there were 15 subway stations affected and 3,700 people injured. A thousand actually required hospitalization. Twelve died. And this damage was caused by a very low-strength mixture of sarin. It could have been a lot more serious.

There were two new labs. One in Tokyo and one in Kamakuishhiki. We know that the Aum Shinrikyi attempted to produce aerosolized botulism toxin, anthrax, cholera and Q-fever. We know that they sent somebody to Zaire in 1993 to collect Ebola virus samples. In 1990, botulinum toxin was released near the Diet, (their political assembly) in Tokyo. In early June of 1993, they sprayed botulinum toxin from a vehicle trying to kill members of the Royal Wedding and around Imperial Palace. We know that in 1993 the Aum released anthrax spores for a four-day period from an office building that they owned in downtown Tokyo. And finally, briefcase devices were developed with the intention of releasing bot tox. From all of these incidents, there were no known injuries or deaths. Either they were not successful, or they did not understand the aerobiology of these agents. The fear is that they could have killed many more people.

The Aum Shinrikyo subsequently has apologized for the Tokyo sarin attack. But we know that the organization still exists and that they are spreading their influence around the world. They have offices in many areas of the world, not just in Japan. They are back in the computer business, which is how they funded their organization. They are also buying real estate. The bottom line is, this organization still exists and still is going strong.

DR. HOLLOWAY: It does have a new name.

DR. CULPEPPER: Aleph. The first Hebrew letter of the alphabet -- A-l-e-p-h? Some other interesting events over the past several years are on this slide. Again I emphasize all the anthrax letter and bomb hoaxes. One interesting character by the name of Larry Wayne Harris, a self-proclaimed microbiologist, claimed that he worked for the CIA. They have disavowed any knowledge of him. He was found in 1995 with three vials of Yersinia pestis in the glove box of his car. He claimed he did that because he wanted to show the country how easy it was to procure these biological agents. Do

you know where he got them from? Rockville, Maryland. American Type Culture Collection which is a warehouse that collects biological agents. He simply forged his letter from letterhead from some university and they sent him three vials of Yersinia pestis. So it was not too hard to obtain.

In fact, the Iraqis got their initial anthrax strains in the mid 1980s from American Type Culture Collection. The American Type Culture Collection has subsequently tightened their regulations for procurement of biological agents. They have assured us that it is no longer as easy to get it as it was for Larry Wayne, back in the old days. In 1998 Larry Wayne Harris emerged on the public scene again when he was found to have anthrax in his car on at least what was thought to be anthrax. It ended up simply being anthrax veterinarian vaccine, a very different substance. In 1993, Thomas Lavy was crossing the Canadian border, and fortunately the Canadian border guards checked his car. He had a plethora of automatic and semi-automatic weapons and ammunition. He also had about five pounds of ricin, which is a toxin, that can be very lethal if used as assassination weapons. He had recipe books about how to make these different agents. He had some tens of thousands of dollars in cash. He was arrested and put in jail and just hung himself about a year and a half ago.

Is biological terrorism the ultimate weapon? I think it might be, for the reasons that I list here. As I mentioned already, they are easy to procure and inexpensive. They are invisible. A biological agent can enter the system through any portal - cutaneous, gastrointestinal or inhalational. We think the most likely exposure is going to be inhalational. One can contaminate water supplies, but generally the water supply has several factors that will prevent any serious effect: dilution, chlorination, and filtration.

What can you or I do as physicians and providers to counteract these effects? I can detect it in the environment. I can wear protective equipment. I can immunize the people before they get exposed. Once they have been exposed, I can treat them appropriately, using rapid diagnostics and proper therapeutics.

DR. NORRIS: Has our military been developing biological weapons as well? You mention the Soviets. And if so, how do you justify that, and what protection do we have that those are not going to be the ones that the terrorists find?

DR. CULPEPPER: Let me paraphrase your question - is the military actively involved in developing offense biological weapons? No, we are not. Did we in the past? Yes. We started in 1942 following a known threat by the Japanese who had a very active biological warfare program. They were actually using POW's as their guinea pigs. Nearly 3,000 POW's were killed by the Japanese in the pursuit of developing biological weapons. So, knowing that, the United States started our own offensive biological weapon program.

From 1942 to 1969 we were successful in developing a good number of biological weapons. We never released them. We did a number of trials using simulants. That is, biological agents that are not pathogenic, but simulate what they do, in order to figure

out how best to aerosolize them, how well they can be put into a bomb or weaponized, how can they be released, etc.

In 1969 President Nixon unilaterally put an end to all offensive biological warfare research in America. Three years later all the agents that we had developed were destroyed. The US was responsible for developing a biological weapons convention that 140 countries signed throughout the world, putting an end to all offensive biological warfare research. There is no need for the US to have offensive weapons. We are very, very effective with the conventional weapons that we have. The US started a defensive research program in 1950. When we stopped the offensive program in '69, about a year after that, USAMRIID was built to pursue defensive biological research.

DR. SHAW: I have heard conflicting reports. I am curious about the efficacy of the anthrax vaccine and its utilization.

DR. CULPEPPER: That is a good question. The anthrax vaccine is very important. I am very much in favor of having our troops vaccinated against this very likely threat in the battlefield. But it is also one of the highest threats for use by bioterrorists in our country. CDC is considering stockpiling that particular vaccine, or an anthrax vaccine, for protection against a bioterrorist attack. The vaccine, as we have it today, was developed and licensed in 1970 by the FDA. It was developed mostly as an occupational exposure prevention. In those days wool sorters used hides from overseas that had anthrax spores in them. In the process of developing the wool out of those hides, anthrax spores were released into the air, causing cutaneous anthrax and inhalational anthrax. The vaccine was developed to protect these workers. The anthrax vaccine is very successful, very effective. The only human trial ever done to date was done in those wool mills. It showed clear scientific evidence that it was protective against cutaneous anthrax, the most common form of anthrax. There are epidemics throughout the world of cutaneous anthrax today.

There were not enough cases of inhalational anthrax to prove statistically that it was effective against inhalational anthrax. We do know in the group that got the vaccine, there were no cases of inhalational anthrax. In the group that did not receive vaccine, there were five cases of inhalational anthrax. The numbers were not sufficient to give statistical significance. So, obviously today, we cannot do human trials. I cannot give you anthrax vaccine to you and then expose you all to anthrax to see how effective it is in humans. So, the only way I can test that is in the animal model. And, as with most biological research, there is a difference between what animals are used and what the results are. So, we have used guinea pigs, rabbits, mice, and rhesus monkeys. The rhesus monkey is the organism most similar to the human being. In a rhesus monkey we have shown clear efficacy, and safety for the inhalational exposure.

DR. ENGEL: We heard what I thought was a terrific presentation last night and one of the major themes was the competing interests of federalism versus local constituents. In preventing bioterrorism you are faced with a similar issue: the probability of one of these events happening somewhere in the continental U.S. is probably relatively high. It is a higher risk than for any single community in the U.S.

From a federal perspective there is a great deal of interest in defending ourselves against this, and in many ways for psychological reasons, for psychosocial reasons, because it is the reverberating psychosocial impact of a smaller event that is the bigger challenge nationally. From the local perspective, if I am from outside of Washington D.C. which you could argue is a pretty high-risk place -- if I live in Seattle or Portland, Oregon, or some place far way, the risk seems much less. It seems to me that you have presented a worst-case scenario. Not only is the risk of this kind of event low for any single geographic region, but the risk of a worst-case scenario is even lower. There is also the risk of it happening at any given moment of time, which is lower yet.

Maintaining a constant level of readiness in a given geographic location is an overwhelming task for a community. It is a costly task for a community. Part of the reason communities fall out of awareness is because almost intuitively they realize their community has other competing interests that are more important when weighed against the probability of this kind of a thing happening in their community. Part of the problem is we are dealing with speculative probabilities. No matter what the probabilities of these kinds of events are, it is going to be exceedingly low for a given community that needs to stay in preparation for this kind of event. It is going to be a considerable amount higher on a national level that it will happen somewhere.

DR. WEISAETH: Do you have any comments on the genetic research? What nations are preparing for using new genetic knowledge and manipulating biological agents?

DR. CULPEPPER: I will come back to that question. First I would like to focus on this issue about the response to an event that may never happen. Are we doing the right thing? Are cities able to maintain the preparedness?

MR. PARACHINI: You cast this as a low probability event with high consequence, and yet most of the presentation focused on the high consequence. Indeed, your question points to the right thing. For this discussion we ought to bear in mind the higher likelihood of a low-consequence event, which is what will be more likely to have to deal with. So I want to make sure what we want to prepare for the unlikely, but high-consequence event, because it would be high consequence. It is very unlikely. And indeed, of the agents you mentioned as likely for terrorists as opposed to nation states, only two have actually been used -- salmonella and ricin. Ricin is an assassination weapon which has to actually penetrate the body. Salmonella occurred in The Dalles, Oregon and we did not know it for over a year.

We have to try to put in perspective, based on what we know now, which is a benchmark. It is not necessarily what might happen in the future. But if we merely speculate on the worst-case scenario about the future, we are liable to skew all of our preparation for something that will not happen, and indeed may ensure that we prepare for the wrong thing. The intelligence community has changed its list of agents three times. And in the three times they have changed their list of agents, we have made all sorts of investments in chasing different responses to different agents that we then had to re-do. It is a very difficult problem to get a handle on because we are at such a new

stage of it. But we should not draw such broad conclusions based on the nation-state programs and think that those will naturally show up as terrorist incidents in Washington or Dubuque, or other places. That is the hard part at this moment as we address this problem because most of the threats -- most of the incidents being followed by the FBI have been created by people in this country talking about the threat. We have all these threats and anthrax hoaxes, all of which started after public officials started talking about it.

DR. MARLOWE: I would like to divide terrorist acts into two. One is quasi-rational or rational-seeking political leverage or political effect. The other, which comes out of various religious fundamentalism's, is seeking an apocalypse. This was presumably one of the motivations of the Aum. One may not necessarily be looking at a high-consequence event in itself, but how do we deal with the possibility that an event is being engineered in terms of a second or a third-order effect? The hope of the Aum was a world war, at least this is how some of them expressed it. And there are many other groups that are seeking to facilitate Armageddon and the end. How do we deal with using this as leverage to create this kind of second or a third order effect? This has to be a continuing concern because it seems to be awfully easy to manipulate people into doing certain kinds of things that are supposedly responsive.

DR. DEMARTINO: One of the things that happens in discussions like this is that people who have just a small amount of information start worrying about things like, "Well, is my next door neighbor making a biological weapon in his bathtub?" which is the question I get when I speak. Giving this sort of information to the public makes me worry about making people too afraid. When I listen to you talk, I do not hear any mitigating factors, anything that would argue for this not happening next door. And one of the things that is important for people to know is that with the Aum Shinrikyo which was a group with a billion dollars in assets and Ph.D. chemists working with them could not get something aerosolized. It is not that easy. You cannot simply do it in your bathtub, and you cannot go out and get the form spreader and put it in and then walk down Fifth Avenue. That is not realistic.

Also, the idea that biological weapons are an attractive weapon for groups remains unclear. Any state sponsored group that could be even remotely connected with a biological weapon would wreak such havoc on itself from the Western world that it would make it a very unlikely event. They are much more likely to stick with conventional weapons where they can get away with it and hide, and there is not such a terrible stigma against that use. The idea that state sponsored organizations are looking to distribute their biological weapons is not so clearly an immediate threat. It is still a low-probability event, so just how low does it have to be before you stop worrying? The fact that we are talking about it means that it is not that low. The questions are when do we put our efforts into a low or high-consequence event, and how do we keep people interested in something that is unlikely to affect them.

DR. URSANO: This is an important issue because we are touching on some of the issues of risk communication as well.

DR. NORWOOD: While a terrorist event may be low probability, we are always faced in almost any community in the U.S. with hazardous materials events such as a chlorine tanker having some accident, or looking at the possibility of another flu pandemic. Preparedness is not just for biological or chemical terrorism, but for other technological accidents as well.

DR. ENGEL: We need to focus greater attention on low-morbidity, higher-probability events, rather than catastrophic events. When you discussed bioterrorist activities about half of the items were hoaxes. That is a good example of an event with a much higher probability and significant morbidity. The primary impact is psychosocial. I have been taking care of Gulf War veterans with unexplained physical symptoms for the last four years. Many continue to be very sincerely concerned Gulf War veterans and the consequences of perceived exposures during the Gulf. I am a Gulf War veteran and I am also concerned about the environment. It is unlikely that many of the things that they have experienced during the Gulf War are having the impact on their health, however, they are attributing it to the Gulf War. That is one sort of long-term morbidity of certain types of higher-probability events. The other higher-probability event that goes back to what Harry said, is we might be focusing too much on one independent variable and missing a whole bunch of competing independent variables. When you look at the major terrorist events that have happened in the U.S., in New York City and then in Oklahoma City, we are dealing with bombs. It strikes me that those kinds of conventional terrorist weapons are a much higher probability and high consequence kind of tool.

DR. NORRIS: Listening to this conversation and thinking some about the mental health implications of this reminded me of the criminal justice experience in crime prevention. They were trying to do so much in some earlier times to engage the public in crime prevention behaviors that they inadvertently created a great deal of fear of crime which also has great implications for our quality of life, what is going on in American cities, etc. Some of the epidemiologic research has found that fear of crime probably has as great, if not a greater, consequence for mental health than does actual criminal victimization. That is something we need to think about, and then also think about, the fact that that research has clearly shown that the people who tend to become most afraid may, in fact, be those less at risk than some others. For example, older people. I am sure this happens here as well. For example, every summer there are some older people who die because they will not open their windows when it gets hot because they are afraid of crime. So we can create problems by trying to create preparedness as well as by not preparing.

DR. TINKER: What do we want the public to feel, think, and do about this issue?

DR. CULPEPPER: Be aware without paranoia.

DR. TINKER: In terms of knowledge, attitudes, and behaviors do we want to move people from just a simple awareness to taking action?

DR. DEMARTINO: One of the reasons why we are talking about biological terrorism is because there are particular aspects of biological terrorism that do not show up in any other kind, in particular, the fear of the unknown and its potential effects on population behavior. That is the thing that is so different about it than so many other forms of terrorism or war. This particular niche is something that we do not know much about, and that in the worst-case scenario, is something that we know can have enormous effects -- evacuating cities, complete disruptions of economies and cultures. We do not know how large scale it can get. In answer to your question, the thing that we would like to be able to do is to bring enough awareness that people do not have the kind of mass reactions, that can cause these sorts of large changes in geographical areas, for instance, or on a national basis. I do not know if we can make people understand that, without making everyone afraid all the time. It is a very difficult road.

DR. TINKER: Is awareness the countermeasure or the antidote to panic?

DR. DEMARTINO: That would depend on how you define awareness. How awareness comes about, how it stays with people, and what people make of it are all very important and would be one way of mitigating those kinds of consequences. Some of the other kind of mediating or mitigating factors that I have been hearing is a framing issue, risk versus hazard. Risk is the probability or the likelihood of something happening. And the hazard is the event or the phenomenon itself. It is a disservice to only focus on risk. We also need to look at our unit of analysis from a risk perspective. Are we talking about purely the individual or are we talking about societal risk? We should not limit our conversation to risk alone. We must also focus on the benefit of this information and the benefit of this knowledge. How do we go about conveying societal benefit and not focus just purely on the risk dimension of this issue? Then there is the very interesting dynamic of apathy versus outrage. How do we calm people down about certain issues? In addition, how do we create and generate interest in an issue when there seems to be a great deal of apathy?

DR. MARLOWE: I wonder if we are not being a bit arrogant in making a false dichotomy. After all, the greatest sponsor of bioterrorism in human history has been nature itself. We are forgetting the number of massive epidemics that have come as humans blunder into new ecological situations with rapidity of transportation, etc. Maybe we are even forgetting HIV or the original plagues of smallpox, bubonic plague, etc. And is it not a false dichotomy to consider that preparedness for bioterrorism is a preparedness only against the bearded terrorist rather than a part of general preparedness as we humans blunder and explore parts of the earth? Just as folks started exploring and trapping moles in outer Mongolia and created the first great bubonic plague epidemic, or the rapidity with which HIV has spread throughout the world? The counters are the same. Therefore, I wonder if we are not being arrogant about the natural world and also being short-sighted about considering response to "bioterrorism" different from the response to the biological dangers that rest out there.

DR. RADKE: In 1986 I was invited to an international meeting in Switzerland of young medical officers. I represented the Army and we had a panel on biological warfare. The great concern was that even if you could aerosolize an agent, it is very

difficult to control given weather and wind patterns, etc. It is most unlikely it would not be used in the battlefield. The mental health professionals at the conference said one thing that impressed everyone, that it would most likely be used as a fake, a cloud coming at an army could panic or paralyze the army well enough to give the enemy the advantage. That is what terrorists want to do. Given this, the higher-probability incident would be panic-like syndromes caused by the threat of using a biological agent rather than the actual use.

DR. CLIZBE: It is a detection question - the assurance that, yes we can detect this stuff in advance, or no we cannot. So it is really a question of your sense of our developing capability to detect. And anthrax is the classic example, however, this goes for some of the other biological agents as well. What is the status of that capability?

DR. CULPEPPER: The technology for detection of biological agents has rapidly progressed over the past several years. Initially we had truck-mounted vehicles that had to be stationary that did air sampling, concentration, and then literally using smart tickets, or ELISA-based antibody antigen assays, were fairly successful at identifying the biological agents. The problem is, you had to be exactly where the cloud was. If you were 10 meters away and the cloud does not come right over that particular truck, you are not going to detect. Since that time several new detection devices have been developed, some of which use the very same technology. However, some use some new laser infrared-type technologies where you can scan the horizon and look for any increased concentration of biological matter in the atmosphere, up to 100 kilometers downwind or 100 kilometers away. That technology will be useful for port protection, base protection, etc. The newest technology is designed to identify the agents rapidly. What is being developed now, is a hand-held rapid detector that can, within 15 minutes using PCR analysis technology, identify with accuracy what the biological agent is. That is the direction they are heading now, and are proceeding fairly well.

DR. BARBERA: I want to return to the larger perspective. Currently in the United States at a national level, our concerns are weapons of mass destruction. If you go back 10 or 12 years, our concern was major earthquakes because we had a series of them around the world, e.g. Armenia, Mexico City, a few moderately small tremors in California. Everyone talked about becoming prepared for Armageddon, the huge 8-point plus earthquake for 60 seconds under Los Angeles, and we realized we could not do that. And by trying to prepare for an earthquake of that magnitude, we were not preparing for the smaller events that were much more likely to occur. We moved a few years further beyond that, and all of a sudden hurricanes became the major event of the United States because we had Hurricane Andrew that blew through Florida. There were the "what ifs" if Andrew had turned just a little bit further north and blown straight through Miami and all of the other things. So we tried to prepare for the Armageddon of hurricanes, and that has fallen off the radar screen. We have prepared and tried to do things for lots of things including evacuating half the east coast for a hurricane that blew along the coast and had little sequelae, and it has fallen out of fashion. Now because of the events that Randy described, between bioterrorism attempts and chemical terrorism, and then the blasts in Oklahoma City and New York City, we are focused on this. From an emergency management perspective, we have to remember that this is just another

one of many hazards facing the United States. If we take it completely out of our "all hazards" approach, we are going to end up total losers, because a few years from now this is going to fade as we have something else happen, the big earthquake, hurricane, etc. I agree that the lower morbidity/mortality events are much more likely than low-probability/high-consequence events, but I am not sure we are preparing for those lower probability and lower mortality/morbidity events, and keeping it in focus. One of the things we have not done is combine public health and emergency medicine and everything else with emergency management. One of the big things that we did wrong, nationally, I think, was when FEMA did not take this on as a major project five years ago. James Lee Witt had done incredibly good things. This is the one area where we missed an opportunity.

If we do not start combining all of these different concerns, such as the pandemic, (which are probably more likely than the naive well-executed bioterrorist event killing hundreds of thousands of people) back into something that is sustainable and multi-use, we are going to be in trouble. Taking that further to a behavioral information management perspective, there is only a certain amount of awareness you can give to people when they are not interested in it. Everyone reads about the threat in the paper. No one can read in the paper how to prepare for it. We can tell people this is going to be a big deal, and then we can prepare to give them the information they need when the event occurs. And that does not just mean the public. That means law enforcement, and medicine, and public health.

During the B'nai B'rith incident, I talked to the public health person from Washington D.C. and the special watch person from EMS. They told me they had all these people they might be bringing in, and they were going to wash some people off. I hung up the phone and I called Ed Eitzen from USAMRIID, and I quickly reviewed these things. It was very helpful for me to be able to speak based on what Dr. Eitzen from USAMRIID had said, not just from Joe Barbera the emergency physician. It helped calm down our emergency department to know, for example, that just because someone was being brought into us wearing protective gear we did not need it. The FBI had called USAMRIID at the very beginning of this thing and asked what two misspelled words, anthrax and Yersinia, meant and then they hung up the phone. If they had continued the conversation the B'nai B'rith incident would not have been much of an incident. These are all basic things, that if we can incorporate into our national and local policies, will end up in perspective and be more of a sustainable real response to an operation.

DR. HOLLOWAY: I agree with those remarks. They are right to the point. I would like to come back to this low-probability characteristic. Some years' ago I went through several of these cycles and attended my first meeting to prepare for the utilization of bacteriological warfare in 1970, that we ought to be aware of that, and therefore worked towards these generic outcomes. I had an opportunity, about that same time, to interview several people who were professional terrorists. They were international terrorists and that was their business. They actually made money doing that business. We can talk about how you can make money as a terrorist if you want to afterwards, but it is quite doable. What they pointed out, as they described how they

did their business, was to choose low-probability events that had precisely the characteristics we were describing here as the ones to act on. They were pretty aware that sticking up a grocery store was not going to get very much in the press in terms of a terrorist event. They knew that. They sometimes would get money that way, but they knew that that was not a terrorist event. And so when they designed the events, they designed them with different weapons and different requirements over time. The one thing I was convinced of, once I had finished talking to those folks, is that there is really not a way to get ahead of them except inasmuch as they cannot use the technology. Weaponizing these things is hard, so they may not be able to use them one way or another. But in terms of preparing for them, what we have to prepare for are the more generic things, as reflected in their last remarks. That is, if we know how to manage very large bacteriological problems, we have now taken care of the generic problem that we have ongoing, if we have integrated the proper things. It is only since 1980 that the office of the President has identified itself with developing an emergency response in this country. And it is only since, in the time of James Lee Witt, that we have really had a national program that has attempted to integrate across types of disasters to do this. We ought to recognize that what we are being asked to do is bring in and perhaps look at this particular problem and see how we can make recommendations that result in its integration rather than its becoming another crusade, another war against - fill out the blank, that ends up being the usual kind of ineffective spinning of wheels and eventually goes on to something else.

DR. URSANO: One question everyone is addressing is, what should we prepare for? Should that be, perhaps, the more likely low-consequence event? Should that be the effects of communicating the risk to the community? Should that be natural events such as the West Nile virus which no one has yet mentioned, which has shown its head again and we are now stationing chickens in order to detect it and waiting for it to creep down from New York to Washington? Should we prepare for the protective behaviors that are necessary from the hazard, as Tim suggested, to distinguish preparing for risks versus for hazard? John and David's comments at the very beginning highlights questions about whether the psychological interventions should be addressing the question of whether society, community, and family function should be separate from the whole issue of the biological risk itself, and what are the psychological interventions necessary for that aspect of our societal needs?

4

PSYCHE AT RISK, PSYCHE AS ARMOR IN BIODEFENSE

Joshua Lederberg

DR. URSANO: It is a pleasure to introduce Josh Lederberg. Josh is a distinguished scientist, Nobel Laureate, professor for all of his career, who has taught not only his students, but all of us, about how we can learn about the world of microbiology, and also about its dangers and risks, which has been his focus more recently. He has also been a distinguished member of the Department of Defense Science Board, and has been focused on this particular topic of bioterrorism and its risks to the Department of Defense community as well as to our nation now for a number of years.

DR. LEDERBERG: I do not have to remind you that this conference is primarily devoted to consequence management, and that is a very important arm of our response to the threats of biological attack, biological warfare (BW). I could not be more delighted than I am to see the expertise that is being brought to bear on the psychosocial aspects of these problems of consequence management which have to go hand-in-hand with all of the technical, medical, clinical support, vaccines, antibiotics, first responders, and the physical aspects of that management.

I have been very deeply involved in that side of the game, but as I look ahead and see what further technology is likely to bring to the fore, I look ahead 10 or 20 years about what our knowledge of pathogenic organisms of infectious disease are likely to bring forward to us, and I have a rather gloomy prospect of the balance between offensive and defensive capability. That has led me to try to put more and more attention to what more can we do to provide disincentives for individuals, states, small groups, the whole panoply, to contemplate, plan for, and implement the use of BW in the first place, because I think in the long run we are going to have to depend much more on these events not happening.

Consequence management is an important link in that chain. Without preparedness we are so vulnerable that it is almost a criminal temptation for anybody to go to the top of the tower and start shooting at people at random or the microbiological equivalent thereof. But even using optimistic projections of what good consequence management could accomplish in today's world with today's agents, you would be doing very well and you would be very, very pleased at the possibility of rescuing 90% of your potential victims. But when your potential victims number in large exponents of 10, you do not congratulate yourself that much because of the leakage of what you had not been able to contemplate is still a horrendous toll.

Getting BW to not happen is a very, very important part of the program and it goes hand-in-glove with the other issues. The defense can be organized along the lines indicated. There are any number of other taxonomies that might be brought to bear. They are all very closely interrelated to one another, but I am going to concentrate on issues, for my own discussion, raising questions. I have very few answers about the deterrence and prevention, what we might do to lessen the likelihood that there will be a biological attack.

The paradoxical historical datum is that there has not been a really significant BW attack in recent history. This is used by some as an argument that we need not make any fuss at all about the problem. If they have not done it, then why put in any effort to deal with it? I doubt if that is going to be very contentious in this particular community, but I will deal with that shortly. I do not adhere to that view, but I do respect the history, and believe it invites our attention to the possible reasons for that regime of nonuse. The immense disparity between the capability for mischief of a relatively accessible weapon and its actual exercise.

This is not unique to the BW arena. If you stop and think about it, there are many individuals who have access to things like tanker trucks full of gasoline that could really wreak havoc as well if they were really determined to flame out a large part of a city or a subway system, or kill a lot of people. And I guess no one has done quite that thing, although the bombing of the World Trade Towers would be at that comparable dimension. I am not suggesting that BW is unique in that disparity between the extreme mischief that individuals could deal with and were just hell-bent solely on destruction and what they have for the most part actually done in the past.

Part of the answer to the question is that mayhem and destruction are generally small parts of the spectrum of what even states or terrorist groups want to accomplish. They almost always have rational political purposes in mind and those purposes have more to do with coercion, some degree of retribution, some degree of warning, a large degree of fear, that could often be accomplished at much lower levels of destructiveness than I had just been remarking on.

But the world is changing, and I guess the downing of the aircraft at Lockerbie was the turning point in which mass mayhem did seem to become the order of the day for a narrow sector of actors who want to use force in an unregulated way that falls under the overall rubric of terrorism.

So, we ignore such contingencies at our peril. I want to concentrate on a few questions that this audience may be well qualified to help think through. I will lay out my agenda, I will telegraph all my punches, and then I can bring back just a few scattered observations for bits and pieces of the story and then invite your wisdom and commentary.

One question that is very much in my own mind is, can we mobilize rational planning for dealing with BW attack, without on the one hand panicking the public, and on the other inspiring the potential perpetrators? I worry a lot about the latter. I worry a lot that the very fuss that we are making in order to get changes in public policy, to get investment, to get public adherence, may also be accentuating, let's call it the attractiveness, the glamour, the potentials of damage in this arena, and I really deplore the way in which the media have been invited.

They do not do this all on their own, make hay at a kind of maximizing these sorts of events. It is not that they are lies. By and large, what they are saying are things that could happen. But who needs to drill that home to the minds of individuals who might be borderline to start with? You have not seen me taking part in "Nightline" and other media exercises of that kind. I have no objection to talking to smaller groups, people whom I have some trust in, even people whom I do not trust, who are part of an elite that needs to be persuaded that there are issues at mind. Some degree of that just can not be helped.

But I am making a psychosocial judgment about the degree of harm that could be elicited by that kind of ventilation and balance against the good, and I do not know if it is right or not. Many people tell me that I am wrong. The cat's already out of the bag and the information is readily available. There has already been so much talk. Once the movies have gotten into the game what more can you add to it? So, why are you worried Josh? Nobody is going to pay any attention to you anyhow even if you are in the public media. But this is among the kinds of issues I would like to have your own experience and background in dealing with behavioral problems to bring to bear.

More importantly, and I do not have a clear answer to it, can we understand the non-use regime, the historical paradox, well enough to help plan for its reinforcement, or at least to make sure we do not erode it. And here I will have one or two concrete suggestions to offer about it, at least not eroding it. And then a rather grim thought. What about the day after tomorrow? What will a biological weapons attack bring in its wake? And in particular, will it ignite a series of copycat efforts and other things that we could do beforehand to at least mitigate that possibility, once the boom has, in fact, been lowered. And I would have to be an enormous optimist to believe that that will not happen in some guise or another.

Besides consequence management, in the immediate sense of minimizing event-related casualties, what might then be done to discourage further conflagrations at a point where there might be a little doubt of requisite public investment, but what would be the wisest things to do at that point?

Here are the headings of my socio-political inquiry. One of them - I have touched on all of these already in some measure, but I would like to put some degree of system at this stage, because it is going to get very disorderly for lack of good ideas and lack of good content as we go along. There is an issue of persuading elites that there is a serious problem of ready access to BW on the part of amateurs, perhaps particularly in the Department of Defense, because it would mean bringing them to a mission that they are not accustomed to dealing with of civil support of attacks on the civil population in response to that level.

There has been substantial skepticism, but recently quite a turnaround, so today I would say there is not a unanimity but a very strong consensus, especially among medically-informed specialists who know what bugs can do, and know how easy to grow them, and have some sense about how easy it is to disseminate them, that we are now seeing a moderate degree of public investment. Perhaps the most important member of that elite who has been persuaded, is the President of the United States, always taking a very personal interest in these matters. He is dragging some members of his cabinet by the heels towards paying close attention. And there is some very strong leadership in this matter and that is embodied in what I am sure you are all aware of, the Presidential Decision Directive 62, which laid out the framework of what government organization might be like in trying to cope with these issues and did really put on a mandate to agencies not really accustomed to dealing with these kinds of issues. On the one hand, the Department of Health and Human Services, on the other the Department of Defense, and Department of Justice, since we are dealing with crimes, might have greater familiarity with the law enforcement aspects, but know nothing about disease and infectious agents, and bringing them together (see Figure 1). So I have a marvelous picture of Janet Reno embracing Donna Shalala and being congratulated by the President for them both joining the National Security Team.

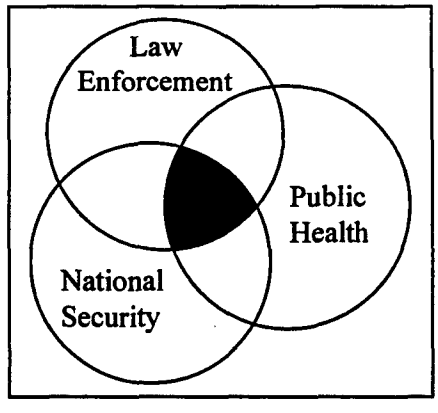

Figure 1. Organizational Framework for Biological Warfare

Most importantly is the issue of outlawing in the deepest sense of the term, even the thought of the use of biological weapons or just putting this so far outside the pale, that it is not contemplated as something that any human being will do. We know individuals who are so unsocialized or so anti-socialized that perhaps this is even more of an incentive than it is a deterrent, but the vast majority of people do operate with some framework of a sense of social order. They may not like the one that they are in. They may want to change it, but very few really want to see it collapse all together.

We have come a long way with respect to delegitimizing the use of biological weapons, particularly embodied in the treaties, the Biological Weapons Convention which does this at least rhetorically at the level of states. We have a modest amount of domestic law that deals with similar situations, and I will have more to say about that a little later on. In principal it is widely adhered to but we still have to organize our resolve in international forums to achieve effective enforcement. And the problems we have had at the U.N. Security Council in really getting the French and the Russians and the Chinese to go along with us in developing an effective regime of sanctions for Iraq and frustrating its very clear intentions of development of biological weaponry. It shows we have really got to go a long way.

But that is also connected with the fact that we are so strong we sometimes forget that we have to be smart. And we are using very blunt instruments, they are not as blunt as dropping bombs, but even economic sanctions that are devoted to the economic welfare of an entire people have had a backlash. They have it in the international forum and they have it in the domestic policy. I think one of the burdens that we are under, if we are going to have a reasonable world order, is that we have to find ways of enforcing that order that do not penalize entire peoples, that do not penalize the victims of tyrants even more than they are already subjected to and the fact that they are living in a tyranny in the first place. These are overlapping categories. We have the issue of discouraging proliferation. We do have sanctions on the one hand. Imperfectly elaborated, imperfectly enforced, and subject to the whims of what are regarded as myopic national security interests

This nation did something quite disgraceful and something very much against its own national security interest when it looked the other way at Iraq's use of chemical weaponry in Iran and against some people in the Kurds because at the moment we were leaning towards them. It need not have required very distant vision to understand how, in any long run, that would be very much to our disadvantage and it certainly has proven to be in spades. That is an example of the kinds of things that we need to scrupulously avoid if we are going to sustain this sort of regime that we are looking forward to of a more civilized kind of world. Connected with that, we as a nation, the most powerful nation, the one most deeply involved, the one who I think has the most to lose from the disorder that would accompany the habitual use of weapons like biological weapons, we, ourselves, have to come to the table with clean hands.

I have given you one illustration where our hands were more than a little bit dirty. I think we have present policy junctures to deal with that I will talk about a little more that are at least so ambiguous that they raise very serious questions as to whether we are

pursuing the right course or not. A very positive step would be to reinforce the sense that global health is a shared program, is a shared objective, that we will work with other countries and expend our own resources in order to enhance everyone's security against infectious disease no matter where they are. It is a disgrace that we have medications that are unaffordable to tens of millions of Africans who could profit from them.

I am not lambasting the pharmaceutical companies. They are operating in a mode that we have instructed them to, to make high-risk investments, achieve wonderful progress at the technical level. But we cannot let it stop there. We cannot let there be an impasse where a few billions of dollars could make such an enormous difference to the welfare of an entire continent. To the extent that we turn our backs on that kind of a situation, I think we are a little bit hypocritical in saying that biological weaponry is so awful because you are recruiting an infectious disease to an inhumane purpose, when we are not going all out in our own potentiality of countering infectious disease on a global basis.

Consider how much publicity should be given to the entire issue. I have already touched on the topic. And I am more concerned about inspiration than about information. Anyone who already has the idea that they want to produce biological weapons will have little difficulty, I am sad to say, in getting every nuance of information that they need and in capitalizing what are indirectly the fruits of our multi-billion dollar investments in offense BW between World War II and 1968 when we were in an arms race with the Soviet Union in the development of this kind of weaponry. They were not dramatic technological breakthroughs. They were not constructing new organisms, but they were discovering that these can be aerosolized, that aerosol routes of dissemination were very effective, for what might be otherwise very limited diseases, like anthrax; define the parameters for them; define the conditions for stabilization of those materials, their shelf life and so forth. All of that is available in the unclassified literature.

Now you kind of have to know how to look for it if you want to make the most effect, and you have to know what part of it to believe in order to make the most effective use of it. And that is where, what I would regard as overzealous dissemination of what are the most effective routes, what are the most effective media for producing and disseminating BW are not doing us very much good. I do not know how to censor it, but I think some modicum of restraint on the part of people like us who are trying to work towards solutions might be thought about. And I will have some more illustrations about that a little later on.

As I look ahead to what new technology has to bring to bear, and here is where I came into the story – I was first recruited into BW policy to be a consultant to the Arms Control and Disarmament Agency in 1970 as an advisor to the U.S. Delegation of to the BW disarmament talks. One reason I was recruited is, that unlike a great many other scientists who were mounting protests against our offensive programs, development programs in both CW and BW, I felt the BW issue was so much more compelling for the reasons that what technology has to bring to bear, that it would be wise to carve that

out, make a separate issue of and I thought that we could much more successfully negotiate, as of 1970, a disarmament treaty that covered only BW than one that would also have to embrace chemicals as well.

The reason for that distinction is that chemicals had been part of the armamentarium of military organizations very actively since World War I. They played a very significant part, 10 to 15 percent of the artillery shell loadings in the last year and a half of World War I were chemical munitions, and while these were mostly disabling rather than lethal casualties, they did wreak one hell of a toll and they became part of the military doctrine of most states as a result of that experience. They were established and authenticated weapons, whereas that could not be said for BW. In fact, it was very difficult to try to define the circumstances under which the United States was likely ever to use biological weaponry. It is a niche that is well filled adequately by other kinds of weapons in terms of targeting, reliability, precision and so forth. A powerful and rich nation like ours does not need biological weapons in any way or fashion to accomplish its political or military goals. We have much else we can rely on.

The opposite can be said for the larger number of smaller and poorer countries, and especially sub-state groups, that do not have access to the missiles, precision-guided hardware, advanced aircraft, and even in some ultimate circumstance nuclear weapons. It is the poor man's retaliation or poor man's response to the high-tech weaponry that is the core of our military capability. It is very much to the United State's advantage as a powerful and as a status quo country to outlaw BW, and giving up our offense program was a tiny, tiny sacrifice to make in that direction.

The converse aspect of it would be the inevitable and eventual leakage of whatever technology was being advanced at our own laboratories. I have nothing but honor for the folks who were pursuing national objectives in working in those labs. Many of them I have known well. They were doing the job that had been assigned to them. It was a political decision, one that had to be conducted at a very, very high level, about what was in the best interest of this country. And we did very, very well to get out of that game.

But what about the new technology. How I came into this arena was that I was the inventor of many aspects of genetic manipulation and microorganisms, of the groundwork and how they could be used for the development of even more effective weapons. Effectiveness is often paradoxically moderating their effect, making them less contagious but making them more controllable, making them more amenable to certain protection of your own side and evading the countermeasures of the other side, rather than making them any more lethal than they already are. It is pretty hard to get past what is already on the table in terms of sheer lethality, in terms of sheer violence, but making them well-regulated military items is another story. And here the continuation of that arms race would certainly have been brought to bear the highest levels of technology for an ultimate purpose that would be very much to our national and global disadvantage.

But how can we regulate? Is it possible to even contemplate regulating that technology in the future when everything we do in the name of medical research, in the name of understanding pathogenesis, in the name of targeting new kinds of antibiotics and developing new kinds of vaccines overnight, that could be converted to quite nefarious use? I do not think there is an answer to that question, and it is still one more reason that I think we have got to try to deal with this problem as close to the roots as possible because what looms in the future is even more frightful than what we have on the table today.

And then a very practical kind of issue, how can we sustain effective intelligence, the penetration of terrorist groups, get into their heads, get into their planning? The FBI has actually done a remarkable job, not a very well-advertised matter of how much of this kind of planning they have already been able to get into. There may be one FBI agent for every terrorist in numerical terms, and it may take that in order to accomplish the goals involved. But, how can we proceed along these lines without an unacceptable intrusion into the ordinary course of the lives, the protection of our privacy, and so on. They are really quite serious dilemmas that have to be thought about, that also have their psychosocial component.

Now here is the good and the bad side. This is one of the more inflammatory official reports that has been issued in this field. I happen to have chaired -- Technology Assessment Advisory Council, an advisory group of this report of the OTA. And I tried very hard to get them to temper what they were going to put on public display. And they did cut out a lot of stuff that was even worse than what they had put in, in terms of technical detail.

But this was the most nearly authentic public document about what the potential scope of a BW attack would be. And it said that 100 kilograms of anthrax spores in a line source, across one boundary of Washington if the weather is right, the wind is right, and everything else is well prepared, could generate a million casualties. And one still has to accept that judgment. Now it is a best, best, best case from the point of view of the aggressor.

Innumerable things can and will go wrong with that scenario. So guess what? They will cut down the death yield by a factor of 10, maybe by a factor of 100. They will contemplate an attack where, when you have done the body count at the end of the month, you have had 10,000 victims, but you would have 5 million people exposed, and you do not really have a very good way of knowing which of those 5 million are going to end up in the 10,000 lethal casualties. By the time they are obviously symptomatic its essentially beyond our current modes of treatment. We need to do more research in how to treat anthrax later on in the day and since a lot of the disease has to do with shock syndromes and so forth, it is not totally impossible that we might get there.

But as things stand at the present moment, if you are, 24, 36 hours into the appearance of overt symptoms, essentially treatment is unavailable at that stage. So you have got a population not of 10,000 even though that is the limit of the accounting, you have got 5 million people that you have got to take care of -- well, that is the problem

that you folks are all facing at the very moment. It is at the far extreme, but it is a not-impossible scenario.

I think this was a pretty compelling argument. It did lead to Bill Cohen having a sack of sugar or flour throwing it up in the air and saying something, what it could do. I would have preferred if he said, yeah, but it is technically pretty tough and I am not going to tell you all the secrets of what would be needed the get the extra 20 DB of performance. I do not want this to be advertised as being too easy even though in the right hands it would be for reasons that were already gone into. But it was a pretty persuasive document, that said, yeah, there really is a problem and while you can knock it down on the basis of meteorology or did they really know how to make the aerosols, I am afraid we have been teaching them now to make the aerosols, is unfortunately part of the answer.

If BW is so effective, why has not it been used before? Until the last decade or so, theater was the main objective of almost every terrorist act. It was a demonstration. It was calling attention. It was eliciting sympathy. It had other purposes. It was a way of recruiting individuals who were at the margin. Once you get them to be involved in a criminal act, they are yours for life. We saw a great deal of that during periods of civil unrest during the Viet Nam War. A lot of the provocation for student violence was to recruit them for still more aggressive action by getting them involved in the first instance.

But massive casualties would have worked against their political objectives because they were trying to recruit sympathy for their cause and tried to divide their oppressors, invite overreaction on the part of law enforcement and the military and so forth. And if they are too aggressive, they subvert those kinds of angers. Well, I will not say we are past that. I think 90 percent of terrorist activity still belongs within that political ballpark, but we have too many events like Oklahoma City, like the World Trade Towers, to believe that there is always going to be that kind of restraint.

There are inherent technical thresholds in the use of BW. It does require a certain ease, if not knowledge, about dealing with microorganisms, and it is that ease which is part of the inspiration which is not yet so broadcast that anyone wanting to do violence is going to think of using BW in the first instance. But the more it is fictionalized and the more attention given to it, the more that barrier is reduced. I can give you recipes that you could perform in your kitchen, and you could find them on the web if you started looking for them.

The unfamiliarity with these weapons, the uncertainty about what the scope of their attack would be, the lack of prior experience, and also the fuzzy targeting. The World Trade Center Tower is a symbol, so it was not just trying to kill a lot of people, it was doing one at the center of the power of this country. It was part of that message. You send anthrax over Washington and you kill a lot of people from every walk of life and every socio-economic, racial, ethnic kind of group, and you have to be a totally unaffiliated individual to even want to think of doing that. To kill the Pentagon is one

thing, kill Washington is another, from the point of view of that mentality. So there are still barriers at that level.

During the Cold War a well-storied phenomenon, we were so preoccupied with maintaining the balance of terror between the super states on both sides, we were able to suppress a lot of more minor kinds of eruptions. They were not going to be allowed to start trouble that we did not want to be involved in at a larger level. That broke down in various circumstances, but it stabilized the world. You could not have had the Balkan Wars during the Cold War. We got them promptly when the Cold War faded away, and that sort of discipline then disappeared.

And there are cultural restraints. They are historical reality even if they are perplexing to understand why they were the case. This is language from the treaties. The Geneva Protocol, "Whereas the use in war of asphyxiating, poisonous or other gases, and of all analogous, liquids, materials or devices has been justly condemned by the general opinion of the civilized world, we agree also to extend this prohibition to the use of bacteriological methods of warfare." This was the echo of the Shrecklishkeit anti-German propaganda of World War I. The Germans could be pinned down with having introduced the use of gas warfare in the trenches, and they were not going to let them forget about it. One of the first things that was entailed in the treaty limitations, that even before there was a general disarmament treaty, was that Germany was not allowed the possession and development of these kinds of weapons.

More recently, in 1975, the Biological Weapons Convention, this is the exhortatory language. "Determined for the sake of all mankind to exclude completely the possibility of bacteriological agents and toxins being used as weapons, convinced that such use would be repugnant to the contents of mankind and no effort should be spared to minimize this risk." Well, you can believe it or not, but the language is there. It has been imported into international law. I think it has reached the status of customary law even beyond the signatories, I have no doubt, whatever, that officials of even a nonsignatory state would be likely to be hauled before a new Nuremberg court as having committed a war crime if they were to use biological weapons in the face of this kind of language. But, I will just put it down as a cultural display. At least the idea of this kind of abhorrence, of this kind of prohibition, has been well established in the rhetoric.

Now what do we have today that makes it different in terms of probabilities of use? The escalation of terrorist lethality I have already mentioned to you. I sadly have to comment that this reaches other walks of life and I am almost brought to tears to have to say this, but I think about Columbine High School and I think that there must be a thousand kids every year who are doing laboratory projects involving DNA splicing, PCR, genetic engineering of one kind of or another, the handling of microbes, who have access to laboratory facilities that will be quite adequate to the production, not of a thousand liters, but of a few liters, of serious infectious agents. And by the evidence of the Columbine and the abortive copycat efforts, we are dealing with a population, some anyway -- well, their hormones are raging. They are not very well socialized. They do not fully contemplate the consequence of things they do. And if you do not believe

what I said, think about all the hackers coming from that class of our humanity who enjoy showing what they can do to bring down the system.

So actually I have a pragmatic worry about that community, but I do not know what to do about it, except keep an eye open for aberrant behavior and do not support projects on growing anthrax for high school talent search. You may think that's a joke, but things very, very close to it do come by, and keep an eye out for what they are actually doing. And keep an eye out, this is a matter of school mental hygiene more generally for disturbance of a variety of other kinds, because kids could do a hell of a lot of damage. They are not going to kill Washington, but they may kill the school, or they may kill a good part of the city they happen to be in.

The splintering of regional and state authority and the upsurge of ethnic and religious fanaticism. This sector I worry about the most because there is a curve of experience, training, facilities, and funding that gets higher and higher the closer you get to state organized groups. But we also see a lot of splintering in those groups. Think about the Palestine Authority. We have Chairman Arafat who is trying to hold together a coalition, trying to conclude a peace treaty. But he cannot readily control every element of his own organization, and we have already seen a good deal of low-level terrorist violence whose objective is to torpedo the agreement. The rejectionists.

I worry that some element that might, in past years, have had state sponsorship, have had state funding, have had some training in the use of any of a variety of weapons have now splintered off and no longer want to follow the rules that their bosses lay down, because they have their own ideas on where to go. And we are seeing this kind of splintering in even the most tyrannical of states. We are seeing it in Iran today and somewhat more positive directions. I guess we are going to see that in North Korea as we find a government possibly moving to more pacific directions. But, as tyrannical as they seem to be when they are founded on fanatical ideologies, those ideologies may survive to more rational directions of political oversight.

The asymmetry of conventional military power is probably the largest driver. There are large incentives for states who know they cannot beat the U.S. on the battlefield of the kind that we define, who from their point of view may have no other recourse than the use of unconventional weaponry. With all of its limitations of targeting and so forth, BW is really the best shot they have. And then there is the diffusion of information, and it is only compounded by the Internet.

Now about this repugnance, I have a quotation, the cultural issue, from Vannevar Bush, a book he wrote shortly after the war. "Without a shadow of a doubt, there is something in man's makeup that causes him to hesitate, when at the point of bringing war to his enemy by poisoning him or his cattle and crops or spreading disease, even Hitler drew back from this. Whether it is because of some old taboo ingrained in the fiber of the race, the human race shrinks and draws back when the subject is broached. It always has, and it probably always will." I do not quote that because I believe it. I do not know what is ingrained in our fiber. I do know the history that we have talked about. That fiber may be a cultural fiber, I am more willing to believe it. But even as

strong as those remarks were, I have to say that there was certain, let's say, disingenuousness in those remarks. At the very time that Vannever Bush was writing these statements, he was also promoting the offensive BW program at Fort Detrick. So as persuasive or as passionate as those remarks are, they fell short of saying there should be a full dissociation, should not even think of even using these things in retaliation, which would be carrying the matter just one step further.

But that language is in the air, and whether you believe it or not, I would not just rely on it. I am not telling you folks to pack up and go home, you do not have to worry about consequence management, there will be nothing to manage.

There is something to grasp on to here, and I think we need to again examine, what it is we can do to reinforce these attitudes, these folkways, these mores, and not encourage their violation? I am trying to inquire what directions we can take. I think our most important media are probably physicians, health providers. Some of these are going to have the most obvious technical skills for the development of these kinds of weapons and their adoption. But they are also part of a world-wide community of discourse of information, of some commonly held ideals of service to humanity.

They played a large role in calling President Nixon's attention to the issues entailed in chemical and biological weaponry. Now this country is not quite like some of the others, but there could be communities of this sort. In France, in Germany, perhaps even in Russia, that have not been cultivated in any way, that we, as physicians, ought to be in closer contact with to try to make common cause. We do have. We have Ken Alibek who defected from the USSR by his own account because of his repugnance about what he was up to as a former biological warrior. He may have had other motives as well, but I think we should honor that one and ask, "How could behavior of his kind be further reinforced?"

We have taken some small way. We have cooperative threat reduction programs. We are investing a few million dollars here and there when we would have paid billions to neutralize these threats during the Cold War for converting old BW facilities into ones that could be oriented towards research and development for vaccine production. Trying to buy out some of the old BW warriors on that side.

It has taken years and years and years to get a tiny trickle of funds, but something is happening in that direction. So, these sentimental attitudes can be reinforced by other kinds of action. So here I am going to turn to something of the opposite. This was an advertisement that appeared in The New York Times about a month ago. It is from a Latvian physician who has a great deal of grievances, but he has picked up everything possible to organize anti-Russian propaganda. I think we might have a great deal of sympathy with his concerns about what is happening in Chechnya. Here is his ad. It is a call to arms - allowing the Russians to exterminate the Chechens and Latvians today may likewise lead to unknown consequences when biological weapons become a reality. Picture in the near future, a Chechen in a kitchen somewhere, growing something that can take out a big part of Moscow. Oh, you do not think he will use it? Do you really think they would pass on an equalizing weapon? I do not think so.

But what is remarkable is that The New York Times ran this ad! This level of discourse of "Let's use BW. Let's get back against our oppressors. They are killing us. Let's kill them by any means available," I am afraid it is going to be more and more of the tempo of the ethnic wars, grievances and so on, when indeed, there are massacres occurring when there is oppression, but the side effects of redressing evil on these parts, on what is happening in the rest of the world, I do not have to spell out for you.

This is from The New York Times last week, "Fusarium considered a tool to kill cocoa in Columbia." This is a plan which is quite far advanced and been pushed by a couple of congressman from Montana. There is a lab there that has been receiving research funding, some $10 million dollars a year or so, to develop strains of a fungal, we will call Fusarium, that hopefully might be so specific for Erythroxylum, the cocoa plant, that it might then be sprayed by helicopter (U.S. helicopters to be sure) over the plantations in Columbia and get rid of our cocoa problem.

This is being pushed at some very high levels, and I cannot think of a worse idea if we want to maintain a no BW regime in our deep-rooted thinking. I am not claiming it is an overt violation of the treaty. It is not an act of war. You will see how we have leveraged the Columbian government to assent to it. This is the Columbian Military Aid Act, and it is a condition to military assistance that the government of Columbia agree to the implementation of this program of microherbicide distribution.

My fear is that we will end up in the worst of all worlds. It will be deployed. There will be a big brouhaha during the process of it, but, you know, how can you be against the eradication of drugs? Well, it is not going to work. Nothing like this has ever worked to the level of efficacy. It will put a dent in it. It may kill half the crop or something of that order. So it will be marginally effective. A very high likelihood of collateral damage, that there will be other crops, maybe merely just by attribution, there will be wilt disease in other crops that might be attributed to collateral damage from this source.

Fusarium is not unknown as a human pathogen, and Fusarium toxins were what we worried about a lot and what was called "yellow rain" in the Southeast Asia as a source of trachothecene microtoxins. And we would have demonstrated enough efficacy, say, "You know, they did this to us." They meaning us, did this to them. What a cute idea. "Why don't we take out the cattle in the United States when we know how to do it." Just get past the customs barrier with a pound of contaminated meat where there has been foot-and-mouth-disease, and you have a $5 billion dollar catastrophe overnight.

So, to inculcate an atmosphere which seems to legitimize the use of biological weaponry seems very much opposed to all the things that we are trying to preserve in the previous regime. I am just hoping that Mr. Clinton will take this under more serious advisement and get the level of interagency and interdisciplinary review.

I am astonished at how many people I have run into, in the intelligence community, in agriculture, and in the defense community -- who have not even heard about it, even when it has appeared in The New York Times. This is from another page of that OTA report, and this has to do with, how much do we have to blab about how to do these things? Do we really have to advertise the excipients that can be used to compound the stability of biological warfare?

It is just gratuitous, that these guys are showing off how much they have been able to get into the scientific foundations. You can accomplish the policy purposes of documents of this sort without going into this explicitly in detail. Now let us hope people mistrust the government, as they sometimes tend to do, and they will believe that this is misinformation. Unhappily that is not the case, and these are just some more recipes.

I am going to look now at new technology, and this does get kind of scary. The astonishing point is that this article was published. A young guy learning how to do biotech decides to do some genetic engineering with Bacillus anthrax in a Russian laboratory, to his credit it is a published article. And what does he do? He does something. He changes the whole complexion of what you might have in mind by engineering new pathogens. I attempted to pooh-pooh it on very good grounds that putting a pathogen together from whole cloth is a pretty tough thing to do. We do not even know the 50 or 100 genes that would be involved in converting your garden variety soil organism into being an effective pathogen. It has all kinds of adaptations it has to make to the human environment, knock down the defenses, etc. But that is not what he did. He took a professional pathogen, like anthrax and just put something else into it. What he did was import a toxin from another much less grievous Bacillus strain, some hemolysin from Bacillus cereus, so it is called cereolysine, with a very elementary bit of engineering, just taking a plasmid from one to another. Any high school kid can do that, and generate it, an anthrax that now has a second mode of action. The bad news is that this probably defeats the vaccine that we now have available. The so-called protective antigen protects against anthrax by knocking out -- its prime -- the entry of its prime and lethal toxin into target cells, and thereby disables it as a pathogen.

Give it another toxin, the anthrax is perfectly well able to grow in individuals who are immunized only against the protective antigen, but without the lethality our nonspecific defenses are of macrophages and so forth can take care of them. Put it in this new toxin, and at least in guinea pigs they can. Now this is far from having been tested to where it is a certain evasion of our vaccines. I would not abandon our vaccination program on the grounds of these experiments, but they show a pathway in which genetic engineering is quite likely the direction they are going to be taking - not generating more horrendous agents, but being the counter countermeasures against the specific defenses that we brought to bare.

So we think these are bad guys? Let us look at some good guys. Here is a report out of the Institute Pasteur in Paris. They had the idea that there was a whole family of new vaccines that could be made using attenuated strains of Bacillus anthrax as the platform for doing it. So they carried the technology of genetic engineering, a perfectly

legitimate, perfectly valid purpose one more notch. There is a how to do it implication of this that says, "You know, anthrax is going to be a very convenient organism to play all kinds of tricks with. These are for beneficial purposes." But you know, the message is out there. All kinds of other possibilities are in the offing.

My message is that the technology is only going to get worse. We cannot relent on the consequence management or the other diligence. We have got to have our fire trucks, we have to have our training, we have got to have the equipment. Fires of all sizes and kinds are going to be lit, and they are absolutely inevitable. It would be criminally irresponsible to leave ourselves open to any level of attack. But more and more sophisticated forms of attack are in the offing, simply as a by-product of a technology. We would not know how to stop if we wanted to. We could not stop because there are too many other gains, and we better get to the roots of the problem of trying to , say, "Why do we want to -- why does anyone want to see BW in the first place?" I do not know the answer to it, but I put that as an equally important question to the consequence management.

DR. WEISAETH: I raised the issue of genetic engineering in the last session. I think you have, in a way, answered my question. But I could have a follow-up. How far away do you think we or somebody is from producing a weapon that could be highly selective in terms of characteristics, of a population, for example, black or white or another skin color.

DR. LEDERBERG: Well, the examples that I would know how to build will protect minority groups because these are often like the Duffy Factor. The absence of this receptor protects West Africans from some forms of malaria. One could imagine constructing weapons that use that receptor in which the West Africans would be protected. Even at that they would be quite imperfect. What level of precision are you going to require? It is next to impossible to get better than about 90% as a 10:1 ratio of sensitivity of your target group compared to just about everybody else. Now you know, you can believe that there are infinite possibilities in genetic engineering, and you can even target particular individuals, but that, I think, really is in the realm of fantasy. Some rough and ready discrimination might be. The genetics of racial difference is so grossly misunderstood. Skin pigment, I believe, is a sexually-selected character. It originally was naturally selected. There might be some advantages in some environments. Yes, a dark- pigmented skin is great to protect your skin from aging prematurely in sunlight and so forth. But the way it has been maintained, it is an ethnic label. It is a group label. Aberrant individuals tend to be selected against because they are not like the norm of that particular group. It is a complex phenotype of half a dozen different genes involved, but it only goes skin-deep. If you try to look at the rest of the genotype, ethnic groups are so much more alike one another and there is so much more deviance within groups.

Around this table from individual-to-individual is a hundred times more genetic variation than there is in any ethnic group you are to name compared to any other one in terms of systematic difference. And I think that has simply not been generally understood. I do not put it as an overall impossibility, but when you contemplate, how

would you ever test a system of that sort, there would be no animal models for it to start with, I think it is pretty much fantasy. I think more likely you could find ways in which the different pattern of second-level immunity -- if you are a rice eater compared to being a weed eater. That would be a much more systematic difference among population groups. If you want to rely on selectivity I would use rifle bullets, or I would use geographical localization and not the genetic ethnic targeting.

DR. MARLOWE: I was struck by the analogy of a hacker. That is one I had thought of too. This leads to an issue that you opened, Dr. Lederberg, which is, how do we learn more about the conditions that produce people rather than nation states, that will use these kinds of things, these kinds of weapons, and not necessarily for traditional reasons? Americans have used biological warfare for quite some time now. They used it against the North American Indian with great success.

DR. LEDERBERG: I knew Lord Amherst did, I did not know about Americans doing it.

DR. MARLOWE: As we moved to the northwest frontier, a number of colonists did the same thing.

DR. LEDERBERG: I would be very anxious to see documentation of that.

DR. MARLOWE: It has also been done in South America. How do we start defining both the conditions and the kinds of motivations, leaving aside the religious fanatics and simple gain of people who will do this in terms of the way hackers have done it and in terms of the expression of power. I think this may be a very real problem.

DR. LEDERBERG: Maybe I am being a Pollyanna, but I think recruitment in a positive enterprise puts those energies in a constructive direction. So you know, be partners for global health and use your smarts in that direction. Show what you can do there.

DR. MARLOWE: Here I think of something like those two young men at Columbine and the world they got caught up in on the Internet, of the world of the Aryan nation, and like generation of fantasies.

DR. LEDERBERG: But, 30, 40 years ago even those kids in Columbine might have been boy scouts. We do not have that kind of organizational impetus to do positive things. If we had it once, what might we do to get it again?

DR. MARLOWE: At what time do we undo the 60's and 70's?

DR. LEDERBERG: Well, there is a piece of it. We gained a lot in individuality and we lost a lot in terms of trust. I do not have answers.

DR. BROMET: When you were talking about what we would call primary prevention, it was very interesting, and on one level it would be wonderful to believe

that that is where it is at. But on the other level, I started thinking about teenage suicide and the reminiscent discussion about, should we start programs in the high schools to prevent teenage suicide? We should not do that because we are going to give kids ideas that they might not have had before. The fact is, it is absolutely impossible to predict which kid is actually going to commit suicide. We know what the risk factors are, but they are not specific.

DR. LEDERBERG: But we have learned to pay attention when they start talking about it.

DR. BROMET: Yes, we have learned to pay attention when they start talking about it, but we cannot really identify which kid is likely to do such a thing to himself. So on the one hand it was very interesting to hear you talk about primary prevention, and on the other hand I was left feeling like, is that possible or should we really concentrate our efforts on secondary prevention?

You mentioned physicians. We had done some work with the Chernobyl accident, and actually it was partly the physicians who really fueled a lot of the psychosocial problems that happened afterwards. They did this in a couple of ways. One is they, themselves, believed either because they were told this officially by the government and/or because they firmly believed it because they are not the most educated people, that Chernobyl had caused all health problems that you could imagine, from heart disease to gastrointestinal disease.

DR. LEDERBERG: The world media did not and some of our green groups did that.

DR. BROMET: In data that I am going to show later, if you as an ordinary person had been told by a physician there that your health problem was due to Chernobyl, it had enormous consequences for your personal health.

DR. SHAW: What should our communication strategy be? There really is evidence in terms of dramatization of adolescent suicide in the media, that if you show a program on adolescent suicide, suicidal behaviors actually increase and as subsequent to that dramatization. It seems like you are really walking a tightrope in terms of awareness, education, and really as I think as you said, inspiring, kind of copycats.

DR. LEDERBERG: I will give you my personal communication strategy. That is, talk to groups that you think might undertake constructive action and be very low key in talking to everybody else. So I did go so far as to edit a theme issue of the Journal of the American Medical Association. That turned into a book. I think you have seen some readings of some contributions from the number of people here to that. Now that book will get in the hands of others, but I think if they are already so motivated they are going after a book like that, there is probably little more that would inspire them. At least that is my hypothesis. Also, stay away from the sensationalist media. You know, the sound bite, especially the imagery of video.

DR. SHAW: There are two issues with communication strategy. What do you do before the event? I come from Miami where we always predict bad hurricanes every year. Then, what should a communication strategy be once the event has happened? What do you really do to mitigate panic and terror subsequent to a happening? I think that is the major task of this group - issues of consequence management. What should our communication strategy be and how should we use the media?

DR. LEDERBERG: I think credibility is the most important element. You want to maintain a sufficient degree of civil order; that there is some chance of containing the situation, that people will stay in line to get their antibiotics instead of smashing down the windows or flee in panic when it is not appropriate, when fleeing would not do any good whatsoever, and so forth. But, they have to be able to hear from people that they then trust. So that means that you have to have people ready to talk straight, who will not mince words, who will not prevaricate; (if they do, they will be caught in lies) and have them ready in abundance and make sure you have the channels.

The TV stations have a contract where at least some of them can be taken over for broadcasting emergency messages. What I do not know is whether in the height of an emergency, you would have a TV channel available for official communications, so you do not have to depend on CNN - who will get there first, you understand that part of it, but the particular way in which they massage it. I am not talking about shutting CNN up, but I am talking about having -- if you want to hear what your government has to say about it, get it first hand, this is the place to go. Is that in place or not?

DR. LEHMANN: My comment relates to the work on suicide prevention in adolescents, but also speaks to the other issue about attitude. One approach to suicide prevention is not to keep secrets. If you know a person is at risk, share that with someone to try to get help. It is an attitudinal thing that focuses on the idea that the kid is keeping secrets from everybody else when the secret is going to be harmful. One of the things we have to look at here is the issue of attitudes and how we can influence people's attitudes towards being anti-biological warfare.

DR. LEDERBERG: And, at the same time, be very discreet about it.

DR. LEHMANN: Yes, but also recognizing things that actually can be done so we do not promote an attitude of helplessness, but rather can promote some rather basic ideas that may lead one to more helpful and adaptive coping.

DR. URSANO: I am sure many of you know, one of the most effective prevention campaigns was instituted in Australia that had to do with the occurrence of melanoma. What made it such a success was the phrase "slip, slap, slop" and I'm not sure I can get all three correct, but it is: "Slip on your hat, slap on your shirt, and slop on suntan lotion." This campaign, in fact, had dramatic effects in decreasing the incidence of melanoma. This is an issue of how and what to target in the question of primary prevention. Larry raises a new type of target in terms of community attitudes, which may not be specific to the question of bioterrorism, but more specific to mini-risk factors.

DR. SMITH: There are a couple of issues that may be a little misleading in that, if you are talking about bioterrorism, and you put it in the same category as natural physical phenomena, the hurricane, I think historically, you have a major difference in popular understanding of the implications of the phenomena. I do not know what you can do for the people who have gotten sick or are immediately exposed to getting sick in the city where an event has taken place. That is a primary response issue that many of you are much better prepared to handle than I am. I do see an issue with bioterrorism of other places, the city 500 miles away, or the town 50 miles away, where people understand once a hurricane or a tornado or an earthquake has happened, you are through. But, a biomedical phenomena has a ripple effect that is not understood, that is feared, and we can go back to the history of epidemics prior to the introduction of vaccines and antibiotics, and see that people's behavior becomes very antisocial. When they fear something they cannot see is going to come into their environment from somewhere else, and there is a psychosocial issue that somebody has to have preventive measures in place. We talk about authoritative information. In 1947 you had five cases of smallpox in New York City and everybody could explain where they came from, what needed to be done. Vaccines were made available, and you still had massive panic and police barricades and a need to mobilize the National Guard in order to simply get people who had been vaccinated to behave themselves. You may not have needed to, but they did it, and you have got big pictures of mobs coming to places. Now, they mostly behaved, they mostly were told, and things settled down, but there was a lot of immediate, immediate misinformation that was brought under control. But the issue is how you control that and how it moves to the next level. And that is different in biomedical history from physical/natural phenomena. People have different understandings of those kinds of issues.

DR. MARLOWE: I was going to bring up New York in 1947, because my recollection was that there was no panic. My entire high school simply marched up the block to 16th street in Lower Manhattan, Stuyvesant. We all lined up. We were all re-vaccinated, which was very much the story all over the city. Millions of people were re-vaccinated. The thing was that, (a) We had a far greater trust in government than exists today. It has been undermined terribly. But, (b) we knew that there was an effective, available way to cope with the situation. And, in terms of consequences, the thing I wonder about is, what is the offer? What is it that we are telling people we can do for them consequentially after the exposure?

The fear of the unknown, the lack of information, certainly we know from combat, is the most disorienting, demoralizing thing for people. What is it we are prepared to say, to do. How do we maintain psychosocial organization under these circumstances? And, I think this is something that requires attention.

DR. LEDERBERG: I will confess that I already graduated from Stuyvesant High School long since the time of the event, but I have been very interested in that circumstance and I have been trying to get, and I have not found, a detailed after-action report on it. Marcy Layton gave me a sheaf of clippings from the New York Times and their rather incomplete account and there was -- I think, one of Burton Ruachay's Annals of Epidemiology covered it to some degree, but it is such an important event. It is such a

precedent for what you hear, would have to cope with. I think it deserves very serious further study. What I have read may reflect Phase II on what was commented on. It certainly was brought under control.

I am impressed with how effective and how orderly that campaign was and it was from an epidemiological perspective as well. I think there were no more than a dozen cases total from that primary air contact. Now that was not a totally naïve herd. This is a population, a good fraction of whom had already been vaccinated before and so forth, so one has to take that into account. But, I would plead for a very careful restudy of that particular incident if the sources can be found.

DR. FLYNN: I would like to comment about the importance of credibility of those who communicate the messages. For a long time, I have felt that that was really the key, certainly a key, to consequence management in situations like this. My thinking recently has gotten a little more complicated, to make sure that we go beyond just making sure that the institutions, the individuals that are speaking, have the confidence of the people to an expanded concern that those people and anyone who speaks, knows what they are talking about. I am very concerned that we could have credible spokespeople in an area that is as complicated as this, saying either the wrong things or contradictory things, and, that credibility goes out the window. I lost confidence during the Midwest floods a few years ago. We did have credible representatives speaking to public health issues and the CDC, the State Health Department, local health departments, each said three different things when it came to the advice of, how long do you boil water before you can drink it? Now, if we cannot get three major, credible, governmental groups agreeing on that, how are we going to be sure that we are giving the people the right messages, even if we have the Surgeon General standing up and doing it, that has credibility. So, I think it is an issue of not just having the right people do it, but making sure that the right information and consistency of information happens, and that is even a bigger challenge, I think, than some of the others.

DR. LEDERBERG: You will not get that unless you have your strategy worked out well in advance as to who is going to take responsibility for what!

DR. CULPEPPER: At least they said to boil the water.

DR. RADKE: As I listen to the description of the rational planning and social-political strategy, it raises some skepticism in me because I have been living in the political world in the State of Minnesota as a mental health professional, and for the last five years, as a State Medical Director. What I have found is that society and the politicians are unresponsive until there is an incident. I do not know if that is complacency, blissful ignorance, or denial, but they are unresponsive. Then there is an incident. And, then what we have is an over-reaction, with a political solution, that does not make sense because it is neither rationally proactive, nor is it on target and it wastes a lot of time and resources. I am concerned that we face the same thing with something as important as responding to bioterrorism, and I was wondering about your thoughts on that.

DR. LEDERBERG: My approach to this has been Chinese water torture as a way of approaching political leadership. I have been working this beat for, as I mentioned before, about 30 years. First of all, I had to get professional consensus among other physicians and microbiologists, and so on, and that took a little while. That is where I have applied most of my own energies and efforts. There has been substantial response. If you just look at the kind of budgets that are going in, the funding for training and first responders that's -- there may not be an incident to which first responders will be responding to, but, I think it is an important part of overall training. We are lucky we have not had a major incident that got in ahead of our planning for it. But, I am feeling pretty optimistic about the way things are moving just for the moment. The organization of the government has been atrocious until fairly recently, but I think partly under the President's personal pressure in this regard, it is moving along.

I am sorry this group could not have had a chance to get a briefing by Bruce Lawlor. General Lawlor is in charge of Joint Forces Civil Support, a program that is starting to do staff work in the design of how federal government would be involved in the largest-scale incidents. They would only come in if they were dragged in by the requirements of the situation and the local civil authorities. But, it is a totally different world today than it was two years ago, from the point of view of the tangibility of the planning. I do not know if there are other efforts. It is more obvious to be able to see that at the Federal level and the DOD level. DHHS is just beginning to realize that there is an issue there and there are two or three people in the secretary's office and CDC - Scott is here so things have been moving. I do not know why you are feeling so discouraged.

DR. RADKE: I am reacting to the fact that on a federal level you see things happening, but on the State and local level we do not. I remember the incident on the Red River flooding where on two different stations at the same time, there were contradictory recommendations being made by authorities in place.

DR. LEDERBERG: Even if they are fairly minor issues, like how long to boil the water, it does undermine the credibility that they are offering people, if they cannot give the same story. I am not saying that there's not a long way to go, but I think at least the vector of movement is positive.

DR. HOLLOWAY: I wanted to make the point, which I suspect everyone here already knows, that this issue of getting the same message out is further complicated by what is considered good journalism. Because good journalism today means to show balance in reporting. A standard CNN reporter is going to have one person who says one thing and another person who says another thing, "on-one-hand," "on-the-other-hand," to prove that they are being fair. You ought to prepare for that in your overall strategy, because they are literally operating within the canons of their ethic when they do that. And so, you should not be surprised about that.

DR. LEDERBERG: I would still appeal for a place, a channel that says, "Now here this. This is Big Brother speaking. You may not like it, but Big Brother is all you've got

in terms of how to manage this situation and this is what we know and this is our plan." And, not have it filtered through the media.

DR. HOLLOWAY: I consider what I have just said an argument for your particular point of view about an official channel that provides official information and that this not fall under the usual requirements of reporting. I am both agreeing with you and suggesting that the situation will not go away because it is a requirement of the press to operate the other way.

DR. LEDERBERG: The reporters will snipe at it and, it will be ever thus, but there at least ought to be a place where you can know what the governor had said, what the Department of Health official had said, and hear it from their own voices and not filter through the reportorial mechanism that you indicated. Let the reporters snipe too, that is part of it.

DR. HOLLOWAY: But the discouraging part of that is that, when faced with something like Three Mile Island, the social response of the governor was to lie. This is the point where you have the situation where things can turn to disaster very rapidly with regard to the follow-up information. We need to inform those people who are going to be making those remarks that they need to be reporting what they do believe to be the truth.

DR. LEDERBERG: This is where exercises are all-important. I mean, these folks may operate according to their own practiced instincts or ones that are applied to other situations. Even that kind of an issue would come through during exercises.

DR. BARBERA: I want to go back to Brian's point and probably emphasize as much as I can, because it is nice to have a channel or an avenue of getting information out, but maintaining your credibility in the public arena, especially in something like bioterrorism, is going to be exceptionally difficult because medical and public health scientists are not the people usually conveying the messages to the public. When the messages are conveyed by the usuals, which are politicians, law enforcement, and emergency managers, they are often way off the mark. We see many other examples of this, like with Hurricane Andrew, when the governor said anyone with health and medical background that can help, please come and we deluge the state with some good people, some bad people, some outright frauds. We are going to have everyone deluged with experts that the media has found. In multiple venues that I have been involved with bioterrorism from the B'nai B'rith incident to a table-top exercise that was held for Janet Reno and Dick Clark to the recent Top-off bioterrorism where I helped to run the medical scenario. You get this information out there right away.

The idea of quarantine, which law enforcement seems to understand, or thinks they understand, and public officials. They immediately go to it. That alone will completely destroy public confidence immediately. In the bioterrorism event in Denver, quarantine was immediately invoked and we immediately shot back, "Okay, you have quarantined Denver and the Denver Internal Airport." You have just gotten a phone call from Colorado Springs Airport. They are overwhelmed with travelers who want to get

out and are going to get out, and they are flying out of there, or they have just overwhelmed the State of New Mexico with people going south to get out. The second we do any of those sort of things, the public officials are going to lose public confidence, and from there it's going to be a free for all. So, how do we connect the medical and scientific things? We have a lot to do way ahead of time to get this message out so it is scientific, so that it can fit all the different circumstances.

DR. LEDERBERG: That is what that exercise was all about, to be a part of that educational process.

DR. BARBERA: For those of us who believe in a systems approach to things, exercise is the last thing we do. First, you develop a system and then you train people in the system and then you exercise it to test it.

DR. LEDERBERG: That is when you think you know what you're doing!

DR. BARBERA: The problem is that you can predict all of this ahead of time. In the American psyches it is, "We had an exercise and we did okay, so what's the next problem? Let's move on." I am not sure that we are anywhere near where we need to be in terms of the systems.

DR. LEDERBERG: Does this group know about Top-Off. That something we might want to discuss.

DR. URSANO: We will have a chance to hear some more about that particularly in the panel session.

DR. WEISAETH: We have tried to study the credibility of various information sources during nuclear fallout. It started during the crisis in 1986, during the Chernobyl crisis, where Norway got more fallout than any other nation. Health personnel, health authorities came highest in trust. Now, we have no nuclear power plants, so the nuclear physicists, actually, were seen as very reliable sources of information. And, we have done this on some occasions since 1986. The problem we see is that the trust in local health authorities is low, and it is the same with the media. Local media have low credibility, while the national media, particularly Public Broadcasting, have very high credibility compared with the commercial channels. About 70% of the population, have a high trust in public authorities when it comes to information about the nuclear fallout. We did a study in Kola, where we were able to interview 2,000 Russians. The shocking finding was that 19% of them stated that they would believe information from their authorities about radiation level in the case of a nuclear accident. We also asked people, would you like to share the disagreement between experts? Approximately 50% said yes. We want them to wait until they can disagree and know with what they disagree on.

The young, urban, well-educated people have been immunized towards the information society. They can tolerate disagreements between experts. While the rural part of the population, the elderly, less, perhaps, educated, have this other attitude. The

main problem I see is that the radio will be the most important mass medium, because it will be on the spot and since, particularly with nuclear fallout, will be scattered, so if you give national information, some people will get the wrong type of information, while the local radio can sort of tailor-make its information to the people that are in our area. The main problem we see is the lack of expertise at the local health authority level and among the local mass media, and radio in particular, because it will be so important.

DR. ENGEL: I wanted to go back to Dr. Radke's comment that in situations like this there is a tendency to come up with do-everything solutions. We are a group of people who have a certain amount of expertise in this area. We may see some reward in it for us to recommend do-everything solutions. What I would hope that we would do, is something that has not been done enough in health care settings but is receiving increasing emphasis as the cost of health care goes up and there is a limited pool of resources. And that is, we focus on a couple of issues. One issue is that we are implementing things that we know will be effective. I realize there may be a shortage of those sorts of things in this particular instance, but we place a certain moral high-ground on focusing on things that we know we can do with some positive impact. Then, similarly, we focus on the feasibility or the cost of what it is that we do. That we also, for instance, as something becomes easier to do on a broad scale, that we are more prone to implement it, even if the body of evidence in support of its efficacy is less. We have to weigh the big social picture, which is, there are lots of concerns that communities have. There are lots of concerns that we all have, and we have to balance our enthusiasm for this particular issue with the realities and look to what we know will be effective, and on some level what we think can be feasibly implemented.

DR. URSANO: Josh has drawn our attention to some additional targets, and I do see a theme emerging about what are the targets for behavioral intervention. It may or may not be the good news for Robert and Brian because we are expanding their offices' task, but it is their tasks to figure out how to tell the Secretary. Because clearly, the targets include how to minimize or decrease inspiration, which is a substantial undertaking, as well as how to decrease the spread of familiarization and increasing comfort with biological weapons.

In addition, the issue of maintaining cultural constraints, which I think is a marvelous topic, and I should tell you all that we tried to get some legal representatives to attend the meeting and were not successful with that. Certainly, to mobilize rational response, which we have spoken about before, to return to Lars' comment, in particular, which summarizes the issue of our need to have and focus on both credible and knowledgeable communication, but to recognize how those terms are dependent, potentially, about what group is being spoken to and how it will vary by the group that is listening. And, we need to crank that into our equation as well.

5

COMMUNITY RESPONSES, SERVICES & ACTIVITIES

Moderators: Lisa J. McCurry & Harry C. Holloway

Panel: John P. Corless, Theodore Jarboe, Barry McDevitt & Pamela K. Montgomery

DR. URSANO: This panel will address a number of important community issues that affect how a community functions following a disaster, and how it returns to its normal functioning after an incident of bioterrorism. The panel includes a distinguished group of people with backgrounds in emergency and disaster management, in the Montgomery County school system, the Metro Transit Police Department, the Montgomery County Fire and Rescue Service, and the Washington Suburban Sanitary Commission. Many people who have experience with previous disasters or disaster-planning exercises know that it is really the local community that is affected first. The initial responses occur at the local level, and this involves coordination between a number of different agencies. For example, in the Washington D.C. area, if there were an incident of bioterrorism, there are 37 agencies that would need to be involved immediately. It is also important to involve corporations and private businesses in a community's disaster planning, because disruptions in those areas are also going to affect the community at large.

The members of this panel have been represented in such groups as the Metropolitan Washington Council of Governments Bioterrorism Defense Plan Executive Steering Committee, the Montgomery County Emergency Management Group, and the Executive Board of the Maryland Emergency Response and Information on Terrorism Organization.

DR. MCCURRY: Each panel member will present a brief discussion of the challenges which they face in responding to bioterrorism, with an emphasis on problems specific to their field, not necessarily specific to their organization or city. Police Chief McDevitt has worked for the Metro Police Department of the Washington Metro Transit Authority for 25 years, and has been the Chief of Police since 1996. He is a board member on the Northern Virginia Criminal Justice Academy and is President of the D.C. Law Enforcement Executive Forum. Chief McDevitt is a graduate of the FBI National Academy and the Senior Management Institute for Police.

Deputy Chief Ted Jarboe has 37 years of experience in the fire-fighting service and has been very involved in planning for, and responding to, terrorism and disasters. He spent nine days in Oklahoma City as part of FEMA's Urban Search and Rescue Task Force after the bombing. He has been involved in domestic preparedness programs against terrorism, and is a leader in Montgomery County's efforts to prepare for acts of terrorism involving weapons of mass destruction.

Ms. Montgomery is the Safety Supervisor for the Montgomery County school system and has been in that position for seven years. She oversees the entire safety program and was instrumental in developing the local school crisis plans for all of the schools in Montgomery County. She has been involved in a number of different disaster exercises and real emergencies, such as a train wreck in Silver Spring several years ago. Ms. Montgomery is a member of the Educational Resources Division of the National Safety Council, and is the past vice president of the school and college division of the Safety Council of Maryland. Previously Ms. Montgomery held the position of systems safety analyst for Vitro Corporation, and was a safety engineer at Lockheed, California.

John Corless will discuss how a water company such as the Washington Suburban Sanitary Commission (WSSC) could be affected by bioterrorism, and how they could maintain operations following an incident of terrorism. Mr. Corless is a professional engineer with graduate degrees in environmental engineering and business administration. In addition to working for the Washington Suburban Sanitary Commission for 26 years, he has been in the Naval Reserve for 36 years and he served in Vietnam, Saudi Arabia, and Kuwait. He currently directs the Health Care Operations for the Naval Reserve, National Naval Medical Center in Bethesda. Let's begin with Mr. McDevitt's comments.

MR. MCDEVITT: Last night in the mail was the current issue of US News and World Report, which talks about America's best hospitals in this country, and it is an annual report. It talks about rating the hospitals with 17 specialties, and I was thinking last night as a storm was passing by, "I wonder if some day those 17 specialties will include the treatment of biological warfare.

Earlier this morning there was some talk about panic and awareness, threats, behavioral problems, credibility, trust, and attitude. After 25 years in the Washington area, I can tell you that if last night the weather person on television predicted an inch of snow here in Washington, then everyone in this room would have gone to the Giant

Food store up the street. There would be no bread, milk, or toilet paper. So in talking about control and panic, I am just trying to figure out who is going to be in front of the microphone telling the five million people that live in the Washington region that "there has been a bioterrorism incident, but don't panic".

I work in all 7 or 8 major jurisdictions here in the Washington area, and I know all of the Federal assets and local assets very well. I spend almost a half-million dollars training 325 officers on an annual basis, and a lot of that training deals with weapons of mass destruction now, following the sarin gas release Tokyo in 1995. I should mention these trains were converging on one station where the sarin gas was released. One of the reasons why the sarin gas was deployed at that particular point of impact was because there was a police station right above that metro station and that group was having a great deal of problems with the police department.

Also, with the World Trade Tower bombing in 1993, one of the goals of the terrorists was to interrupt public transportation. There were some major commuter lines underneath that building, and it was the intention to not only drop both of those towers, but also to completely disrupt public transportation in the City of New York.

One of the things that I am concerned about is the psychological effect on our first responders, be it police, fire, or the first aid people that are responding, if nothing does happen. As I mentioned earlier, we are spending so much money training. Five or six years ago we had an annual in-service training to teach the officers to write their tickets and police reports more legibly. We concentrated on grammar and the King's English. But today it is all practical exercises with weapons of mass destruction. We do not do anything in the training room anymore. Everything is a practical application of what we do, which takes a lot of time and costs a lot of money. But what happens to an officer who is on the force for 25 years before he or she can retire and nothing happens? I don't know the psychological aspects of that, and I do worry about that because the threat is constantly there. It used to be we were worried about being shot and killed or stabbed. Now we have this invisible threat out there when we go out on the street on patrol on a daily basis. We could be affected by a biological agent and not even know it, and that has a psychological impact over time on public servants.

When people are affected by anthrax, and they go into the hospital or see their personal physician, they have already had the symptoms for 2 or 3 days. In law enforcement, we are told that there is no medication that is going to be given to these people because we have to save it for those who may need it and these people are going to die. So, we are looking at it from a law enforcement perspective. When you or I go up to our family physician, and he or she says that "there is nothing I can do for you, I'm sorry. Go back home and die", how many of them are going to go back home and die? What type of chaos in society will occur if someone is told they have a matter of a few days to live, and what implications does that have on the larger family?

The issue of quarantine was mentioned, and we have had some experts here in the Washington D.C. area give us all kinds of information and training on quarantine as it exists in this region. The law enforcement community has a question. If everyone in

this room had to be quarantined because of a contagious disease and three of you said, "No, I'm not going to do it, I'm going home. I'm leaving.", then what is the response from law enforcement? The health officer is looking at the police department to enforce the quarantine. So, the question from my sergeants, lieutenants, and captains is " when do we use lethal force on someone who refuses to be quarantined or breaks out of quarantine?" Do you shoot and kill that person? We do not know the answer to that.

One question is "In the event that something does happen what do you do with your resources?" Well, we know that with our contingency planning here in the Washington region, everyone who is on duty now will stay on duty. They will not be allowed to go home. We have provisions for police at least. I am sure the fire service and Emergency Medical Services (EMS) have it too. We are aware that when we do a shift change later today or this evening, depending upon what CNN is reporting, we may not have people coming to work. So, in the event that weapons of mass destruction are used and we have some catastrophic loss of life, no one will be leaving and everyone will be ordered to work and stay. We have provisions for housing and feeding the people. We know that if we do let the people leave, the police officers go home to their families, and many will not come back to work.

In a biological event, local law enforcement, I believe, does not have the same role as it does in other events. For example after an explosive device was detonated, or there was a chemical exposure, that crisis would clearly be handled by local law enforcement. Although I will say that in the Washington D.C., with the FBI terrorism task force, the FBI may also be involved, as they have in the past. After a bioterrorism event, we realize that people will be coming to doctors with symptoms of the flu, and then a day or two later people will realize that this is something bigger than the flu. And the Centers for Disease and Prevention will do their pin charts, maps, and then a few days later we will realize that every one of these people was at Metro Center or Farragut North here on the Metro.

The problem from the Metro's perspective may occur after the incident. I think we are pretty good at handling the crisis. We have good training and we have good equipment. Our goal is never to toe-tag a police officer or fire fighter. That is our number one goal, and hopefully we will be able to live up to that goal. But we live in a world of perception also. Even after the incident is long gone, how many people will feel safe coming back on the Metro the next week? And getting back to credibility, trust, and attitude, who is it going to get in front of that microphone, on local television at least, and convince the community that this is a safe place? Is it going to take the President of the United States traveling by helicopter, like he did at Three-Mile Island, to get out and have a press conference there? So that is a major problem with perception after the event.

The other problem is decontamination. We have been spending a tremendous amount of money and time in trying to determine how do you decontaminate in a subway environment, and who are the experts that can do that? Unlike Japan, in Washington D.C., as soon as you have an incident like this, and there is one microphone set up somewhere, there are going to be so many people from Congress, the White

House, the FBI and other federal assets, not to mention the local assets that all want their time in the media. But who is the person or what group of people will finally say, "Okay, the area is safe and people can come back to work, or they can come back to visit the nation's Capitol?"

MR. JARBOE: I appreciate the opportunity to come here today to speak and offer some observations and perhaps some questions from a first responder perspective. I was in Oklahoma City for nine days, but two distinct things that occurred there, I have not experienced here. One is that we went to a location that was away from home. So I had no emotional ties. I had no connection to that location, and the people that we retrieved, the deceased, I had no contact with. I did not know them, except that they were people who, unfortunately, died as a result of that incident. But if that had occurred back here, it would have been a lot different. I want to speak on bioterrorism and I want to mention a little bit about chemical weapons to tell you where we are and how we differ.

In Montgomery County we have a population of about 850,000 people, 500 square miles. We have a metro system that interconnects with Washington D.C. and other contiguous jurisdictions, and we have been working for over four years to develop a response capability. Our domestic preparedness is predicated on seven elements, and I use the acronym ATERPER, A-T-E-R-P-E-R. This is how we are developing our response capability today. A stands for Awareness, T is for Training, E for Equipment, R is for Resources, P for Planning, E for Exercises, and R for Research. We say it is the aggregate of those seven elements. You cannot just take training and say you are then prepared. I believe very strongly that the community needs to be made aware. The great challenge will be how to educate people so that you do not get the reverse of what you want. You do not want people to panic.

The community, which is the target of terrorists, should have a say in their own destiny. All we do is tell them through the media what is going to happen to them if someone releases anthrax or detonates a nuclear device, for example. But we are not doing much to protect them or to give them a sense that we can survive. If you can remember, many years ago when Russia was a very strong threat, more so than today, they had 144 targets in the United States. So they said that if they hit us at 144 targets, they would kill probably a hundred million people. So then the question becomes, what about the other hundred million? So, we did try to do something but I really think we need to do a better job of educating the public and talking to them about what can they do if something should happen.

For example, if we did have an alleged outbreak of smallpox, we do not have enough vaccines. But if we have a release of smallpox, the people will go to the hospital, but you know the hospitals are going to be overburdened. We already know that. So what will the community do at large? Where will the beds come from? They may very well come from their own homes. They may end up staying home and kind of isolating because there is no other place for them to go. They need to be educated about what to do in advance. Getting back to the first responder perspective. Here is something that I have no answer for, but you can help us by virtue of your profession.

From the first responder perspective, how do we deal with the situation where we respond to release of a chemical agent like sarin or soman, and it was initially dispatched as some sick people in a shopping mall? So the people go unsuspecting because the medics don't go in with their protective clothing on every day. It is only when there is a direct need. So we find out that they called back and said that there was something going on, and we send a HAZMAT dispatch. When we get there, we see two or three medics lying outside the building, dying or dead, and we have to continue on with our work; In the course of this, some of our other people end up succumbing to that exposure. How do we deal with that? We don't deal with that. Now, sure, in the conventional setting, we have a fire in a high-rise building which may result in structural collapse, flash-over, or et cetera, which may claim a fire fighter's life. But that is something that we kind of expect and it is kind of calculated.

We do not have a quota, or a certain percentage of first responders which is okay to die, as Barry indicated. Unlike the military, they might say that with the chemical mask, there is a certain percentage that will not work right. There is a problem. They did not put it on properly, and so there is a certain number of casualties that will succumb. But we cannot accept that, entertain that, in the civilian world. We would never do that. But we have to think about it.

To return to bioterrorism, there are two types of bioterrorism events, as I see it from a first responder perspective. The first one has a small-scale potential. We have been seeing around the country frequently, and that is the hoax with a package or letter saying there is anthrax or something inside. So far most have turned out to be nothing. But we don't know that at the time, so we must treat them as something. I believe as first responders we can manage that emergency. There is no question in my mind. The single most important factor to our collective success in preparing ourselves against terrorism is our knowledge about the enemies, the threat. The more we know about those agents like soman, GB, GD, or anthrax, or botulinum, and how they manifest themselves, the symptomatology, how we can decontaminate, and how we can protect, the better we can manage.

Getting back to training, and I said the just one element, the words alone won't do it. You have to exercise it and you have to put it into the aggregate of the seven elements of domestic preparedness. If we attempt to build a response capability on a shallow foundation of knowledge, I think it will come back to haunt us, in that we will tend to overreact or under-react in the face of the situation. I use that example with anthrax. If we had an incident involving anthrax in Montgomery County at the post office, I would like to be driving right by there when it happens. Not because I am an expert; I am not an expert. But I have been dealing with this subject for over four years. I know what anthrax can do, and I know how to protect myself. So why is that? Because I have availed myself to training, education, and exercises.

The second type of bioterrorism event is the covert release of a pathogen that we do not know anything about until people start to become symptomatic. And then there is some time before they diagnosis it as being something other than the flu. And so we

know there are going to be a lot of people who are going to succumb to that. But as first responders, we are going to play a lesser role because first responders in that scenario will be CDC, the local health department, will be the hospitals. To a lesser degree, the emergency medical services of Montgomery County will be involved because we will be transporting people to the hospitals and so forth. But if we are involved in that, I am going to be worried about my wife, especially if the event occurs some place that she may have been. I am going to worry about her.

The issue was brought up about what to do about antibiotics? Now, I am going to tell you right up front that if my wife is starting to feel bad, I am going to need to get some medication to her. If the doctor says, Oh, no, we have got to give it to the other people, then, I am not going to be there. I am a human being. I am going to take care of my wife, because I figure this is a doom-and-gloom, unprecedented event, and she is mostly likely is going to die. I am going to do the best I can to help her. You need to help us to better address those kinds of issues. How are we going to face knowing that maybe 20 of our fire fighters don't come in because they started having flu-like symptoms, and then later we found out that it was anthrax or something and they died. And we have to continue on even though we are not directly involved, but our people are involved, and also their families.

I appreciate the opportunity to speak to you. I don't get to speak to many groups like this. I raised these questions about the media. We need your help in helping us to better cope with our stresses. We have what is called rehab, a rehabilitation area, where fire fighters go after their bottle is expended. They go to get rehydration, rest, and medical surveillance. But we need psychological rehabilitation. And I'm not taking specifically about CISM, Critical Incident Stress Management, which comes later. I'm talking about beforehand. How do we cope? How do we deal with those kinds of things?

Lastly, getting back to Oklahoma City. I have never had a smidgen of stress with what I saw. I am not sure whether that was because of my age, my children being grown, my length of time in the service or I essentially blocked it out. I was there when bringing a baby out of the ground, recovering two people that were dismembered, et cetera. It never caused me to lose sleep at night. It still has not and I do not know why, but certainly other people did experience those kinds of effects. We are good at "action relieves anxiety," but when the action stops, then things start to hit us. We need psychological help ahead of time, not just post-exposure. I have a strong passion for this.

MS. MONTGOMERY: My background is occupational safety in health and industrial technology, a double major. Working for this school system gives me a unique perspective on the types of things that we're dealing with here. We are potentially vulnerable to a bioterrorist threat, because we do live near Washington D.C. and our county abuts up right against it.

I would like comment on the Columbine incident. Our school system has always had an emergency and disaster plan in place since the 1970's. The problem was is that it covered mainly fire drills and an emergency if there was a power outage or something

like that, and it wasn't really comprehensive. Just prior to the Columbine incident, we had hired the same spokesperson that talked at Columbine. The National Alliance of Safe Schools representative was doing an audit of our school system. So we had that going on, along with the actual tragedy that happened at Columbine.

Our school system includes over 135,000 students, multiply that times two parents usually, and grandparents, teachers of over 20,000. You can imagine thinking about all those people while you keep seeing flashbacks on the news of students with their hands up running outside of a school building. You are wondering to yourself nationwide, not only here, "how safe are our schools?" I have had experience with emergency exercises that deal with weather-related emergencies, bioterrorism events, table-top exercises, etc. Each of our schools have a written local school crisis plan. It is a boiler-plate plan that covers anything from a bomb threat and how far away from the building you have to be, to a fire emergency, et cetera. Does it cover bioterrorism? Is there a tab in there that says weapons of mass destruction? No, there is not. You can imagine not only the political end of it, but also dealing with parent-teacher groups when they see that, or if they see that on a bulletin board coming into the school.

I would like to talk briefly about things that Montgomery County Public Schools has done to try to prepare for what I call "crises and emergencies." Then I would like to see and get some feedback from you about how you think that the bioterrorism piece could fit into that plan. A few positions within our school system are made aware of and educated on possible symptoms of chemical and biological attacks. This is done through representation on our local emergency planning council (LEPC) and our emergency management group. The reason I say that is because Montgomery County was one of the first in the country to have a public school position on a LEPC, or on an emergency management group. This was not only because of the resources that we could provide to emergency services, but also so that we could get the straight story from the emergency operations center when dealing with an actual event.

So we knew accurately what we would be asked to do, whether it was to provide an emergency shelter as a high school, et cetera. Some other things were developed last year because of the Columbine tragedy. We also trained all of our principals and their on-site emergency teams (OSET), on what is called a boiler-plate plan for school crisis planning. This basic plan recognizes that each school is unique and they have specific concerns related to site-specific issues. One of the common basics that you have to deal within a multi-hazard plan is the chain of command. For example, usually the principal goes to meetings and is out of the building. Well, who is the second in command? I know you have that structure in the military. You can imagine in a large school district that having layers of the chain of command is important.

I am going to highlight some important points that we had our school district think about, including the importance of alternate sites. Before, nobody really ever took a look at that if I had to evacuate my building for some type of emergency. I know that I have to be 300 feet from the building for a bomb threat or 50 feet from a building for a fire drill. But what if I had to really evacuate because there was an actual bomb device found? And we did have that happen and occur in our school. So we do look at

alternate sites. We also talk about where the media is going to be staged at, so that they do not come right into the school and bombard everybody. But where are they going to be staged, and who is going to be the one spokesperson? We are trying to get our principals to think on that end. We also have a mental health piece in the local school crisis plan. There is a core crisis team that is immediately dispatched, depending upon what level of crisis occurred. Examples include a suicide in a school, a tragic bus accident like we just experienced in May, or suicide attempts. We also talk about the evacuations. The on-site emergency team are usually people that do not have direct classroom responsibility, because we want the teachers to be accountable for their students. We have other positions in the school system that can respond to who is going to check the bathrooms, and who is going to check the exits, etc. We also have a packet of emergency flip cards. We put this together mainly because we wanted to get people through the first 10 to 15 minutes of a situation at a school before the police or fire apparatus have arrived.

With the Columbine incident, the one SWAT team had a delayed reaction in going into the building. We have worked very closely with our police department on how they are going to enter our schools, how familiar they are with our floor plans, and what they will do if they have a student shooter, or an intruder in the building that is armed. They have already had that planned out with staff from our school system.

So, we feel we are prepared, but we also know that there is not 100 percent. We also have an emergency kit that we distributed last year that has radios, flashlights, and an emergency cell phone. It also has megaphones and caution tape for crime scene area. But it also has the most important part, which is student and staff lists, an accurate list of the students and staff that are there. Also, there are field trips. Many people do not think about that, but who is on the field trip? Can you imagine talking to a parent if, for example, a bomb was in a school, and a class was missing, and somebody forgot that they were down at the Washington Monument on a field trip. Those are the types of things that happen during real emergencies. It is beneficial to have a dedicated person in the school system to work as a liaison to emergency services and medical people that provide help in the school system when an emergency or disaster occurs. That would also be very, very important during a bioterrorism event. We also have the opportunity to have table-top exercises and actual mock exercises with Montgomery County Fire and Rescue Services and Emergency Operations.

I want to give you some background on some of the things that have caused us disruption at a local school level that you might not consider. We had a situation at a middle school where a student stole a pound of mercury from a dental office. He put it in a soap dispenser. So now any child that went into the male bathroom was exposed to mercury. We had a good response from Montgomery County Fire and Rescue Services to the school. We had to decontaminate 75 children before they went back on to the school bus and home. The media was there. We had one spokesperson from fire and rescue that handled that situation. Another example was a pipe bomb in a student's book bag in a high school. There were rumors because we have safety and security people in our schools so the principal asked to bring the student down to the office. The student came down to the office, and the principal asked him, "Where is the pipe bomb

that we know you have?" He said, "Right here in my book bag." He brought it down to the principal's office.

So we work very closely with fire and rescue services and police, and we provide information on pipe bombs. We distributed that information to all principals. There was an actual bomb that was in a book bag that was wired in a locker. We had the bomb squad come in and detonate the bomb. We also had a plan in place immediately that would evacuate those students and take them to an alternate site, which was another high school not too far away. And you can imagine what the media event was along with that. So we try to pre-plan as much as we can. I don't want to give the impression that's all we have in Montgomery County. I can only tell you throughout the years that is what I've experienced.

Our recent bus accident was a fatality that occurred in May on Muncaster Mill Road in Maryland. I was on the scene for eight hours. I saw the trauma of the 33 children that were left on that school bus. We had an immediate response from the mental health people right on the scene. We also had three children who were flown in critical condition to Children's Hospital. One factor affecting mental health was that it took approximately 12 hours to get the bus driver out because that is how crushed he was in the driver's seat. You can imagine the impact not only on future bus drivers who wanted to know what was going on, but also on the responders themselves. Our school system has taken an approach, not only from a preparedness standpoint for emergencies and crisis, but also by developing response teams. We have an overall administrative response team of high level officials who make rapid decisions and they must provide a report. They cannot send a substitute. There is also the on-site emergency team and a core crisis team. The crisis team consists of counselors and pupil personnel workers. We have a safety and security response to the incident to help coordinate resources that emergency services may need. Our focus on the mental health support in the school system is also important and should be invited early. This involves conflict resolution, and peer mediation, etc., and we do have those programs in place. Communication is another important piece. We know we want to have a one-point contact for communication but we also want to dispel rumors and misinformation. That is why we work closely with our county agency and our county information office.

MR. CORLESS: I am going to give you some background on our regional emergency planning process on the waterside, and then follow it up with some specifics of our toxic and bio-threat plan. I will end by discussing some notable weaknesses that we see in our plan and I would be interested in other weaknesses people might notice. I will provide some geography for people who are not from the Washington DC-Metro area. Baltimore is to the north, Richmond to the south, and we are surrounded on all sides by populated areas. You can imagine what the planning process is like trying to get all the regional governments to cooperate and come together on a firm plan of attack. In general we have done fairly well. All regional governments and water utilities have agreed on a master water emergency plan. It is most frequently used for handling HAZMAT spills, sewage overflows, wide-spread water outages, droughts, and the kind of typical emergencies which occur in water systems and it is hooked into other plans including our toxic threat plan.

The master plan is tested at least annually in a full implementation test, and in fact, is generally implemented once or twice per year for actual emergencies. Thank goodness it has not been implemented for biological threats. One of the triggers for the plan is what we call our water supply tampering plan, or the toxic threat plan. One of the premises of that plan is that despite recognizing Dr. Holloway's concern about playing into the hands of terrorists, we have decided regionally to provide full disclosure for any plausible threat before verification. As long as we have gone through it and feel that it is plausible, we have decided to go ahead and notify the public. Conceptually the plan is a consortium of the three largest water utilities in the area which provide water to about 80 percent of the population in the area. The utilities have established a sampling plan to monitor the system in the event of an emergency. They have agreed to share laboratory capabilities that hook into the water emergency plan for basic support. The toxic plan itself focuses specifically on threat evaluation and toxic biological information resources. The generic plan is what we depend upon for utilizing the regional communication process so that we can all come out with one message. The plan, if followed, would do that. We have to figure out a way to follow the plan.

One of the things we must consider is alternative water supplies. To give you some background, generally there are no cost effective ways for water utilities to interconnect with each other. The infrastructure is not there to carry the large amounts of water from one end of a system to another. So we do not have the capability for me to shut down my plants and utilize water from another utility. We do have the capability, though, to switch water supply, particularly raw water supply in some cases. If we have a problem in a particular river, we can draw water from alternative rivers. We do have a couple of different rivers that supply the area.

Historically we have always looked at tanking in water by using water trucks or other trucks. We found that most of the hospitals, because of JCAHO requirements, had already contracted with every truck company from here to Wisconsin. As it turns out, capitalism has solved that problem for us with the bottled water industry going the way it has in the last several years. It is really an easy mechanism to truck in drinking water by semi from remote parts of the country. So, drinking water is a relatively easily solved problem now.

For the operational response, we have got to make decisions. Do we continue to operate our treatment plants or not? If we think the problem is in the raw water supply, we have to decide whether we are going to shut it down. It was mentioned earlier that water plants tend to have multiple barriers to prevent contamination from getting into the drinking water. There are physical barriers, coagulation filtration, and chemical barriers, oxidation using something like ozone or chlorine, and hopefully, a residual in the system as well. So you may not automatically want to shut down your water plants, because there is a trade-off. If you shut down your water plants, all of a sudden you have no supply for fighting fires. How many people are you going to kill, and how much damage are you going to do by having fires rage out of control? So there is a trade-off of that versus the risk of the possibility of contaminated water being used?

Even though you put out a do not drink order, some people still want to utilize the water that is out there if you keep it in the system.

A local problem is probably more likely for us. The Columbine-type approach, in which someone wanted to do significant damage, but on a relatively small scale, may affect only thousands of people instead of millions of people. That is complicated by the fact that water systems in this country are not secure. In fact, many utilities do not even have fences. Anybody who has ever happened to notice that we are feeding on tanks, can see that the fences do not do any good. There is ready access to the tanks and water systems in multiple ways.

So the system is not secure. It is much more vulnerable on a local-area level to contamination than probably on a wide scale. There is a trade-off of probability versus the extensiveness of the potential damage. There is no serious mechanism for early detection of problems. We obviously depend on the medical community to help us. In some small ways we have made some progress. We have attempted to make a stab at monitor intestinal problems. For example, if Cryptosporidium were the agent that was being utilized, that actually might show up in some monitoring that we are implementing in the state of Maryland. We are trying to tie into sales at local drug stores to see how much Pepto-Bismol goes off the shelves.

If that had been done in Milwaukee, then the Cryptosporidium outbreak might have been caught a little bit earlier. Another concern is that although the plan clearly has a decision maker identified (the water utility), in actuality, that may not happen. The first people who get notified before we actually make a broadcast to the public here are the public officials, the elected officials, and sometimes they have more clout and they may not stick to the plan. They may renege on previous agreements. They may have their own political agendas. They may advocate for premature reaction, even though we have not determined that a threat is even plausible.

We had a parallel kind of situation last summer in this area. We had an agricultural drought, and from a water supplier perspective, there was absolutely no shortage of water, even projectable, for at least two years in the Washington Metropolitan area. But for political purposes, we determined that we were in a drought situation and we naturally went to water restrictions. So there you can have it all in writing in a plan, but sometimes it is just not stuck to, and we have not figured out how to overcome that yet.

Our last and most notable weakness is complacency. We really are not committed to providing the funding and the resources to go at this in a really serious manner. Our plan is now 16 years old and has not been substantially updated since that time, and has not been exercised. Even though we have this regional exercise, we have never been able to get the region to devote those resources specifically toward a biological or toxic threat, to actually implement those parts of the plan.

DR. HOLLOWAY: I actually was involved with Oklahoma City as well, and stayed involved over a long period of time with Oklahoma City during its phases of

recovery. I have also had a chance to work a number of these disasters. One of the things that is really striking is that in a place like Oklahoma City, where there was an excellent response acutely, there was a failure to prepare for the care over a long term basis. This was not a part of any of their plans, and that later got them into deep trouble financially. And particularly in that overall group, relative to the acute group, was where the mental health casualties came to light. There are two parts to that. One is that at that time, the way FEMA's funding was set up for the acute things, there wasn't any preparation for those more chronic casualties coming in. In some disasters a debate goes on about local operating funds for fire departments, police, and others. Finances can fall way short as they have consumed their resources in the acute response and they are waiting for the Federal check to arrive that backs up X, Y, or Z in terms of a tax base.

So within many of these plans, there is a real difficulty in realizing that if there are casualties acutely, there are problems chronically that must follow after that. There is a second level of planning which needs to occur. It is not at all surprising in many of these disasters to go to the overall site and listen to the mental health folks complaining that no patients are coming to see them during that acute phase. The real problem that goes along with that will come later. It is our experience that if you wait for two to three months, you will see your surge of casualties that are left over in the families of survivors and others.

I would like to make another point and that is one that has been made by the workers at Oklahoma City about how this thing spreads out. You have heard from a person who was part of that extremely credible and skillful group that went in and helped out Oklahoma City in acute rescue and the overall long-term consequences of that. At the time that was happening I was an official in NASA and I was having my lunch in the NASA Executive Dining Room, having the usual discussion about what was going to happen in the next launch, when the announcement came through of the bombing in Oklahoma City. I did not know whether my grand-daughter was in that nursery or not, because that is where my daughter works. Two people in her office in fact died, and as I rushed down the stairs I became aware of one of the kind of communication potentials. My daughter at that time was working at the University of Oklahoma medical department, and running their overall computer set up. I was running downstairs to send off a message to my daughter to find out about my granddaughter. When I brought up the e-mail, there was an e-mail message that said, "she is okay." I have tears even to this day.

We have talked about media as if media is the classical media. But that isn't true anymore. There is an entire network of media with regard to disasters, which is e-mail, the net, and all of those aspects. So, I hope that that is a part of our discussion of the way in which things spread out from these local areas.

You might want to think about the different scenarios you could have. One scenario could be a dispenser attached to an air handler that is discovered going into a portion of the metro. Another that you could easily have is people beginning to appear ill at various schools and nursing stations. The school nurses begin to identify a group

of folks coming in at those areas, and they become first responders. You might want to think about these various other scenarios that might alter how you respond.

MS. MONTGOMERY: When we have had our emergency table-top exercises on bioterrorism, one of the things that we are tasked with that a lot of people do not think about, is how fast you can locate all your schools within a five-mile radius of the metro stations. We have those mapped out. Also what schools are on an energy management system, with a computer system remote site where you can shut down your ventilation system, as in the scenario you mentioned. We have practiced that on table-top exercises.

MR. PARACHINI: I am intrigued to hear someone from the school system and the water system. In our data base of terrorist incidents, over 600 incidents from around the world, in the anthrax area, one of the largest groups is kids making anthrax threats that then exits the school. So my question is, how do we create a culture that discourages kids from doing that? There are events that are real and dangerous, but essentially what has happened now is that we have anthrax threats in schools that perpetrate themselves throughout the culture and begin to zigzag all around the country. What sort of things do we need to be doing in regards to that, to keep kids from carrying that forward?

The same is true in our database on water systems. One of the most common threats and actual actions by terrorists or by groups, is on water supplies. But all of the research that we have done on these various incidents indicates that they never have any adverse effect because the dilution effect is so great. How should we think about this both to discourage a culture of making these sort of threats or taking these sort of actions? And how can we reassure people that, indeed, the water system is safe?

MR. CORLESS: Since it was the most recent question, I will go with the water comment. First of all, I would not be too complacent about dilutions being the answer. Historically, that has proven to be the case, but if someone does their homework, it is not that difficult to calculate what you really need. In many cases, it would take literally 18-wheelers coming in to dump the contaminant into the water supply.

MR. PARACHINI: There are actually no incidents where what you have described has occurred. You are describing a possible vulnerability which has never happened.

MS. MONTGOMERY: When you have students and you have the Internet, you are going to have hoaxes. It used to be they used to pull a fire alarm when they had a test. You get out for 45 minutes and then you go back in. Now they know if you can say there is a bomb threat, they get out for three hours before the bomb dog arrives.

The next thing potentially could be that we have sarin in the building and then chaos hits. We try to say there are consequences for your behavior. We had a rash of bomb threats, or more than we thought we could handle. So, we said, "Okay, now we are going to go to the courts, we are going to go to the State. We are going to have some type of legal ramification for these students." Not only are they going to get suspended,

but they are also going to be charged with something. And I have to keep reminding myself, too, that during the Columbine incident, they were building that stuff in a garage, in the home environment. So, I think there were different types of behavior that could be recognized by the school, including dress and type of students.

DR. MARLOWE: I would like to discuss the issue of quarantine. I suppose my generation was the last in which individual quarantine was an expectable and legitimate concern. I was quarantined when I had scarlet fever as a kid. In the 19th century, they shot people trying to leave cities in which there was yellow fever. We have basically de-legitimized it as a concept, and I think that if you look at the history of the way we've handled HIV and other things, anything that has interfered with the individual's power to control his or her own movement, has been de-legitimized. What do we have to do other than use massive police power, which will probably not have a very good initial effect, to re-legitimize concepts like this, in the event of bioterrorism or other kinds of phenomena?

DR. HOLLOWAY: I will make a direct comment from the last simulation we did. This was an actual simulation, which involved some of the folks from Montgomery County and we did have lawyers present. We had one lawyer who had previously been a major active person in the ACLU and the other person was very highly placed in the U.S. Government. Both agreed between themselves that there was not a legal basis that would be upheld on review for quarantine. Furthermore, the chap from the ACLU who was, to say the least, unfriendly towards the police, said that as soon as there was an announcement of such an event, he would be in court to get an order to prevent anything like that from happening. And it did not trouble him at all that there would be casualties. As he said, "the human rights are far more important than dead people." He was very clear about where his values were. So I think that David is raising a real issue here that is actually going to be played out.

DR. LEDERBERG: My comment is going to straddle the issues you just raised. There has been a different legal decision in New York City. The City Commissioner of Health, Peg Hamburg, was upheld in her right to restrain individuals who had active tuberculosis and incarcerate them if necessary in order to get them to take effective treatment because of the finding that they were a threat to the community.

DR. HOLLOWAY: Although that event had not yet occurred, they brought that up and said that as long as this remains at the local level and does not get to the Supreme Court, it will not be overturned. And the basis for overturning it, in their opinion, would be that all of the current legal precedents that establish the basis for quarantine have been overturned already in the court. So that is what they based their prediction on, that local courts will continue to uphold it. If it goes up on appeal, it will not be upheld.

DR. LEDERBERG: The Appellate and Supreme jurisdictions we are not sure of, but they were not an impediment in this situation. The grounds for public concern and the public safety were really quite clear, and there was also a benefit to the individual. But it was the threat to the public health that was the grounds for it. However, one has

to say that the circumstances where quarantine is justified from an epidemiological standpoint are very, very limited. There was a triage situation. You have to have an event that is serious enough to warrant that quarantine, but where the quarantine has a chance of being effective.

I could imagine if you had individuals aboard an aircraft that had been the subject of a potentially infectious attack, that there would be no difficulty in quarantining or incarcerating those individuals until the question of their being a threat to the community was resolved. And there would be like a likelihood that it would be of some efficiency. As soon as you get to more than a few dozen or a few hundred people, quarantine is inefficacious. You will not have only those individuals or even predominantly those individuals who have been targeted, and there will be hundreds of thousands of others that you have no hope of capturing.

So I think most public health folks have dropped even the thinking about quarantine as an appropriate approach. It just is not going to work except within a very restricted range of circumstances. What you can offer is to say, "Look, stay put, we will be able to take better care of you. If you insist on leaving, that is too bad, but we will have fewer people we have to take care of. You are on your own." And you will not have affected the public health by that much in most of the circumstances we are talking about. You have to think through very carefully why you want to impose that quarantine in the first place.

DR. HOLLOWAY: That was exactly one of the findings in that simulation, that there were only a very, very small number of cases where it would be necessary.

DR. LEDERBERG: There are cases in which you might wish to do it, but it would be futile.

DR. DEMARTINO: This builds on the things that we have been talking about, and I wanted to ask, not just the panel, but others here in the room, to comment on something that we have been skirting around for the afternoon. That is the issue of the way people may react, how the population at large may react to something like an event like this, or the announcement or a threat of an event like this. We certainly know that in some instances, such as in Surat, India, in 1994, there was a concern about plague running rampant through the city. This proved not to be true, but it did not stop a third of their population of 400,000 people from leaving immediately, only to return three days later. Now, either you have to decide that India is so different from the United States and the people are so different that this would never happen here; or, we need to consider what are the necessary and sufficient conditions that would cause something like that to happen?

Is it just the threat itself with nothing else? Is it a lack of information, or that there is no treatment available? Is it that there are public officials announcing things that are frightening? People may hear things like, "There is going to be a quarantine. There is not going to be a quarantine." We know that in Surat, going through the city in a van with a megaphone saying that if you have symptoms of the flu that you may have the

plague probably was not a help. So maybe we would not do that here in the United States. But you know, it could happen on CNN. First it starts as a flu. You might not know you have it and then it's all over. These are the kinds of things that those of us who have some role to play in the Federal planning are so frightened about. We do not understand what are the necessary, sufficient conditions that could cause something like this to happen and steam-roll very, very quickly. So, any thoughts would be helpful.

DR. LEDERBERG: Medical care personnel were the first to flee in India.

DR. HOLLOWAY: Along the same lines, the first step in the problem is you, as an official, and your fear. Because it is fear in the leadership and uncertainty in terms of planning that provides a message to the rest of the population that this is an extremely high-risk situation. This actually explains part of the problem that occurred in India around that particular event. We always talk about somebody else panicking and frequently, what that is a symptom of, is how we are feeling.

DR. MARLOWE: You bring up a fascinating question and one for which we really have very little data. Historical precedent really does not help very much because we did not have the same expectations of medicine being able to technically handle the problem in the past. We really do not know what the "average American," sees as the competencies and capabilities if something like this happens. We do know that in other kinds of trauma, earthquakes, the Northridge is a good example, we did not see panic. We saw people trying to help each other. I think this entire question of whether it is a situation that the systems we know about are capable of coping with and maintaining some margin of safety for us, may be a very important one. One of the problems is that attitudinal research does not help very much, and we simply do not know. We often project panic because it is been a wonderful literary device, but there really has been far less in actual situation than in motion pictures or television or novels.

DR. SHAW: I am reminded that the cognitive psychologists tell us that how you define a situation determines your kind of emotional response to it. I'm also reminded of a cartoon in the New Yorker, where it shows commercial airlines flying across the Atlantic, and one pilot pulls down a P.A. system and says, "Ladies and gentleman, there is absolutely nothing to fear; you're not in any imminent danger." The real issue is what kind of definition, and we know that each one of us individually and idiosyncratically define different situations very differentially. The issue is what kind of definition do we really want people to have? And I took a little bit of issue, I think, last night with Dr. Smith's presentation. I will be a little bit of a devil's advocate, because in pre-World War III, I am not sure that was such a bad strategy. How do you convert terror and panic into reasonable fear, and how do you really develop a program where there is some reasonable expectation involving emotional management of a crisis situation when it evolves? So what kind of definition do we want the community to have when they hear -- and what should their expectancy be when they hear -- about the possibility of a bioterrorist activity?

DR. URSANO: Just to raise three issues, I would like to hear something about. One is that we have not heard anything in the school about parents and the PTA. We

are talking about the community, and in many communities, the VA Hospital represents a huge component of the community, and where does the VA fit into this issue and the Red Cross. The question of, if we are into the community issues, what triggers the Red Cross to be involved in one of these, and what would be the Red Cross' involvement if it were a four square block water contamination that occurred? There are some other community issues to hear from.

MS. MONTGOMERY: I can address the PTA issue since we work very closely with the PTA's. If something were to occur, like you said, in a four-block area, it is usually the PTA president who is one of the first ones to call the principal and say, "What can I do?" Even if it is a phone tree. And I am saying that just simplistically because in elementary schools that is what we have. We try to involve our PTA's not only in this type of planning, but also so that they are made of aware of the things, and they do not get preconceived notions about what the school system is or is not doing. You have to reach some type of medium or comfort level so that there is not widespread panic too. So, we do involve them in the planning phase.

DR. LEHMANN: I can comment about VA. Classically, if there is an activation, a Presidential order is invoked. We provided, for example, for the Olympics, the pharmacy back-up. During floods and other disasters we have had both the medical and mental health counseling personnel available. If you look at Oklahoma City, in fact, some of our folks were among the first people who got there simply because it was there, and people came out. We had folks who were trained and prepared to respond to that, some of the folks had been Red Cross people and we have done some of our own training programs since then, collaboratively, with Red Cross. So we have got a number of folks who are available and there is regular disaster training that takes place in our organization. In fact, when I was chief out there way before the bombing, I noticed there was no mental health components to the disaster training, and I said, "We should have some mental health components at the disaster training." So the next disaster training we had was an incident where there was an explosion in my drug building.

What we need to do is to continue on a local level to have the collaborative work across all of the medical organizations, both public and private. I think a lot of that happened in Oklahoma, but it was kind of built up. Perhaps some of it was planned and some of it just kind of happened. The things we have to look at are the short-term, what kinds of debriefings are really most useful for the people who are there initially? But then, when it's all over, when everything's been cleaned up, what about the folks who are left there and the mental health consequences on adults and children for the folks who were there?

DR. CLIZBE: The Red Cross response would encompass a lot of different dimensions and literally the scenario you described, the four- square block thing. Barry and I were talking last night about the importance of the Red Cross and other agencies exercising and getting together in advance. I think in the four-square-block-scenario, ideally, our chapter in that community would have already been working with the local emergency management and with the responders, and the schools, and everybody else, and the role would be well defined. There a number of roles that we assume we will

play. One of them is a sheltering role outside of the affected area that will be the safe place. It will be the place where we are not contaminated, the building is not contaminated, and after people have been screened and checked out, there is a place where they can go. So there is a sheltering role. Certainly, the mental health role, like in Oklahoma City, that has gone on now for five years is important. We still have an active mental health role there.

A third role, and I view it as mental health really, is people getting information about their loved ones. We had two people in this room talk about the stress they felt about not knowing the status of their loved ones. The Red Cross has a system that we call a welfare inquiry system which we set up to allow people to try to find out about each other. I think it gets to even some of the communication challenges and how do you control panic and everything else.

One way you keep the panic from spreading outside the immediate area is for people to know about, or be able to find about, their loved ones or the people they are concerned about. So I think that is a third kind of role we play. One of the things which may sound like a trivial example, was the whole Y2K thing. We published a brochure that ended up being widely distributed (I think we published 5 million copies and 15 more million copies were published by other agencies), because people wanted some kind of information. It was just a fairly calm, straight-forward, "here are sort of are the things you need to know", all hazards approach. It will work here in this setting, just like it will work for a hurricane or a tornado or something else, and I think what we lack in the Red Cross is the consensus we are trying to create here.

We have the mechanisms for distributing the brochures. I think we even know how to do it, and in a way that does not cause panic, but we do not know what the content should be. We do not know what the consensus is that these are the common things that could be said, and I think that is another major role that we have at the local level. Whether it is a four by four area or a bigger one, we need to get a consensus with local emergency management and at the national level on what the darn message ought to be.

DR. URSANO: Both of those strike me as very important, the welfare inquiry system. It is nice to have that acronym, I have not heard that before. And also this issue about the Red Cross being the mechanism for distributing information about concerns about infection, as well as emotional support for families in which disease occurs. How does one get together that type of information, to be able to distribute it in a rapid way?

DR. CLIZBE: In the top-off exercises, the Red Cross set up an 800 number, what I hope was a virtual 800 number. And the concept was that people needed to have a place to call to get whatever information was available. One of the things that we found is we needed HHS, Center for Disease Control people, and the corps engineers people and everybody else sitting right there beside us answering these hypothetical questions that were coming in that we did not claim to know the answer to. It may not be that we literally know the answer to the epidemiological question, but we have the mechanism

for distributing it and if you are sitting there, figuratively or literally beside us, then we have a way to get that information out.

MS. MORGAN: It is not necessarily our role to be the one who is making the determinations of the health needs, or the impact on the community. That is the Health Department at whatever level the Mental Health Department, but we need to make sure that we are the ones that have the access to the community, so that we are sitting side-by-side like John said. Getting that accurate information, so that we are all saying the same thing and disseminating the same message. We do not want to describe three different ways to make the water safe to drink it, we want to give the same message.

DR. URSANO: The other spot that I am concerned about is the issue of hospitals and how to deal with an epidemic and how their own personnel will respond, let alone how the people coming in would respond. Mike, you were around at the time HIV first came out, how did the hospitals respond then?

DR. WISE: The hospitals did not respond very well. I remember when we tried to hold people in rooms, they got angry and called congressman. It was a disaster. We are not well equipped for the most part. For example, in terms of consultation psychiatry, access to good psychiatric consultation or good mental health consultation in most hospitals is quite limited. Most academic centers have consultations as part of their training role. If you go out to most communities and talk to them about access to mental health consultations within a medical setting it is almost non-existent. They cannot access it because of reimbursement issues, etc. They have no systems set up because reimbursement is so poor that it is really very, very difficult to get that. So, that is a real problem when you think of all the casualties that will present and the psychiatric sequelae that will be there. Most mental health people are not well equipped to go into that setting. Most feel very uncomfortable. You send non-medical people into an ICU or other kinds of setting, and they are just not equipped to handle the tubes and all the other kinds of equipment. It is a difficult scenario.

DR. RADKE: I resonate well with the discussion being focused on community because I think that is where the disaster occurs. That is where the response will occur. My concern is that as we look at the community there are many variables that we do not really know until we get there, until it happens. That is, what is the leadership? Who are the leaders? Are they competent? Are they capable? Do they have the resourcefulness to calm the community, to present cogent information that the community could hang on to? We do not know about the community's preparedness. Are they ready? We do not know about the collaboration or cooperation between the fire department, the police department, the water department, the school system, the health care system, the Human Services Emergency Management, Red Cross, etc., who are going to be in the early or first response. We have no idea about the capacity to respond, and we talk as if we do.

In Minnesota when I went to St. Peter after a tornado, there was a much different response, a much more focused, solid, well-led response than when I went to a little town that was just 40 miles away. They had, at the same time, experienced the tornado

but they were totally devastated and did not know what to do. They were paralyzed by what had happened to them. And they were 40 miles apart. It was the same in a series of thunderstorms, the tornado was recorded on the same day. The responses were totally different because the communities were totally different. Just like individuals are totally different.

We have to say to ourselves that we are not going to have a similar response even if we bring to bear our best thinking. We still do not understand the variables that affect a community's ability to respond and we have to be willing and able to say that there may be disconnections, miscommunications, and ill-informed people. There may be well-meaning people who come into a situation like what happened down at Fort Campbell with a plane crash. They were totally misrepresenting mental health and behavioral health and really did not understand the grief reaction and the need to work through grief. They were permanent bereavers, who believed you grieved the rest of your life. Those are the kinds of things you have got to be ready to work within the community, because each community is different and they do not have the same basic foundation that we think we are talking about today in this room.

DR. HOLLOWAY: The panel made some points that ought to be considered by this group. One is that people have to be kept at the site because they would not come back to work. I think that we all ought to remember the overall importance of the support for the responders at the first level. If there is any lifesaving potential in these overall response systems, then it is in the local system, in the acute phases. What is done early is going to affect everything that happens later. I want to give you a general rule I have developed after attending many disasters. "There is no disaster so bad that people coming in from outside cannot make it worse." And therefore, I want us to think about the impact of the national system and the plan that we have put together for it and how that might interact with this local system.

MR. JARBOE: I would like to comment on what you are saying about how the jurisdictions vary across the county. That is so true, and it is partly a function of their knowledge base and their resourcefulness. I would like to speak about our county's capability. We will soon have over $600,000 worth of chemical response equipment, from detection to 1,200 Mark I kits. We have put 90 kits into each of our five major hospitals. We have 30 of those kits on each of our medic units and 90 on our HAZMAT Units. We are going to give the police chemical protective mask suits and gloves so they can come into the warm zone and help us if we have a chemical emergency. They can help maintain order, and deal with someone who presents a weapon. We are not capable of dealing with that as first responders as fire people, so we need to be able to equip them.

We have developed training in-house, our own training program. We have put together a number of quick references that are 8-1/2" x 11" laminated, that are on all of the emergency units. A lot of us teach nationally. We do a lot of training, so I think we are not the norm, we are way above the norm, as far as preparedness. But, how do we measure how well prepared we are when we never faced it before? We do not know. I mean, no one really knows. We have some indication from what happened in Tokyo,

but they are a very stoic society. I am not so sure we would have behaved the same way. My assessment of how we would truly measure our "capabilities," and again I put that in quotes because I don't think we really can until we have an event, is not by talking to me because I have been involved in it for so many years. You need to walk into one of our 33 stations and walk up to the EMT, walk up to the firefighter and say, "Hey what are you all doing? I understand you've got that guy Jarboe. He's doing such and such. You know how he is, he is way off base." Or they will say, "Yeah, we got some stuff on the apparatus, but we do not have time for that." That is the true measure of how well we do. Because I am a realist. I do not believe there is a perfect solution.

We have to do the best with what we have to have the most impact towards a positive outcome. I treat that as a fire, if we have a major fire in a high-rise building, some people die, but I don't feel guilty. I do the best I can in the face of a disaster. I agree with Dr. Holloway when he said that when you have a disaster we can make it worse or we could make it better by trying to minimize the impact of that disaster. We need to keep it from claiming more casualties, but I have never looked for a perfect solution and anytime someone suggests it, it just turns me off because it does not exist.

DR. TINKER: I just wanted to make three quick points all on the issue of panic and they really respond to Robert's question. Based on our research and experience, you can respond to panic, you can reduce panic, you can eliminate panic, and you can control panic. Each of those requires different strategies and different thought processes. We can have a conversation about that. The other two-part response to your question about panic, our experience has also shown that in order to reduce panic, do not wait for the disaster to occur. It helps to begin engaging the public in dialogue and debate about the issue and to engage credible organizations, as Dr. Lederberg mentioned.

The theme that seemed to be resonating throughout the panel was the issue of planning, planning, planning. Systematic, comprehensive and integrated planning on the part of the first-line responders, as well as providers. I have provided you in a hand-out is called the communications matrix. This was actually something that we did in cooperation with the DOD and VA in response to Gulf War illness. They were very interested in "hindsight is 20/20." If we were to ever have to go through this experience again, what are the things that we need to be doing differently? What are the things that we need to be thinking about from a communications perspective? This actually follows on John's comments too. How do we break this process out according to time periods? What are the considerations? What are the things that we need to be thinking about from a training perspective. The terminology we used was pre-deployment, deployment, and post-deployment, but you could substitute anything. The pre-communications event, the communications event, and then the post-communications event. And what are all the considerations if you were to follow a step-wise fashion? What are the major considerations. from a communications perspective?

6

DISASTER RESPONSES: NUCLEAR, NATURAL & HUMAN-MADE

Moderator: Robert J. Ursano

Panel: Lars Weisaeth[1], Evelyn Bromet[2] & Fran Norris[3]

DR. URSANO: Now we have three distinguished researchers who have thought about the issues of disaster for a long time in very complex settings. They are all at the very top of their professions, and it is a pleasure to have them with us. First we will hear from Lars Weisaeth, followed by Evelyn Bromet and end with Fran Norris.

DR. WEISAETH: At times of trauma and disaster professionals doubt whether society will take care of their own families resulting in a role conflict between your family and professional role. It is more of a problem here in the United States than in Norway because when you send soldiers overseas, safety for the soldier's family may not have been an issue for the United States, while Norway has prepared soldiers to go to the front in a situation where their families would be in war. Norway had a total defense, where the United States had a strong civilian defense and a home guard in order to have a soldiers on the front. It is part of planning for war.

Ten to fifteen years ago the plans for how to operate the U.S. air bases in West Germany in the contaminated environment involved excellent equipment that the U.S. pilots would have. However, it was not seen in the context that their families would live half a mile away unprotected. They couldn't be better protected under civilian German populations.

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[1] See Appendix 2.
[2] See Appendix 3.
[3] See Appendix 4.

I will now report an interesting event. Can you imagine mothers expressing a great sense of relief when they are told that their children are suffering from diphtheria? We came across this when we did a follow-up on the victims of terrorism. In fact, the mothers believed that the children had been infected by Norwegian Red Cross doctors in order to save them. I mention this to remind you of the context, the importance of the context, particularly during war.

So far we have been talking about terrorist attacks as something that hits a society at peace. Our life is predictable, basically, under control. This experience occurred in a fishing village in western Norway during World War II during the occupation. A few SS officers had been killed and the Gestapo decided that this community should be destroyed. And, in fact, all man-made structures were destroyed. All males above the age of 15 were deported to concentration camps where half of them died within eight weeks. The children were seized from their mothers to be deported to eastern Europe and probably to be adopted by Nazi families. Symptoms of diphtheria developed, and a couple of the children died. However, there was a sense of relief because the mothers knew that the Germans would be very scared of bacteria, and their children most likely would be sent back. The learning experience here is that there is something worse than a severe illness, and particularly during war where the willingness to make sacrifices is so great that there is a completely different type of resilience than when we study terror victims during times of peace.

Another example is that we do not see the Stockholm syndrome among hostages during war because you do not have the triangular situation. You are not an innocent, accidental victim. It is "them and us". So the dynamics of the triangular situation does not develop. As a result we had thousands of hostages taken by the Nazi authorities to pacify the resistance movement, but no report about this strange identification with the aggressor. The Germans forced the families to watch the destruction of the community, and they made a film, probably to be used as a part of the terror strategy. It was never shown. And why is that? We do not exactly know, but my feeling is that when terror aims to create fear it is up to us to decide how scared we should be. There is always the risk that instead of fear you will create anger. In this situation the fight reaction will overrule the flight reaction. This is just to remind you that we have Kola as our neighbors and that is the heaviest concentration of nuclear arms in pretty bad shape that exists anywhere, so that's why we have concentrated to some extent on the radiation here.

I will now describe some of the differences between four types of dangers that man may face: 1) natural dangers, 2) "accidental dangers" that we accept that could happen and nobody is really to blame, 3) negligence and, 4) malice. My introduction dealt primarily with number four, malice. What we saw during World War II was actually a strong resilience. I would not say immunization, but people became very tolerant when it came to various terror techniques. In western and northern Europe, the Nazis used a particular technique called the "NN" technique, the nacht and nebel, which means night and fog. This is very different from what they used in east Europe or what we saw in Kuwait that was known to be practiced by the Iraqis. The night and fog principle is that people shall disappear and you shall know nothing about what happens

to them. It is used to create a maximum of uncertainty. So the village that I mentioned, was closed to the people. A forbidden area. Nobody was allowed to see what went on there.

The main problem that we have seen in victims of terrorism during times of peace is the lack of an important cause. There is nothing to die for. We studied a ship's crew which were taken hostage and tortured in Libya because they were believed to be Jewish or British agents aiming to overthrow Ghadafi. Actually, they were Norwegian sailors. We saw more harmful effects of that than when we studied the effects of torture during times of peace among resistance fighters. The main difference was a lack of something to die for. Now to provoke people we could say that to die at Lockerbie is more meaningful than to die in downtown Washington D.C. in a traffic accident. Because, after all, you die for something. You die for the open democratic societies with free communications.

If we define terror as a type of warfare during peace time, that is exactly what the terrorists would like us to do, to start talking about armies. We must create some sense of meaning and purpose. This is important for your resilience. The other broad factors, listed by Ontonofsky: First, are you facing a situation which you fully understand? Is it comprehensible to you? Second, is it manageable? Third, is it meaningful? These are very important because if they are present, the stress resilience will be much higher. We saw a 15% reduction in Norway during the war in the prevalence of psychosis. So a moderate occupation, could be good for mental health. However, the relationship between a war and mental health is really a very complicated one. It is not a strict dose response relationship because motivations tend to increase as well as group cohesion, and the willingness of people to make sacrifices. People do not have time to worry about their neurotic problems. These maybe obvious, but it is important to acknowledge them.

The other type of state-supported terrorism we have studied were international shipping during the first Gulf War. This involved the attacks on the oil and gas tankers in the Persian Gulf between 1984-1988. We found something similar- the lack of a purpose. It was "I'm a sailor and I'm not prepared to die. There is nothing to die for." This is a political issue. When we compare compatible situations in terms of some mortality or risk of being wounded or injured in these four different cases, we find that the psychopathology increases as you move down on this table. We find about half of the psychiatric disorders after natural disasters then after violence during peace time. In one study of a military unit where 55% perished in the snow avalanche, 55% died. There was not a single PTSD case among the survivors. Although these were pre-selected and pre-trained, the nature of the force that kills you or threatens your life is important. Nature may be dangerous and harmful but it is not evil. We tend to accept nature.

Often the hazards are familiar and to an increasing degree warnings are issued in time to take precautions. The 1990's was a decade for natural disaster reduction. The first time I heard that I was amazed. Is it possible to reduce disasters? Actually, meteorology is the only science which Norway has made an important contribution.

Vilhelm Bjerkness founded the Bergen School of Meteorology. Within five years they had developed the cyclone theory and were able to forecast the weather. He never became a national hero because he did not expose himself to physical risks. He was just a scientist. The interpersonal context of the three types of dangers makes them quite different from the natural forces and may account for a higher prevalence of psychiatric disease. The natural disasters are more predictable, more controllable, and there is no culpability.

I will now exemplify an accidental disaster. This is an industrial disaster I studied from 1976 to 1980. A classical drama following the Aristotelian rules, it has a start, increases as a crescendo, and then it is over. A highly invasive set of visual and acoustic impressions. It is time-limited, concrete, and produced PTSD in contrast to exposure to threats. The question is what type of psychiatric disorders do people get when they have been exposed to threats that never materialized as dangers? For a high-threat situation over a very long time, particularly when combined with high uncertainty and low-control like the convoy sailors, the classical reaction is that there is a latency period and then there is a response maybe years later. They also have PTSD symptoms. But, since the event never occurred, there is more space for your fantasies about what could have happened. But still, it is a repetition syndrome. The silent trauma, the trauma that cannot be perceived by our senses, is likely to create more concern about physical health. There is no invasive and occupying strong psychic trauma.

Psychic trauma is characterized by an inability to act. The explosion and fire were uncontrollable. These are the cognitive, emotional, and behavioral responses for the proportion who were traumatized. The stressor is the explosion and the fire, and what you see on top are the protective factors. Your trust in leadership, unremarkable personality, high motivation, group support. We are talking about the 15 minutes these people were exposed to severe risk for their lives and where many were injured and some killed. What impressed me was the importance of the level of training and experience. We could predict on the basis of just one variable, your level of training or experience. We would call that competence, with a sensitivity of 81% and a specificity of 86%, whether their disaster response would be adaptive, optimal, or maladaptive. In other words, we found a tremendous relationship between your level of preparedness and how you reacted. This was an unexpected explosion which came without warning, unprecedented as well, and was followed by a low-risk of PTSD. In this particular disaster, PTSD was a result mainly of a failure in coping with immediate threat. It was not a failure in the recovery from posttraumatic stress reactions. Now what kind of control is this? Control is, perhaps, the most important concept in stress medicine.

There are various types of control. There is behavioral control, which is real control, where you have an option. You can act in such a way that the danger will not materialize. However, that was not the case here. What characterized the people who had a high level of training and the optimal disaster behavior? It was perceived control, and cognitive control. Cognitive control means that you can prepare people beforehand about what things will be like, even though you cannot influence them. For example, you can train them to control their emotions. Perceived control is a sense that you can do something or have an influence, although that might not really be quite true.

The four most important dimensions of the disaster exposure that predicted problems were: the location and severity of physical injury, the mortal danger, what you witnessed, and the attack on the integrity, particularly to be facing impossible choices. And if you remember the human malice bracket, the nature does not threaten your self-esteem, at least not if you look at natural forces in a scientific way. It is not a punishment from God. As Stephen Couch has said, maybe the first victim to contamination, whether it is poison chemical contamination or a biological agent, is the sense that your self, which your self-respect and your self-esteem is built on, has become a victim.

I would like to remind you of some of the findings on experts when they approach a high-risk situation, like paratroopers or parachute jumpers, which is Epstein's studies from 1982. This is fear, and here you have the time schedule. What characterizes people as they become more trained is that they shift to the left of when the fear response arises.

I will end by sharing with you some of the psychological concepts that I think are useful when we talk about preparedness psychology: the positive response expectancy and positive result expectancy. In the Chernobyl-exposed population, we have not found that they feel they are more competent in handling nuclear fall-out, except the part of the population that learned to use "Prussian blue." This was the discovery that you could decontaminate the reindeers and the sheep very effectively by feeding them Prussian blue. These people had the feeling that they could do something. But for people who have not been trained in doing anything instrumental, we have not found any change in the positive response expectancy. However, we have found a positive response expectancy improvement with regard to what the authorities can do, although this is very moderate.

DR. BROMET: I have divided my comments into two parts. First, I will provide a brief overview of what has been learned from "toxicological" disasters. Second, I will talk about Chernobyl and Three Mile Island as case studies because they illustrate in many ways exactly what we are talking about. There are multiple sources of evidence about exposures that involve radiation. There are several studies of Three Mile Island. Of these kinds of nuclear-plant accidents, it is certainly the best studied of all of them.

There were some very interesting reports that came out 10 to 20 years after the bombings of Hiroshima and Nagasaki, where there was very little attention paid to psychological issues. However, there are a few extraordinary reports, starting with Robert J. Lifton's book, which is a phenomenal description of what happened to people psychologically. It is an absolutely beautiful, compelling account of what people witnessed and dealt with and how they coped psychologically. It had a big impact about our concepts of PTSD.

There are a couple of epidemiological-like reports on psychosomatic symptoms, 10 to 20 years or more, after Hiroshima of the survivors and their children. One of the themes that has come up is the persistence of these health beliefs, that your health has been affected and the sick roles that people play because of that. There are studies of

radiation exposure, and studies of other human-made disasters. There are studies like Dr. Weisaeth's of industrial accidents. Then, there is a whole literature on occupational exposures. We did some work on occupational lead exposure and male workers, occupational solvent exposure in female workers where these same kinds of themes come up about the belief that one has been exposed to something that's compromised one's health. In addition there is the silicone breast implant work that is extremely interesting from a different point of view. These are people who believe that they have been poisoned by their experience and are not willing to listen to anybody who says that maybe they were not poisoned.

There are some very interesting effects across all of these studies. One of them is this issue about believing that your health has been affected. However, it is not that any specific aspect of your health has been affected, it is all aspects of your health has been affected from headaches, to gastrointestinal problems, to respiratory problems. People who have gone through these experiences have a tendency to attribute all of their health problems to the exposure. The real difficulty is that it persists and persists.

There are also high rates of other kinds of psychological stress reactions that create a real problem because people who feel that their physical health has been affected, do not want to be told that their problems are in their head. But, in fact, these people are also comorbid for a variety of psychological problems, as any of us would be if we believed that our health was affected by one of these accidents. Most of us would be depressed or anxious.

In these studies, unlike many of the other studies of stress and natural disaster, the severity of the exposure in objective terms is not the issue. It is the perception of the exposure that is the issue and that is very clear in most of these studies. These kinds of events lead to incredible debates in society about what has happened, and how much damage was caused. They really are a source for conflict. One problem is that scientists cannot tell people definitively what the outcome really is because often these are lower-level exposures. These are exposures where there is no medical science to draw upon to say, "This is what happened to you. These are the medical effects you can expect and this is what is likely to happen in the future." In addition, there are delayed health effects, like with radiation. It is, therefore, understandable that people attribute all sorts of health problems to the exposure since nobody can say definitively that it is not true.

An incident happened when we made our first report about the Three Mile Island findings to the Smith College Club of Pittsburgh in 1980. We went to a woman's home in the evening where there were mostly women, but also a couple of men. We talked about what we had done and what we had found. When I was done, this man gets up and says, "I am a nuclear engineer at Westinghouse. Nothing happened at Three Mile Island. I think it is a disgrace that our government has spent all this money on a mental health study when there was no problem, no exposure, and the fact is all these people really needed was a father figure who they could believe in and help them deal with whatever had gone on." There is some truth to that because if you remember, there was a great deal of conflicting information. So, I was royally put down. I was younger than I

am now and actually felt totally humiliated by this experience. Following the presentation this man came up to me and said, "So what are your plans?" and I said, "Well, I am going back into the area in a couple of weeks and I am going to take my three year old daughter with me." And he said, "I wouldn't take a child into that area." This incident speaks to one of the issues that we have been talking about today, credibility, and about what you say in public and what you say in private. It is not just that people disagree with each other, it is that they are not always honest.

Now I will talk a little about Three Mile Island and Chernobyl. These are monumentally different events in terms of the exposure. It is interesting, however, that there actually are some extraordinary parallels between them, such as they both happened at night. They both involve intangible exposure. Why should you believe there is a problem if you cannot see it or feel it? There is an area around Chernobyl, the ten-kilometer zone that was evacuated permanently, but many people snuck back to live in that area, especially older people who wanted to live there and didn't want to live anywhere else and didn't believe there was a problem anyway. Both situations involved an evacuation delay. At Three Mile Island it didn't happen for a couple of days and at Chernobyl it also didn't happen for a couple of days.

At Chernobyl the evacuation was incredibly chaotic, and people were told to get on a bus. They were told they did not have to take their belongings because it was only temporary. They were told they would be coming back, which of course, was a lie and the reason they didn't want them taking their belongings is that everything was contaminated. Some people went off to villages that were themselves contaminated and then off they went to other places. Unlike in this country where you can move to any city you want to move to and get an apartment, there you have to have permission to live in a particular city. So a whole bunch of people arrived in Kiev, which is the place we were studying, and were put in these apartments temporarily. These were new apartment buildings that people were on waiting lists to get into. So in come these contaminated people from Pripyat, the town next to Chernobyl, and they were given these apartments that people had been waiting for. It was chaotic and there was a great deal of anger.

In both situations, there was incomplete disclosure by authority. They were probably lied to in this country, although I think it was more an issue that people had different sources of information that they trusted and they told different stories to the media. In the former Soviet Union, there were deliberate lies. Deliberate cover-ups. For example, the Minster of Health of Ukraine went on television and told the people that there was a small problem, not a big problem, and that it was nothing to worry about. If they drank a little bit of red wine, that that might help them and besides that, a little bit of extra radiation was good for you! While they were saying this publicly, the officials from the elite of the Communist party were sending their children out of Kiev on the train which, of course, everybody saw. The accident occurred on April 26. On May 1, which was May Day, people were outside playing in areas that the government knew might be contaminated. Children were outside playing. And meanwhile, the rumor started spreading that something terrible must have happened because all of these children were being shipped off on the train.

In Belarus, which was the most contaminated, people were not actually told for two years what had happened. So why should people later believe what they are now being told? My husband has relatives in Gomel, an area of Bella Russia. He tried to call his relatives to tell them that they should leave because they have three young children. He said a terrible accident had occurred and that he read about it in our newspaper. And they said, "What are you talking about? If something had happened we would know about it." Because they could not see anything, there was nothing that they were told. This was deliberate miscommunication. Rumors went around, of course, as they did at Three Mile Island. Rumors about three-legged animals and all sorts of things. People around Chernobyl became very much afraid and they developed all sorts of health problems and began to attribute everything to the event. They were not just fearful about their current health or their children's health, but the health of future generations. What would happen to their children's children, for example? The worst thing about these accidents, and the bioterrorist kinds of events, is that there is no way that this can get resolved very easily and so it goes on interminably.

We conducted two studies of mothers of young children. Both studies involved assessments ten years after the event and used similar measures. Conducting research after these kinds of events is very difficult to set up, even ten years after the Chernobyl situation. Our Three Mile Island studies started sooner. Many of the world's worst events happen in Third World countries where there is no research infrastructure. There is a very different way of thinking about health and illness. You walk in as a westerner with all your tools developed on middle-class Americans and think you're going to be able to quickly go in and do something useful. It's actually much more difficult than that. The most difficult issue in that context, is finding people locally whom you can work with, who are interested in learning what you want to learn in the same style.

In our interviews we ask people whether they were worried about their health because of these accidents and whether they were worried about their children's health. The subjects were the evacuees, women who were either pregnant or had kids up to the age of 15 months at the time of the Chernobyl incident. They were all mostly from Pripyat, which was the town next to Chernobyl. The subjects eventually ended up in Kiev. One of the challenges was putting together a sampling frame to get a representative sample of those mothers because there were various lists.

Ten years later, most of these people tell you that they are very worried about their health because of Chernobyl. Ten years after Three Mile Island the data indicate that the majority of people will either say they are worried or that they are not sure, but they will not unequivocally say they are not worried.

In order to prepare for another study of the Three Mile Island women, I called these women about 18 years after the event and talked with them about whether they would be willing to participate in a study. I asked them whether they worry at all about Three Mile Island and most said that they do not think about it. However, I could not get them off the phone because, of course, they think about it. They do not think about it on a conscious level, but once you raise the issue they talk about everything.

These Three Mile Island interviews were not as depressing as the conversations we had in Ukraine. We went to people's apartments to talk to them about their experiences, both before we did our study to learn about what we should be studying and while we were doing our study to make sure that the field work was done properly. The people would feed us and treat us nicely and we would have these wonderful conversations about music, culture, etc. Then I would say, "Actually, I would also like to know what happened when Chernobyl occurred? Could you tell us something about what occurred?" It was as if I had said, "I understand your father died last weekend, I'm really sorry." because these women would start crying. Their kids would be sitting next to them listening to this and, it was a very emotional experience.

It was not surprising to find a strong relationship between believing that your health has been affected and being anxious. Regardless of the mental health variable, if you think you were not affected, you are less symptomatic; if you think you were affected, you were more symptomatic. There is a difference in degree depending on whether this is an evacuee or a control person from Ukraine, or somebody from the Three Mile Island area, but the pattern is the same. Earlier, I mentioned the fact that doctors have a major role in what happens to people who are affected by these kinds of horrible events. We asked the women how many days in the past year they were sick and unable to either work or perform their roles as mothers. These are women in their late thirties, so they are a fairly young population. We asked them, "Did a doctor ever tell you that you had a Chernobyl-related illness, yes or no?" We found that it didn't matter whether they believed their health was affected by Chernobyl or not, if a physician told them they did not have a Chernobyl-related illness they did not have many sick days. But if a doctor told them they had a Chernobyl-related illness and they believed that their health was affected by Chernobyl, they were much more likely to report many sick days.

There is no question that doctors have a major role to play in helping people deal with the anxiety and the stress that goes along with these accidents and if a doctor says, "I think your problems are due to the Persian Gulf." That is something you're going to remember forever. If a doctor says, "I think your problems are due to the fact that you were contaminated by Chernobyl." You will not let go of that.

I want to make a few conclusions about this research, which may also apply to the bioterrorism situation. These are long-lasting effects. These are not short-term things that are going to go away. So whatever intervention you set up cannot be short-term. Public health surveillance rarely included mental health and in these kinds of situations the physical health complaints and the mental health problems go hand in hand. There is very little research in non-Western settings and some of the worst things that have happened, like Bhopal and some of these terrorist events, occur in Third World countries. We need to better understand how to do research in those countries so that we are prepared to do these without making a large number of errors. We need to learn from our mistakes in similar situations. We are going to repeat many of the same mistakes in international research if we do not start setting up a framework for doing these studies.

These events, as horrible as they are and the interventions that get set up afterwards, are opportunities to learn. To the extent that the research goes along with the interventions we are going to learn something. However, if the research is something that is either not done at all or is added on after the fact, it will really limit how much we can learn about what happens to people when they go through these events.

DR NORRIS: Today I will speak very broadly about what the literature tells us about the effects of these events. Even the most cursory review of the literature on disasters and mental health will reveal a diversity of outcomes across communities, then across individuals within those communities. Now, risking over-simplification, I will summarize this literature on psychological outcomes in terms of three hypothetical patterns.

The first pattern is a very typical normal stress reaction to all kinds of losses and to perceived threats. Symptoms increase at first but later symptoms decrease. Then, within a few months most symptoms tend to return to baseline levels. The fact that this is normal makes it no less interesting because there is still much to be learned about why it is that most people, most of the time, are able to mobilize sufficient resources to cope successfully with adversity. If this was the only pattern known to follow disasters there would be no need to intervene because naturally occurring processes are probably sufficient. Now, it is true that probably even in this context, crisis intervention services might help to hasten the process and in this way reduce human suffering in the short term.

The second hypothetical pattern does not necessarily differ from the first in its severity or nature, but the distress does not fully dissipate. There is a sense of not getting over it. While this pattern does not qualify as psychopathology, and I want to emphasize that, we are not talking about psychological disorders, it does imply a decline in the quality of life and well being. My impression, formed on the basis of my own research as well as that of others, is that this is a very common outcome. Unfortunately, when we do only diagnoses, these all end up in the "No" column. However, when you take a more broad-based look at just how people are doing, you find a great deal of people with subclinical conditions.

We need to learn more about why it is that some people some of the time are not able to recover as completely or as quickly as we would hope. This pattern, while not as severe as some, is important because of its prevalence. It is probably the pattern for which it's most useful to think about community level interventions because you're talking about a broad sweep rather than an intense one. That is, we need to look for ways that either bolster the overall resources available to communities or seek to replace those that they lost.

The third hypothetical pattern differs from the first two in that these individuals do reach some criterion level of disturbance. The disorder does not necessarily become permanent, but it often does. Two-thirds of all people who have PTSD have it forever.

If you ever fully meet all the symptom criteria, you are going to have it for a very long time. With this pattern it is most important to think about individual level interventions of a psychotherapeutic and medical nature. The mental health research generally suggests that most disaster victims will experience mild-to-moderate, but transient psychological disturbances. Some disaster victims will experience more lingering, though subclinical disturbances. A minority of disaster victims will experience disturbances that are severe and clinically significant. Probably what drives most of the research in this area is trying to learn more about when to expect which outcome.

After the fact we can go to a community, talk to the people there, and we can explain why they were either affected or maybe do not seem affected. It is more difficult to predict beforehand which stricken communities are going to respond successfully, and which are going to have real problems. The recovery process following disasters is quite complex because we have to consider event-level dynamics, community-level dynamics, and individual-level dynamics.

I am going to present a model that represents my current thinking about these dynamics. It is an extension of a model that my colleague, Krys Kaniasty and I have been working on for a long time about social support. Specifically, we have been studying what happens to social support in these communities over time. This has included some floods in Kentucky, Hurricane Hugo, Hurricane Andrew, Hurricane Paulina in Acapulco, and the floods in Poland. We have found that a great deal of this holds across these different cultures we have studied, however, there are some interesting distinctions. This supports Evelyn's point that we need to be sensitive to cultural differences in the study of disasters.

One of the things that we have seen over and over again is an initial outpouring of altruism and mobilization of social support in disaster-struck communities. That usually gets a great deal of attention. However, over time we see a deterioration both in social embeddedness and in perceived social support, i.e., expectations people have of the help they will receive from others and the quality of relationships. There are a great deal of reasons for that. Of course, people move away. In the most serious cases people actually die. Expectations of support are violated. If you were to ask yourself, how much help would I get in a crisis? You are thinking about if you, you individually, are having a crisis and all your family and friends rally around you.

In these situations the families and friends are in trouble themselves and not necessarily able to provide you with all the help you need. Fatigue, irritability, and differences in opinion over why the event happened can seriously augment the potential for interpersonal conflict. Over time we see a deterioration in social resources, and these are very important for coping. The disaster itself, therefore affects the very resources that people need to cope with it.

I will now discuss a model that points to five key constructs (see Figure 1). The circles relate to the individual in the context of community. The most fundamental assumption is that an individual's mental health rests on the quality and quantity of his or her material, social, and psychological resources. Most of my own work has been concerned with social resources, but I want to talk about it in broader terms. When we talk about resources, we do not just mean money, e.g. property loss. We are talking broadly about all of the things you value, i.e. protective appraisal. This theory is influenced somewhat by Hobfoll's Conservation of Resources Theory. Basically, Hobfoll's definition of stress is the state that ensues when resources are threatened, lost, or invested without a gain. From this perspective, not only is distress viewed as the logical consequence, or the end point of resource depletion, stress itself may be defined as a process of losing resources. Exposure to disaster sets this process in motion often with a sudden, forceful blow. At Three Mile Island they did not have property loss but they did have resource losses such as loss of their sense of safety and trust in the government.

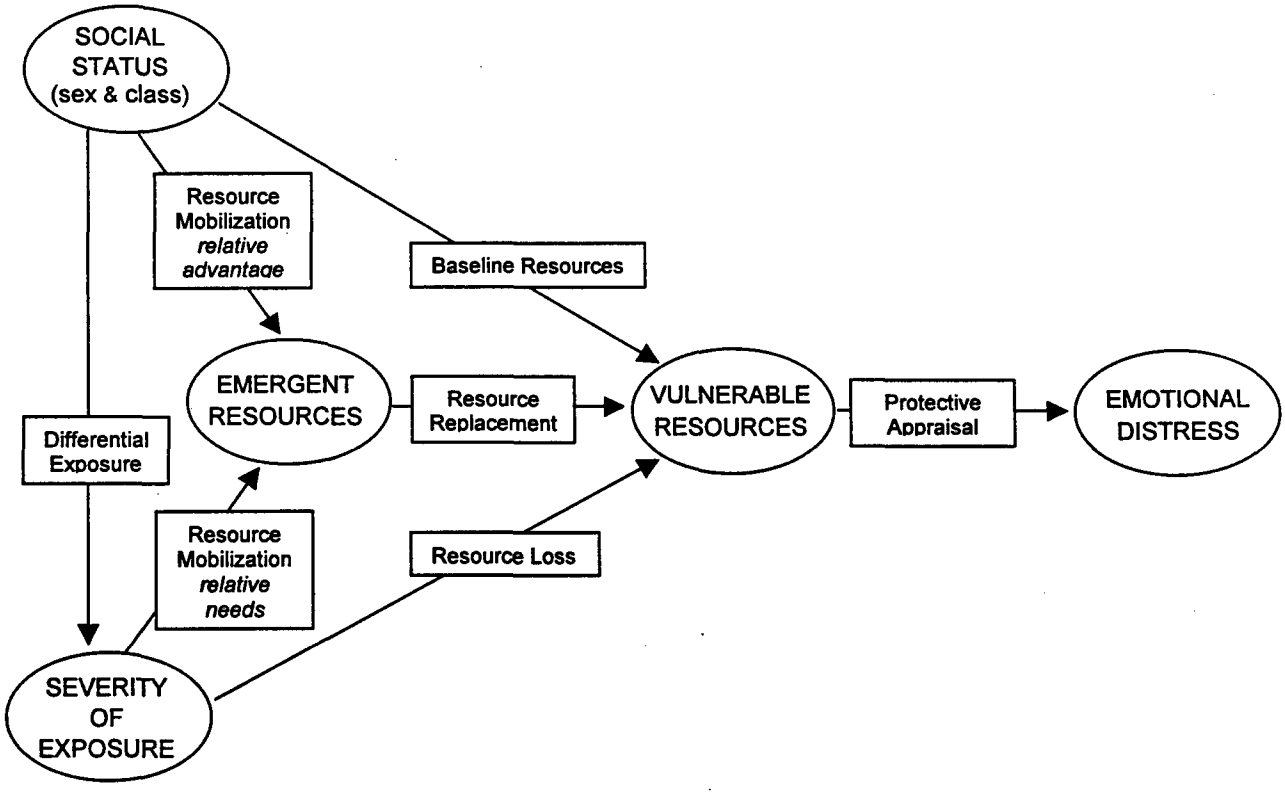

Figure 1. Model

The model makes a distinction between resources that are vulnerable to trauma and those that emerge in response to trauma. Vulnerable resources might include such things as housing quality, social support, and hope. These are our appraised material, social and psychological resources. Emergent resources, on the other hand, are things such as received social support in coping efforts that come into play after the event or because of the event. They emerge because of the event. Emergent resources do not directly prevent emotional distress, but they do help to replace the lost resources or to prevent the loss of resources. Like resource loss, resource replacement is better thought of as a process than of an end point.

Whereas resource loss can occur in an instant, resource replacement takes time and that's one of the fundamental problems here. It is because you can get into a lost cycle and you keep losing faster than you are able to replenish those resources. Resource replacement cannot occur until help is mobilized. Anytime resources are scarce, various rules come into play that influence their distribution. This is especially true in the aftermath of disasters when one's friends and families may be victims as well and unable to provide everyone with all the help each needs. If there is not enough to go around how do they get assigned? How does it get determined who gets them.

Previous research points to the two most basic processes. One of these is the rule of relative needs. This means that the most help should go to those who need it the most. This is consistent with most of our beliefs here anyway, about how help should get assigned, you know, according to need. This is represented by a positive relationship between severity of exposure and the amount of help received. The more severely exposed you are, the more help you should receive relative to others in your community. The rule of relative advantage acknowledges that one's position in the social structure also influences one's access to help. Therefore, it is not as straight forward as, "those who need the most get the most." This came out so clearly in the Hurricane Hugo study, that comparably affected victims, that is, they had the same amount of exposure to the event, who were less educated, of lower occupational status, and of African-American heritage, received less help than did comparably affected persons who were more highly educated, higher SES or of white ethnicity.

You can also get into issues like political connections. We observed this in Mexico pretty clearly, something that I had thought about because it is just a random factor. The most important factor in whether or not you get help could be whether you know the guy who has been appointed to be the aid person for your block. It is just another clue when we go into other settings and other cultures. We really have to look around and see what are the important factors. This lends some insights into why we have such a diversity of outcomes in the research. Why it is that when we look back over the literature we see communities that fared perfectly fine, while others had very high rates of psychopathology. There are individuals who coped fine while others did not. It is sort of a tautology, however, it makes perfect sense that we would have this kind of range of outcomes.

Everything I have said was implied in a very parsimonious definition of disaster that Quarantelli provided some 15 years ago. And that is, a disaster is a social and

political event where the needs of the population outweigh the resources available to meet those needs. Not only do communities vary in the severity of their trauma and losses, but they differ dramatically in their ability to mobilize resources. Often they are adequate to off-set the effects of even the most very serious events, but sometimes they are not. The question remains about how this specifically applies to disasters that are caused by terrorists as opposed to other means. There is, as a pretty clear opinion in the field that, overall, all other things being equal, human-caused disasters are going to be more serious than naturally caused disasters. In my opinion, that distinction has been waning. In part because as we start actually getting to some of the most serious natural disasters in the world, such as the Armenian earthquake, and Hurricane Mitch, for example, we see some fairly serious mental health consequences. Whether it is natural or not, people have an increasing tendency to blame it on humans.

We are conducting a longitudinal study of the floods in Mexico last fall. There were literally riots in the street in Hermosa because of the feeling they were being totally neglected by the government. In addition their community got flooded because of decisions that were made to protect other communities. What do you do with the dams? How do you control the flow, i.e., their version of what the Corps of Engineers does to control the flow from dams. There is an increasing sense of there is a human component to most events. One way to think about how a particular event effects communities or populations, would be to think through what resources are threatened by an event like this. What resources can people call upon for help that might help us analyze it?

DR. ENGEL: After the Gulf War, one of the public health concerns that come up frequently was about children's health in response to these kinds of events. Many Gulf War veterans stepped forward and said, "My whole family has been affected by this, my children are sick." We literally had people say, "My dogs were sick." Evelyn Bromet's work that was recently published in the Archives of General Psychiatry addressed variables that predicted child health. It would be useful for you to summarize some of those findings.

DR. BROMET: We asked the children of Chernobyl about their perception of their own health. We had them fill out standard scales about mental health and their feelings about everything. Then we asked the mothers the same things about how they regarded their children. In addition, children were given physical examinations. Intervention programs that are done ought to consider both physical and mental health. Research should do a good job on both physical and mental health. Unfortunately, epidemiologic research is usually either a physical health study with some terrible mental health measures, or a detailed mental health study with some superficial physical health data. There are very few examples of studies that address both of them in any depth. Our research was strong both on the mental and physical health. However, we did have physical examinations done on these children because it was possible that some of them had been affected by Chernobyl, e.g. an elevated rate of thyroid cancer. The kids were 10 to 12 years old when we saw them, and this may have affected our findings. We found that in spite of the beliefs of the parents, teachers, and doctors about the vulnerability of the children, the evacuee children's self-perceptions were basically the same as the control group. The only variable where they were a little different was in

terms of their perception of their health, but even that was not such an extreme difference. The mothers, on the other hand, view these children, you know, very sick compared to the control group. It was amazing to me that all this angst has not rolled over to these children. The mother's own feeling of somatic complaints about her own somatization was the best predictor of how she viewed her child.

DR. MARLOWE: Let me speak for a moment as an anthropologist. I am struck by the sensitivity on the part of the researchers to cultural, social, and contextual factors. The question I have is, where are the vade mecums, the "Dummies Guide to" that provide this kind of navigational information to the front line and follow on care givers. Psychiatrists today, particularly most of whom have been trained biologically, so that they can go in and navigate and deal with both the cognitive and structural concerns of the community, are also major sources of support. As far as I know, we have no equivalent for the diversity of ethnic groups and subgroups in the United States of the old human relation area files, which were pretty good on Africa and Southeast Asia. This may be perhaps a task that the community may have to take upon itself?

DR. NORRIS: Most of the systematic attention to context in culture in this research is fairly recent. We still have a great deal to learn about other cultures and about subgroups within our culture who are more difficult to access, say for research purposes. Many of those kinds of findings have not worked their way into the manuals, however, the Red Cross has one as does the International Society for Traumatic Stress Studies. Currently I am on a joint committee, between ISTSS and the U.N. that is putting together a series and one will be on disasters.

DR. BROMET: In our department of psychiatry there is not much training in our residency program about this issue, in general terms, not just after a disaster, but in terms of treatment.

DR. SHAW: Even though an acute stressor is very circumscribed in time and space, it very quickly cascades into the chronic and enduring stressor, and that is really what we found after Hurricane Andrew. Although it was over very quickly, 85,000 people lost their jobs, 100,000 homes, trailers and apartments were destroyed, 25 percent of the population moved out of the Homestead area and long after FEMA left, these problems continued unabated. In our two-year follow-up study of children after Hurricane Andrew, we found more emotional behavioral problems two years after the disaster than in the immediate aftermath of the hurricane.

In terms of residency training, one of the things we do every year, with varying degrees of success, is to have a grand rounds presentation in the pre-hurricane season, hopefully, to try and educate the mental health professionals and give them useful information about the possible psychological effects of disaster. We bring in the community resources and emergency management services to talk about the type of shelters and type of preparedness, evacuation plans, and intervention strategies that they have. We try and provide a reasonable didactic experience around issues of the psychological effects of trauma and we try and set up, in an anticipatory way, crisis intervention teams, so that people will be available. However, it works much better in

theory than in fact, and denial is really rampant. We try and work in a preparatory way, although it has been very difficult, particularly working with all the multiple agencies in the city and in the community. We do have a group called Voluntary Organizations Activated at the time of Disaster, and we meet on a regular basis once per month. There is a great deal of preparatory training of people in anticipation of these events.

DR. BROMET: If cross-cultural sensitivity is not part of the residency training program, and we need a great deal of doctors to deal with a bioterrorist event, we are not going to have many people who know very much.

DR. WEISAETH: After I had worked in other parts of the world, I realized how obsessed we, and the Western world are, with predictability, control, and hope. For example, why did Saddam Hussein move the hostages to the Jordanian border, already a couple of days after the invasion of Iraq, of Kuwait, and then move them back to Baghdad? It is to create expectations and to disappoint those expectations. Twenty-two years ago I served as Major in the Nepalese army and I also worked in Phnom Phenh, since we were responsible for training psychiatrists in Cambodia, and I was very impressed by how the Buddhists trained, it is part of their culture, to accept the day as it comes. If you do not have any expectations, you will not suffer disappointments, however, having expectations makes us vulnerable. On the other hand, it makes for progress. Also, the belief in reincarnation, fatalism, and other important aspects of religion and culture. There are very few studies from other parts of the world. We just completed a study of Eritrean soldiers, veterans from the Ethiopian War. Now, that is a Christian Coptic culture, and basically, we find the same as we find among our veterans.

DR. HOLLOWAY: In providing support to the Thai army, where I was a Thai physician for four years, what was remarkable in terms of exposure to combat were similarities rather than differences, although exactly the belief differences that were pointed out here existed. One of the striking things was the way in which we attribute to trauma the loss of hope, as occurred in the Chowchilla studies. In which, for people who were living in areas that were totally devastated by poverty and by various kinds of diseases, the idea of having such hope was utterly foreign to anyone who lived there. It just did not exist. And, in which all of the children were exposed to this kind of trauma on a very regular basis. I do not know in those circumstances whether we have the kind of systematic study that allows us to know whether these kinds of belief variables exercise the kind of power that we attribute to them.

DR. LEDERBERG: I want to raise the question of the variable of religious commitment. My wife is a consultation liaison psychiatrist. She is quite interested in this in the context of her cancer hospital. Without going to other cultures in our own and Western Europe, I did not hear much said about role of religious commitment and outcome after stressful situations. In my understanding of truly devout, there is no meaningless situation. The worst of them are a test of faith, and that, itself, imparts some meaning. Has religious commitment been a studied variable in any of the studies that have been remarked on here?

DR. WEISAETH: The problem in studying religion and coping is to separate the social support which often follows the religious commitments or the effect of the belief.

DR. NORRIS: When we conducted our qualitative research in Mexico with the Latino population we observed a great deal of variability in the way it affected people. For some people it added to their coping repertoire but for others it was almost the opposite. We had a category in our ethnography called, "The Event is the Message From God." Some people forget the idea that this is some benign world. Some believed God did this to us on purpose, and they often did not have good outcomes.

DR. MARLOWE: Some of the largest Eritrean, Ethiopian, Somali, Vietnamese, Cambodian, Thai, and perhaps 15 different Latin American communities, all culturally different, all large, are resident in the United States. Therefore, this is not an exclusively "off-shore" problem. One of the largest Eritrean communities in the world is here in Washington. The largest Somali community outside of Somalia is in Brooklyn. This is a very real problem facing us if we are considering how to deal with bioterrorist events, particularly in cities like New York, Washington, Chicago, Los Angeles, and San Francisco.

DR. BROMET: The El Al plane crash in Amsterdam happened in an apartment complex that was filled with illegal immigrants. They could not even get an accurate count of bodies because people were afraid to come forward because they were afraid they would get deported.

DR. HOLLOWAY: The language of psychotherapy for the victims of the terrorist hi-jacking of Pan Am in Karachi, for the American citizens was Urdu, because these were on the plane, all American citizens visiting their home in India and they were Urdu speakers. The idea that in America we are going to have these complexities is absolutely correct. I want to make a point about this distinction between what it means to have a human-directed event, along the taxonomy that Lars mentioned, and an actual event. You used the example of the Armenian earthquake and setting up the Armenian Space Bridge. The standard joke in Armenia after the crash is that it was to ask the question, "If the same earthquake were to occur in Leningrad, what would you have?" And the answer was "St. Petersburg." Because all buildings built during the age of the Czar did not fall down and those built during the time of the Soviet Union did fall down, and the distinction that was appreciated by the people immediately was that, earthquakes do not kill people. Buildings kill people and it is the architecture that does it.

DR. NORRIS: Such a diversity of people who were affected by some of these disasters and realizing that we just know so little about how people from different walks of life are going to approach these events. In Hurricane Andrew we found that both the culturalization and ethnicity exerted a very strong effect on people with posttraumatic stress disorder but not on people who were depressed. Even after you controlled for education and severity of exposure people with posttraumatic stress disorder were highly affected. We can speculate on probably a number of different causes of that, however, we need to learn more about.

DR. DEMARTINO: I would like the panel to comment about the long-term consequences in a population possibly affected by bioterrorism itself, or just the threat of it. It is not clear just how much of an issue it would be. Biological terrorism will not look like the building bombing. There is a diffuse geographic location for the incident. It is centered in the medical community not in the law enforcement community in a site where buildings are falling down. There is no grotesque death and for many people it is going to look like natural illness. What kind of a model are we going to use? Are we using a model of radiation or a presumed exposure to chemical agent, or are we looking more at a natural epidemic for long-term mental health consequences?

DR. WEISAETH: The secondary disaster is stressors. If there are many of them, this is likely to prolong the psychosocial response. When it comes to the Gulf War Syndrome in your culture compensation issues and public attention tend to prolong recovery. We did a case-controlled study of our Gulf veterans. We looked at those who had loss of short-term memory. Not one of them had labeled this or attributes this to the Gulf War. It never struck them. And it turned out that the memory problems were related to stressful lives. Secondary gain is important because people are very difficult to treat once there is a compensation issue involved and once there is a lawyer involved.

DR. DEMARTINO: There is a sense of injustice, particularly if nobody is being charged, sentenced, or punished for these crimes. Life is not just.

DR. FULLERTON: I would like to comment on what Evelyn's studies with mothers and children. It reminded me of Sandy McFarlane's studies of the bush fires in Australia. One of the best predictors of how the kids did, was how the mother had done. It is important to better understand the mechanism underlying these predictions. Evelyn mentioned that the mother's own somatization was the best predictor of her perception of her child's health. However, the children's perceptions were different. What is the mechanism by which that might happen? How does a child pick up on the perceptions of the mother? Particularly the age range that you were studying, e.g. pre-adolescence is a critical factor.

DR. BROMET: My theory, which is only partly based on our data because I did not expect this finding, is that unlike kids who grow up in stressful environments in this country, these kids are really loved in that society. They are loved, and they are wanted, and so they have a great deal of positive things in their lives. It is not only that they're dealing with the fears about Chernobyl. They are living in families where many of the fathers are alcoholic, however, they are living in families where they were wanted, loved, and cherished. There was no difference between the two groups of kids in terms of their perceptions and their family environment. They scored at a very positive end of that scale. I do not have national data to know what to make of it.

DR. WEISAETH: There is a consistent finding in the Scandinavian studies of the nuclear fall-out and psychosocial response sex difference. Women have much more severe anxiety and depressive responses. We believe this is due to women being closer to life. For example, threat about pregnancy, the fetus, and the care-taking role in the contaminated community-type of situation. The amazing finding was that education

had the opposite effect in men and women. In university educated women and men, education among men usually would reduce worry about the radiation. The higher your education, the less worried you were, and the higher your trust in the information from the authorities. In women, however, if you looked at junior high school, and university educated women you found that increased levels of education, resulted in anxiety and more depression. Perhaps, what is important here is understanding the risk in a situation where you feel you can do nothing.

DR. URSANO: Evelyn, in some of your other presentations you had also spoken about the special programs that these children had received as well, which perhaps advantaged them quite a bit compared to the resources available to the controls even.

DR. BROMET: It was a double-edged sword. These kids were given special lunches at school and special physical examinations by doctors every year. They were given special things that other kids did not get, and it was both a plus and a minus. In that society everybody knows who is a "Chernobyl victim", which is the term for them, and who is not. Therefore, by getting these special lunches they aroused the wrath of the other kids and the mothers and it was an inflammatory issue. Around the time when we finished our study, we were having meetings with groups of four or five mothers and kids to talk about what had gone on with them in the study. One "control" mother lashed out at one of the "evacuee" mothers about these special lunches and about how her kid could use the lunch too and they were having problems getting food. After we finished our study the government changed its policy and now all kids are considered Chernobyl victims and everybody gets the free lunch. However, it was not like that for a long time and many difficulties were created.

DR. URSANO: I want to highlight that we are talking about some important issues around the role of special programs, mothers who identify their children as having symptoms, about the role of physicians and increasing the presence of symptoms. All of these are critical issues for us to think about in terms of interventions, training and resources.

MR. PARACHINI: I am fascinated by this discussion, although I find myself wondering, now that we are 16 years from the Rajneesh case, 7 years from the World Trade Center bombing, and 5 years from Oklahoma City, has their been similar research done on the survivors victims of those incidents that might be more analogous to what we are talking about here? I would be interested to know because that would inform some of our work. In our work looking at the perpetrators we found that for years how people were talking about perpetrators the scholarly literature had no connection with what was really the case with the perpetrators. I am just very curious if that would be the case here. Maybe that would be a good thing for Scott Lillibridge to fund.

DR. BROMET: There are such studies. They have been done.

DR. NORRIS: The Oklahoma City bombing was studied extensively by Carol North and her colleagues. They found surprisingly high rates of PTSD compared to approximately 12 other disasters using the same instruments. In addition, the

Oklahoma City population that they were studying were people with fundamentally good resources. They had government jobs and were surrounded by a protective community and self-worth. This suggests that the event was just so incredibly frightening many of the positives were overshadowed.

DR. FLYNN: That group is currently collecting data on State Department employees in Kenya and Tanzania using comparable instruments. This data will provide some very interesting comparisons.

MR. PARACHINI: The Rajneesh case was the only biological event that had mass casualties. This was in 1984 but health authorities did not recognize this event as an intentional attack for over a year. It would be interesting to better understand this event since it can be compared to these other events we are discussing.

DR. RADKE: Robert asked how would one would treat a bioterroristic event. Given my experience in epidemiology, we are actually talking about an acute infectious disease endemic process, probably not knowing the timing of the inoculation, nor the agent. Also, we are probably responding medically like we would to any infectious process, and hitting the curve after the major portion of the population who is going to be infected, are infected, and what is left is the psychosocial clean-up. It would not be much different than any other terrorist event because you are still going to deal with what is left over and the psychosocial response. That brings me to Evelyn's point that as a person feels that they have more physical or medical problems, they also have more distress. What comes to mind is the social psychologists' self-actualization pyramid, realizing the foundation of that pyramid is safety. The pyramid really crumbles if you feel that you are unsafe. Therefore, the issues that were brought up about self-esteem, control, and concerns about the community response, all can be seen in the context that you have actually shaken a person or a community's perception of safety.

DR. LEDERBERG: That may also segue into my question. I wanted to pick up something that DeMartino had brought up about longer-term consequences of an attack. I know what my reaction would be, and that would be a sense of acute vulnerability. In spite of my cognitive elaboration of the kinds of risks that we have foreseen it is still a hypothetical structure and to have it realized, you know, I would -- with a malicious attack unlike an event of nature, the expectation of this -- some pretty bad guys are really going to do something and they're out there, and when are they going to strike again? That could lead to all kinds of further consequences, mostly scapegoating, on the one hand, hysteria, and the other hand, denial. What's most likely to happen there? If we consider Oklahoma City and the World Trade Center explosion, we do not feel all that much more vulnerable. We are not quaking in our boots, although, they enter into rational arguments about resource allocations, etc. I would not say that there is a psyche of fear, vulnerability, or looking for scapegoats. They are still regarded as isolated aberrant events. It is important to figure our what is going to happen if there is a demonstrated attack, and what measures can be taken so that we have healthy and constructive responses rather than destructive ones. That should be part of our agenda.

DR. BROMET: I would think this discussion must have gone on in Israel. I was struck by what you said because Israel is a place where there have been many of these kinds of unexpected terrible events, especially the year that Rabin was killed and there were several bombs that went off in various places. There was also the SCUD missile events. I would be very surprised if they had not convened these kinds of meetings to discuss these very same issues.

DR. WEISAETH: In our study of the Gulf sailors we found a sensitizing effect. One attack was not that bad, but the second attack created a much stronger reaction. The way I interpreted this was that when something happened once it could be accidental. And the terror attacks in Oklahoma City and the World Trade Center have been different attacks. They were not the same organization involved in another event. It could also be a true sensitizing effect. But when we studied people that have survived several severe exposures during war or disasters, we also see resilience building. These are the two theories of what distinguishes the person who develops a stronger sense of invulnerability as compared to those who get this illusional centrality.

DR. HOLLOWAY: I want to bring us back to one point, and that is that these are not exercises in sociopsychological or social psychiatric theory, and the world is really made up of one damn thing after another. And, my reason for making that point is the Oklahoma City when -- my last visit to Oklahoma City to consult with, actually, Carol North was there and was flying with me that day. We were looking at her data and other data from the follow-up and we had a little trouble getting out of Oklahoma City that day because the largest tornado that had hit Oklahoma City hit that day. And the people who we sat at the table with, from the fire department, all of their homes were destroyed that day as we flew back to Washington. My point is that it is inevitable, it seems to me, that we have to ask the next question, is given that the world is made up of one mischance that inevitably follows another, and that everyone in this room, as far as I know, will die. And those simple facts, of confronting major traumas that will recur again and again, should also cause us to look at the summing effects that Lars is talking about here. That is, what is going to happen, not only in addition to another attack, but other bad things? Because that is the nature of human survival, and that when we talk about feelings of invulnerability and all those other things, we are talking about defense systems. Those are defense systems and they do have these kinds of conversations in Israel. I have had them in Israel, particularly after the Yom Kippur war, in which one discovers when speaking, at least to people from the IDF, that they did not have a terribly hopeful view about the world and how it was all going to work out because they had seen lots of bad stuff. The overall question of looking at things in sequence, not as if they are going to be hooked together giving these kinds of meanings to event, but that there is a chance, if you will, summing across time of the experiences in life is another factor that our studies must take some account of.

DR. MARLOWE: What proportion of Americans now expect another major terrorist event? From the way the media handles it, I certainly would not think that the nation is in a state of denial. Everyone was wondering what major terrorist event we were going to have on July 4th, when there were apparently threats from the Aryan Nation or some of its equivalents. But, what is it that Americans expect?

DR. NORRIS: There is another phenomenon that has gone on a couple of times. It is when we expect something to happen and it does not happen. The most recent example being, all the hype about the millennium and I do not just mean that the computers were going to do whatever the computers were going to do, but that we would have some major terrorist event.

DR. HOLLOWAY: The millennium starts next January 1, 2001.

DR. NORRIS: Remember time is a social convention. Another interesting event involved a person who makes predictions every year about earthquakes. Several years ago he predicted that there would be a major earthquake on the New Madrid Fault right outside Memphis. This almost set off a panic in Memphis among people who had not thought about having an earthquake in 100 years. It is the most laid-back city. Once we visited my in-laws who live there and noticed in the guest bedroom there was all this bottled water, food, up to and including dog food. I turned to my mother-in-law and said, "Louise, you don't have a dog." She said, "Well, Betty does". She was so prepared for that year. Then, of course, there was not an earthquake and I can guarantee you I have not seen any water or food or dog food in that house since. This seems somehow related to these "non-events" of expecting a terrorist attack. I live in Atlanta and several years ago we went through a series of bombing at the Olympics, and then at an abortion clinic and then at a lesbian bar. It started to add up because they had not caught the guy. It was not like Oklahoma City where they caught him. In this Atlanta people really were starting to get nervous until they convinced us he was off in North Carolina somewhere.

MR. PARACHINI: On the polling data in 1997, I worked with a pollster to do exactly that sort of survey, both quantitative and qualitative, and I was dumbfounded. Three out of four people thought that it was likely that there would be a terrorist nuclear attack in the United States. In focus groups, people said we once feared Communism, and now we feared terrorism. There is a funny switch of "-isms," which really are not analogous, but that is what people have put in their mind now that Communism is gone. It is terrorism.

DR. BROMET: Yes, but the follow-up question, which is probably not asked is, how often do you think about this?

MR. PARACHINI: Actually, that was the front-end question and people do not think about national security threats at all. They think about education. They think about health care. They think about economy. But when you ask them about national security, the first thing they think about is terrorism.

DR. HOLLOWAY: There was a wonderful response among my Armenian colleagues and the earthquake. There was a real proliferation in Armenia, as you can well imagine, concerning expertise and managing the medical problems of earthquakes. And, it was very interesting. In doing that, those people, really gearing themselves up for earthquakes, that it is very difficult for humans to think in non-human time, because

earthquakes occurred in geologic time, not in human time. The idea that they are going to have another earthquake, the best bet would be that they might have a moderate earthquake within 70 years, but an actual one that matched the Armenian earthquake, the overall times from building up those tensions is 800 years. That probably extends beyond most people's ordinary practice. It is also interesting how they use that expertise in other places in the Soviet Union, to deal with other disasters. A train explosion, several other events, that occurred in the Soviet Union where they were used. So, it seems to me that this idea of our subjective probability is shifting, and their shifting on this kind of basis of, experience is highly likely, and that the next question is, what are the benefits and dangers associated with that heightened awareness, because what we prepare ourselves for is frequently, indeed, what happened last, not what's most probable.

DR. TINKER: From a comparative risk-ranking based on national-surveys this issue is not on the radar screen. As John said, it falls out of the analysis unless you actually make a direct inquiry about terror issues. Otherwise, they are the issues of crime and education and this will not be a campaign issue in the fall. The question to us as communications experts is how do we get this onto the radar screen?

DR. URSANO: Do we have data following up on that in terms of a time course after an event? What does the decay curve look like, assuming it is a decay curve?

DR. TINKER: I am referring to the omnibus surveys. What are the issues that are occupying the attention of the American public?

DR. FLYNN: Lars made the first reference to resilience we have had all day. My history is in disaster services and something that has been most striking to me, primarily in natural disasters, has been the relative absence of psychopathology following these disasters. From my experience it is more the story of hope and resilience, rather than pathology. As a field, we need to make some shifts and increase our knowledge of what makes and keeps people healthy. This knowledge must keep pace with our understanding of what makes people ill and how to treat those illnesses. That side of the equation is often missing in our disaster mental health discussions. Evelyn touched on this with her study of children. We have a great deal to learn about what insulates those children and what support systems enhance the resilience. We need to know as much about those issues as about the risk factors. How do we move forward following an experience such as Oklahoma City? It is clear from my experience and the emerging research that there is a much higher level of psychopathology that emerges from a situation such as Oklahoma City. Should that lead us to believe that in a biological incident we are not only going to have that increased level of pathology, but what will happen in terms of resilience? That is a question that must be addressed.

DR. RADKE: I would like to comment on what Harry had said earlier that in the course of human history we are going to face many different disaster events. They will occur in nature or due to malice and everything in between. I am concerned that we may be trying to do something of too much specificity and may want to just understand

how we apply the principles of disaster response and trauma psychiatry to the occurrences of bioterrorism.

DR. HOLLOWAY: I hope that there are some studies similar to Dr. North's studies going on for the World Trade Tower victims, because it seems to me that we do need comparative studies that can parse out some of the variables.

DR. BROMET: There was one small-scale study that was done by a guy named Koplowitz, who is a child psychiatrist and his colleagues.

DR. HOLLOWAY: But, it seems to me that to answer that very question about resilience and different types and populations, that looking at different populations, comparing and trying to isolate the variables, since it is very difficult to have controls per se, that will allow you to do this, may be a way to get at the answer to the question of why is it that Oklahoma City has produced this level of pathology given the overall community resilience of the response.

DR. NORRIS: I would like to mention a perspective in the stress field about thinking of this as a continuum. On the one end we have low-level stressors. There are individual characteristics that matter a great deal in terms of whether it is perceived as stressful - whether or not there is an affect. At the other far end of the continuum are extremely severe events and the Oklahoma City bombing would be hard to surpass of the threat to life. Almost everyone who was in Carol's study was injured or saw someone dead – the extreme end of the exposure range. At that end, individual factors matter less. The problem is we do not know which to expect when we are trying to plan where on this continuum any given event is going to occur, let alone even looking at the ones that we know about.

DR. ENGEL: The thing that stood out for me the most about Carol's data was that individual factors seemed to matter quite a bit. She found a fairly large leap in new events of posttraumatic stress disorder in the intervening period, but she also showed that almost all of these new cases came out of a group of people who had lifetime histories of mental disorders before suggesting that these folks could be divided by subsets as resilient versus vulnerable.

DR. NORRIS: I am not certain that it is true that it was mainly in prior cases. The other variable that is probably the most powerful variable in all of these studies is gender. That women are almost, without exception, the more adversely affected by these events and that cannot be explained only by the severity of their exposure or even the resources available.

DR. HOLLOWAY: The thing that is in Carol's data is comorbidity. The question of the chronicity of the comorbidity is not well established.

DR. NORRIS: Comorbidity is a different issue than pre-existing.

DR. WEISAETH: In a way we have underestimated the importance of leadership here. That people from medicine take on the leadership responsibility, and I think we have had some excellent examples of that displayed here today. One of the lessons that we made during the Chernobyl crisis, and later on, were the importance of having experts address the public through the mass media, and they had the credibility, but they were not trained in how to address people; to explain complicated physical and medical problems in such a way that they could understand this. Radiation is much more complicated than the field we are discussing today. Let me give you one example. One message to the public was that we will now keep the cows indoors for six weeks, but children can play outdoors. Twenty-five percent of single mothers in Oslo, when they listened to the radio, didn't dare to let their children out. And this is where psychiatry could actually, you know, contribute somewhat, to teach our colleagues a little about empathic communication. You start by saying there is radioactivity in the grass, the cows eat grass, so this radioactivity will end up in the cow's milk. Now, who will drink milk? The children will, and they concentrate this in their thyroid gland. In other words, in order to protect this, to prevent this from happening, we will keep the cows out of reach of radioactive grass, but as long as children do not eat grass, they can play outside. You know, the caring content that this is done to protect children. I do not think all doctors are great communicators, but there is a lesson to learn, I think, about this.

DR. URSANO: That is a marvelous example in terms of communication, credibility, and knowledge in the media, as well as in our communications to communities.

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DISCUSSION

Moderator: Robert J. Ursano

DR. URSANO: The goal for this morning is to create recommendations, but before we do, are there any comments people want to make as a preamble?

MR. CORLESS: I am sure that I speak for all of us in expressing my appreciation to you for the hospitality and the way the entire meeting was organized.

MS. MORGAN: I wanted to mention that we are dealing with multiple populations, those that may be actually affected or impacted and those that are in the area that are worried, but not affected. And then also those that will flee the area. Multiple populations in multiple geographic areas need to be addressed.

We need to consider the need for any type of congregate care, whether it be sheltering or mass vaccine distribution. That is an opportunity to get with the people as they come together. But if there is not, and they are told to stay home, then you have to use the media to deal with them. So it would be quite different than having everyone in one consolidated location. We need to think about our approach for these different possibilities. A lot of our larger Red Cross Chapters have hotlines that they open up when a disaster occurs, as well as general information lines. Following Columbine, the chapter took thousands of phone calls. We also want to be sure that if the Red Cross or any other organization does this, that they are all saying the same thing, and that they are coordinated. There may need to be one centralized hotline. It may be on the Internet, as well as telephonic, so that people can talk, listen, get information, and have a resource. That may also need to be coordinated through a mental health resource.

DR. NORRIS: I have a similar comment. I was thinking this morning that the task of coming up with a mental health response, may be an impossible one, because these events could be as different from one another as the current disasters are different from one another. Perhaps what is needed is more of a system for needs assessment.

Instead of getting too caught up in bioterrorism, we also need to go back to what we already know and break it down into its ingredients. Was there loss of life and how much? Were there injuries and how much? Was it a centrifugal event or a centripetal event? By that, I mean was it like an airplane crash, a temporary community, or was it a permanent community? We already know these influence how you respond and could widely vary across terrorist events. I was thinking about a check list like that.

DR. HOLLOWAY: The question has come up of out-migration. I believe that this is sometimes overlooked in planning is controlling in-migration to disaster sites. This may be particularly important in this kind of disaster. I would also like to identify with the last remarks. So often we talk about this as if it were an exercise in geometry rather than an exercise in evaluation and matching the response to the overall needs in a given area. The question may be what kind of mental health planning and be the array in maintenance and training of resources can be put into plans. Not the creation of stereotypic plans that do not apply across highly variable populations, circumstances and difficulties.

DR. URSANO: So our recommendations should highlight the importance of the assessment component.

DR. HOLLOWAY: Assessment is a critical issue. Another critical issue is that this response must be within the context of the practice of disaster relief and rescue medicine that is part of the overall operation. It clearly is not a stand alone element.

DR. MARLOWE: Pre-preparation has to be general. In any terrorist event or disaster you are dealing with an extraordinarily compressed time frame. You do not have the time to do comprehensive assessments or comprehensive looking at the situation.

There is another issue of how much preparation do you do for extremely low probability events? What are the potential consequences for thousands of human beings, for the nation, of a low probability event? Pearl Harbor would have been considered a very low probability event. Ever since we have spent billions, if not trillions of dollars, preparing to avoid another such low probability event. What are the consequences of not being prepared to cope with a major or minor bioterrorist event within the context of disaster medicine? Consequences, both psychological and sociological, can readily unravel the fabric of the society that we are dealing with. We can not simply say, and it was my sense several people were groping in that direction, "Well, the events are so low probability, let us just catch-as-catch-can." This often does not work. To use a World War II example, ask any survivor of Bataan how well catch-as-catch-can works in a situation in which there was no preparation for a low probability event.

DR. LEHMANN: I would like to comment on what we need to teach local responders. They need not only to know what is some of the precursor or warning signs are. They need a protocol for understanding what those are. But also to make available

to them information about resources at a distance that they might be able to access quickly. I am thinking about Joe Barbera's comment yesterday. Being suspicious of something, he called CDC and got some information that was quite useful. If we train people as part of a disaster protocol to know what some of the resources might be and how they could be accessed using a variety of modern media, including the Internet, we can accomplish a great deal. In the course of an event, the ability to video teleconference, whether it is for consultation or direct assessment, can be quite helpful, particularly in the mental health arena. It is fairly common now in bioterrorism situations that you will not have the damage to your media infrastructure you would in a hurricane or an earthquake.

DR. URSANO: Excellent points. In our own work with the American Psychiatric Association, the absolute number one thing that everyone says in terms of dealing with the acute response is the need to be able to get someone on the telephone who has done it before. And they want a person. They do not want a sheet of paper. They do not want a plan. They want a person. We sometimes forget the role of people in our planning.

DR. SHAW: I wanted to point to themes of communication strategy which resonates with an action plan. Picking up on what Tim was saying yesterday, there should be a phase specific communication strategy: pre-event, peri-event and post-event. Communication strategies which are configured to resonate with the action plan, because ultimately information becomes the vehicle by which the community becomes organized and resources are made available.

DR. HOLLOWAY: If you are going to use telemedicine or telemedicine facilities then pre-existing protocols can greatly increase the efficiency with which that is accomplished. And those can be used for things other than this particular application. With regard to a point that David made on how you can do pre-assessment, in several books on disasters there are descriptions of how to do pre-evaluations. These are, of course, rough and ready. They utilize techniques that allow one to evaluate things on the fly. They may require the development of new technologies in terms of examining rates of appearance for care as predicting particular occurrence rates, etc. There is an epidemiological literature on evaluation.

MR. JARBOE: I would like to go back to what Larry was saying, about first responders. I agree with you one hundred percent. Communication is very important, and we need to be prepared ahead of time. You mentioned the incident in B'nai Brith. Clearly, the behavior was a direct function of lack of knowledge about the subject and about the particular agent. I would like to pass this around. This is one of our many quick references that we put together in our county. It is laminated. We have seven or eight different types, but this deals with biological incidents. It deals with going to the suspicious package or envelope or if someone says Anthrax.

We have access to many experts around the country. We can go to the Technical Escort Unit. We can go through Chem Trek. We can go through the National Response Center. We do have that capability locally. I cannot say that nationally. Keep in mind

that the country has about 34,000 fire departments. I suspect that out of those fire departments we are in the top one-half of one percent in this area. However, we need to continue to build. In maybe as little as five years many of the major cities and contiguous jurisdictions to those cities will be prepared to help each other. I am a strong believer that I can use first responders from Washington, D.C., Virginia, Prince George's County, Howard County by simply calling for them. I do not have to go through any red tape. And they are going to be coming with equipment that is consistent with what we have. They will be coming with the expertise that we are developing. I see that happening within five years.

My goal, in our county, is to develop a response capability such that we can manage 1,000 chemical casualties by using our mutual aid system. If I were to ask you to write down on a piece of paper, what does he mean by chemical casualties? Is he talking about everyone is dead? Everyone is going to need to have antidotes administered if it is a nerve agent? It is going to vary. But I base that on a distribution that I have come up with. I believe the vast majority of those 1,000 casualties will be psychogenic and only a small percentage will truly, truly have liquid contamination or aerosol contamination on them. But that is part of the education and knowledge piece. In the emergency services we need to heighten not only our awareness but also our overall knowledge of various threat agents, whether it be chemical, biological or radiological, so that we will gain confidence and competence should we be called upon to respond.

DR. MARLOWE: How far along are we, if at all, on a web based interactive system to deal with expertise and need assessment? Let us remember how rapidly the web is moving. Today we can transmit instantaneously between nodes both visual images as well as requests, as well as instantaneous answers. We must stop thinking just about telephones and videoconferencing when we have an almost universal medium. The only question involved is providing some level of security against hackers. Perhaps this is one of the things we should strive for nationally, an efficient interactive system, tying together emergency workers, mental health professionals, emergency medicine and the political structure.

DR. URSANO: Wonderful comment. As we see different types of disasters that are very unique in the expertise needed to respond, this expertise is much less distributed throughout the nation. How one identifies it and gets to it is more complicated. Our task is to be broad in thinking about the possibilities.

MS. MONTGOMERY: In our county we have gone through assessment, the different types of emergencies and disasters where you would need to assess mental health needs. The mental health piece folds into the emergency management piece when you report to an emergency operations center. In our county one of the nice things is that the school system sits right next to the County Mental Health Services and the American Red Cross. We are there assessing needs not only from a sheltering capability but also from a psychological capability. Who is going to be transported, what counselors, what type of psychologists are going to be transported to the actual shelter itself or the actual scene, etc.

I want to stress that it is important that the bioterrorism preparedness be basic and very low key. It could be a public release of a pamphlet providing the basics on what symptoms to look for if exposed to different biological agents; where and when to seek medical help, a list of mental health and doctors' phone numbers, what to do at your home or office if a release has occurred. You should organize this information into pre, during and in the aftermath of an event. In addition, counseling services come into play in the aftermath of an event. In dealing with diverse populations in emergencies or crises where we have had to get information out, there are language barriers. In this country we have probably over 125 languages to deal with when our students come to school. It is not just Spanish and Chinese. We try to get basic information out, quick reference information out, through the children's backpacks, so it goes home. It is important to have the children understand so they can discuss the information with their parents. The same principles apply to other disasters and crisis planning. We cannot bury our heads in the sand and say, "Well, because it is a low probability, let us not give any information out about it even though we have all these experts here." If it is packaged in a way that is basic it will be useful knowledge. The same thing is true for Y2K. No one complained because information went out about Y2K. People may have extra water and extra canned food but they can use it for another type of emergency.

DR. FLYNN: I want to thank Bob and the folks that have worked with him and all of you sticking to this task over a weekend and with such passion and vigor. I am often in situations where I feel like the lone voice on some of these topics. It is reinforcing to see the commitment of so many people who care about this topic. I would like to address the context that brought us here. It is one of these classic good news, bad news kinds of scenarios. Speaking primarily from my office and our programs, the good news is that we have had a disaster mental health program operating for a couple of decades and it is getting bigger and becoming more accepted. The nature of the discussion has changed since I started in this business. There is no longer the question of whether mental health an important factor. Now it is about how big it should be, when, and what should it look like. This is a major change. We have a legislated program on which to build. A FEMA-funded program that my office administers is in legislation. It has been accepted and paid for. We have something on which to build. So that is the good news from my perspective. The bad news from my perspective is that I am not at all sure that the models we have used in our existing program are the models that we should use in terrorist events, and in particular, in bioterrorism events.

I have many questions about what we can draw from the existing model that is transferable. One of the areas in which you folks can help is to determine what can be taken from the model to this kind of situation and what areas are significantly different and we need to use something different. The real bad news for me is the resources that we have been able to gather for this. I began to get very worried about this after Oklahoma City. Those of you who know me, know that I was intimately involved in that from early on and have been for the last five years. I think the mental health sequelae are different there. That was a different kind of event. And I keep thinking, how would it have been even more different, more terrifying, if there had been a biological agent? That is what keeps me awake at night. So without any external

support about four years ago, I started advocating for hiring somebody in the office to address this issue, because I thought it was different enough. That is when we hired Robert DeMartino. We have a huge number of responsibilities in my office, and very limited staff. For me to hire a person to work half time on this was a significant commitment in our bureaucracy. And part of the job that I asked Robert to do, is to try to gather more resources for this. We have been absolutely unsuccessful in that. We have enjoyed very good support within the Department, within our agency, but somehow we are not getting the message across to the highest levels of the administration. We were involved with the TOPOFF exercise. The Denver scenario was a biological one. Scott came to me yesterday, and said, we have to do something. We do not have a capacity for mental health. He said, when he was asking what they were going to do for mental health, they said, "I'm going to call Brian Flynn." That is what has scared me. We are unprepared for a bioterrorism incident. When something happens, myself and several others in this room are going to be turned to and said, "Okay, do something." I am deathly afraid that we will not know what to do or have the resources to do it. That is the desperation that I feel at this point. We have a growing recognition of the differences of these kinds of events and, the importance of them. But somehow we have not been able to translate that into building the field that I think we need to build.

MR. JARBOE: Have you or any of your colleagues, made any efforts to meet with local emergency responders to express your concern and the importance of what you do? I attend a lot of meetings. In the last several years, it seems like some people in the federal government do listen to first responders more so than their colleagues. I know this from working with SEBCOM, SBCCOM and all their efforts. It is very important that there be more communications between people such as you and people such as ourselves so that we can better articulate the concerns. It is a major problem. We are not prepared for bioterrorism mentally. We do need some help. But in order for us to help you, we need to communicate more -- for you to tell us how you can help us.

DR. FLYNN: I appreciate that. My response is that we do what we can. You know, I and Robert speak to as many groups as will listen and that we can find the time for. Building support for this from the local level is extraordinarily important. Part of the frustration that I've found in dealing with first responders over the years is that when I've talked about the range of needs, what I often get back is "We have CISM's so we don't need any of the rest of that." It is slowly changing, but, one of my concerns is the popularity of the debriefing model. The perception that if we do debriefing, that is all we need. I have been trying to fight that.

We have an enormously diverse group here at this meeting. One of the things that you can do is to help keep this issue on the screen. You need to keep talking about this issue and keep raising it in whatever forums you have so that it does stay on people's screens. In the recommendations that come out of this conference it is important that you provide us some guidance. There are a couple of issues that Robert brought up over the time that we have debated. Maybe we don't have consensus on them such as panic. We know something about panic in other contexts. Do those rules apply? Do we believe they will apply in this situation, or do we believe these kinds of events are

significantly different enough that we need to look at it differently. What about long term effects when you do not have a symbol and when you do not have an event or a visible focus? How will that make it different? That will be helpful to the extent you can give some guidance that will be reflected in programs and policies. However, if we just do not know the answers to these questions then that will help shape the research agenda. We must be clear if we cannot come to consensus.

The issues seem to fall into three categories. Bob got me thinking this way when he said late in the first day that one of the issues is to better understand what we are preparing for. We have fine tuned that question. We can now be more articulate about the kinds of events in terms of probability and scope. We can lay out a menu and say, we are going to do all of these or some of these. That is very helpful. Two other questions that have come up for me. Firstly, "Who should we prepare?" There has been a great deal of talk about the general public. This is an interesting and important question. The preparation of the general public is probably a second order consideration when you look at the need to prepare the health community, the first responder community and the mental health community. We cannot be all things to all people. Perhaps the general public must come lower on the priority list. Is that the consensus of the group, or not? The last question is, "What is the content of this preparation?" That is where we are shakiest. The recommendations can either point to a direction for that content or be clear what we do not know. That will help us. What has my office said about these things, and what are the messages that we are trying to get across?

Firstly, what I have already said is that we are unprepared for bioterrorism. That ought to scare everybody. The second is that the behavioral health consequences of a bioterrorist event are very likely to be the most significant, the most long term and the most expensive. In the non-biological context this has been borne out by Oklahoma City. We need to think more broadly about the kind of contributions that behavioral health can make. It is not only in having mental health professionals on the scene or treating victims. It is very tough from a psychological perspective, to really be planning over a long period of time, immersed in these topics, that are asking us to consider the most horrible things that we have ever considered.

We have a major role to play in the preparedness. There are certain things that we should be doing, can be doing in the immediate crisis phase. And there are things that we can do and should do in the consequence management phase. We have made a number of recommendations to FEMA about how to change or modify the crisis counseling program for terrorist events. We have not addressed that issue, with particular respect to bioterrorism. If there are recommendations that can come out of this group, that would be very helpful.

While there are a number of smaller recommendations the basic recommendations from our office is that the programs need to be longer. Typically, the counseling programs run for about a year after natural disasters. We are now saying we should plan upfront for a several year effort rather than have somebody have to justify that. Second, that we need more mental health professionals in direct service capacities in

these programs. Many of the disaster mental health programs for natural disasters rely heavily, and I believe justifiably, on trained non-professionals who are supported and supervised by mental health professionals. On the basis of what we have seen in Oklahoma City this needs to change. And, third, we need to develop a different pay structure because the existing program does not pay for treatment. It pays for informal crisis counseling. We have seen in Oklahoma City that there are a much larger number of people who need professional treatment for a longer period of time. We have been lucky in that the needs in Oklahoma City have largely been picked up by the Red Cross. It was very fortunate that there were many contributions to Oklahoma City. There is a good relationship on the local level and the national level between the Red Cross and the mental health people. The Red Cross has funded many of the long term mental health needs. The next time we cannot count on that. We are recommending to FEMA that they need to develop a mechanism to fund treatment over a longer term program. Perhaps not as part of the crisis counseling program. It is important to recognize the need. We must, particularly in the crisis phase, reinforce the notion that we need to use what is already there rather than developing new resources.

The NDMS partners include DOD and VA. We had a scary incident at the NATO 50 experience here in Washington a little over a year ago. Many of you may have been involved. All the world leaders arrived at one time. It was perceived as a high probability event for terrorism. There was a huge amount of planning that went on for the event. There was a health command center in the Humphrey Building. I and my staff were asked to staff that to respond to any of the mental health consequences that might emerge. In preparation for that, I said, of course we will do that. What would be very helpful to me is to know through the NDMS system what resources we might have available if something happens. Who can we call on, and what kind of numbers, and what kind of time? I said I'd particularly like to know about the VA resources and the DOD resources. The answer I got, not from DOD or VA but from the leadership was silence for a long time. When I pushed that, they said, "They will all be at the table, so when something happens, you tell us what the need is and we will survey and see what the resources are." It showed me in a real life situation, that those of us who are going to be looked to do not know what the resources are. There are many resources there, but I do not know of what magnitude they are or how quickly they can deploy. The important question is how are we helping people like Joe Barbera? How are we helping when he gets 1,000 people showing up at his emergency room that think they have been exposed to something and 10% have. That is a mental health consequence. What are we doing to support his staff in terms of numbers of people and tools? I do not think we have done much and that concerns me. We need to build a whole field here. There are some things we can learn from what we have done historically, however, this is different particularly in the interaction of public health, mental health and medicine. We need to build ways of working together that do not exist at this point. Those are some of the things that this group can be helpful in: either by providing some guidance or saying that we just don't know. But, again, I will end where I started with. This conference has done for me already is really helped sharpen my thinking about the arguments. We will go back to OMB and to the Department. The discussion has helped crystallize what some of those arguments ought to be, so it has been helpful already.

DR. MARLOWE: Two things struck me as Brian was talking. One was the critical role of the first echelon persons and the immediate medical follow up. We are dealing with two phenomena. One is the provision of long term treatment. But also what we are talking about is the re-birth, if you will -- the resurrection of social and community psychiatry, or the ways in which the initial care providers can provide the structure of predictability, of order, of things being in hand. The initial mental health push, going back to things Lars was talking about, is to build on resilience, not along the quest for pathology. There is a lesson to be learned that goes back many, many years to the older social psychiatric model of a comprehensible universe for the people who are survivors of a disaster event. Perhaps this has been forgotten by the people in OMB and other places where people may not be old enough to remember it.

DR. RADKE: From a pragmatic point of view, the complicated nature of terrorism and its sequelae make me think that the community needs to have a simple approach. A generic approach that is flexible and user friendly. One that is applicable to the diverse events that terrorist events are, so that when the community is responding, the community is trying to organize itself, trying to get a balance so it can react, so it has something in hand that is understandable and usable, rather than theoretical. A lengthy manual that does not make sense because it cannot be read in its entirety is not helpful. It needs to be a user friendly document that is generic, flexible and applicable.

DR. WEISAETH: I agree with you, Brian. It is limited what we can do with regard to the gene population. However, we can recommend educating people again and again on the somatic manifestations of anxiety. That way we can decrease the panic disorder or this tendency of somatization. It will also prepare for chemical terrorism. We do not even need to mention that this is our concern. But it is amazing how little even well educated people know about how anxiety manifests itself. One of the limitations in our discussion is the lack of research. The few cases we have have not been well researched. Past epidemics offer important research possibilities to extend our knowledge. We cannot simulate Anthrax or smallpox or -- but, we can summarize the literature on past events.

DR. URSANO: Some of that has been simulated a long time ago.

DR. WEISAETH: Yes, in the fifties.

DR. URSANO: I am not sure that that literature has been reviewed.

DR. WEISAETH: We should update ourselves on what do we know about the psychosocial and behavioral responses to epidemics.

DR. HOLLOWAY: We need to realize that we are in a rapidly evolving world. Infrastructure changes and so will responses. I agree with Alan's point about simplicity. First responders, rather then professionals, are the people who will be on ground at a given place for the disaster. They have a critical pre-disaster role in terms of enhancing useful behaviors. When I used the term "telemedicine" before, I presumed it would be telemedicine on the Internet. At NASA we have already gone to the Internet as our real

source of telemedicine. It is the cheap way to go. The group at Jet Propulsion Laboratory demonstrated that. We had a conference where we demonstrated that to Congress well over five years ago.

But there is another critical role in this preparatory phase. We were approached in NASA by PAHO to provide them a very small grant, $50,000, to establish satellite communication by which they would be able to maintain an inventory of all goods supplied, or stored, in Caribbean countries for responding to major natural and manmade disasters. For the first time then, a country like Honduras would know whether a country like Panama next door, or Jamaica might have resources. This has now been exercised and worked. Now who was the $50,000 for? And what was the big time telecommunications for? It was not because we thought that you could transfer data better by satellite communications. It was that once we had the NASA label, once we had those phones established, we had a reason to have a face to face meeting of the people who would have to play together. It was really to make sure they got introduced and built a system together during peace time so that they would be prepared to build that system together during disasters. It was not a question of satellites. Satellites were just a paperweight, if you do not mind weightless things being paperweights in the overall operation. My reason for using this example in this setting relates to Lars' comment about establishing a research community. It needs to be a continuous dialogue that is arranged to occur between communities that can support each other. That is, those that are nearby, and in which there is a responsibility for this kind of national inventory system of emergency. In the acute event it is important to know about the resources that can come from a distance.

I would like to make a final comment about the availability of resources from DOD. Dave Benedek and I have recently completed a paper for the psychiatric journal in which we looked at the overall availability of various DOD resources and how they were prepared to respond. The good news is that if you want debriefers that is what they are trained in. They are not trained in what the overall habits of local practice is. There is no training with regard to whether and how they would collaborate with people at the local level, or how long they would stay. You have on the other side an unexercised system that is very enthusiastic about helping out. But if you ask whether they have been prepared to help out in that circumstance you will find that they tend not to know the backgrounds of social psychiatry mentioned by Dr. Marlowe that might be applicable in this disaster setting. That begins to describe a goal that we might be pursuing in this regard.

DR. URSANO: For example, none of our mental health teams are presently trained in how to advise people on communicating risk, advising physicians about that, let alone community leaders.

DR. HOLLOWAY: Yes and they probably have not thought through the issue about who needs to be referred for treatment and who needs to be referred in to a more counseling intervention, so they are not trapping people in becoming chronically ill.

DR. SHAW: It might be helpful to think of three levels of intervention conceptually. The initial level of intervention is, what do we do in an anticipatory, proactive way to reduce panic and mass hysteria? This is probably the number one critical issue. Secondly, how do we intervene at the acute stage when individuals present with various psychological manifestations of illness? How can we shape expectancy at that acute intervention to result in a more healthy response? The third conceptual intervention level is what do we do with the lingering effects of the psychosocial adversity in the aftermath?

DR. URSANO: As Jon mentioned, one of our issues is what is the phase and what is the time? We certainly have pre, during, post, or other. We have talked about the groups that we are going to deal with and the target or the goal of our intervention.

DR. BROMET: Portraying this as an epidemiologist, it might be an oversimplification, but in many ways it is a two by two situation, like a two by two table where you have bioterrorism and terrorism. They are really two separate things to consider for the columns. And then you have the people who are directly impacted, both victims and responders, and people who are indirectly impacted, which is along this side here. If you think of that two by two situation, what do we know about each of those cells. I am not sure we know a whole lot. We have the directly affected, be they victims or responders. Then we have an enormous community of people who are indirectly affected. I don't know the Oklahoma City literature. I do not know how much work there was with the indirectly affected. I know there is quite a bit with the directly affected. But in terms of quelling panic and thinking about designing intervention programs that deal with not just the outcomes, but the risk factors for those outcomes which is what those intervention programs ought best be geared towards we need to know about the larger group.

DR. URSANO: Evelyn, this reminds me of another two by two. I was impressed with your rapid thinking when you were presenting and talking with Tim and Jon. This is very important for us to keep in mind as we discuss the question, "Do you think about bioterrorism?", and then "How often?" Those are very interesting and complementary survey questions. Perhaps we do not ask this often enough to get a handle on, both what type of problems we are dealing with and how they are seen by the public. Perhaps the antecedent to the first question should be "Do you know what bioterrorism is?"

DR. MARLOWE: There is a distinction with the explosive or gun based terrorist act. Those who are not physically affected know that they were not physically affected. In the bioterrorist or chemical act, people who were not physically affected do not know that they were not physically affected. And this provides you with a very different kind of population in terms of apprehension, anxiety, fear; not only the grief responses of the people who were affected. This is a very important distinction for ways of organizing. By the way, I don't think these are potentially low probability events. As a contributor to the Southern Poverty Law Center, I have a very good sense of the frequency of terrorism in this country.

DR. URSANO: The knowledge of safe versus at risk is an important distinction and a major bioterrorism issue.

DR. ENGEL: Another heuristic is the visual image of a series of concentric circles that define a geographic distance from ground zero with the circles representing movement over time. It gets at the issue of indirect group versus direct involvement. Each of those groups are going to have a different natural history and may require somewhat different responses.

DR. URSANO: Group by exposure across time.

DR. ENGEL: Correct.

DR. WEISAETH: We need to think about what kind of situations we can learn from that we can apply here as long as we do not have cases. The first phase of a bioterrorist attack might well appear to be an ordinary epidemic because no one will know whether this is manmade or a natural epidemic. Our generation in the western world is not very familiar with the psychology of epidemics as were the past generations. I think we should take a new interest in that. The first responders - I am sure we can research them by creating scenarios where we have people in ordinary exercises, playing, for example, an anxiety response from an early symptomatic case of an infected person.

DR. URSANO: We have what I would call moderate, others might call minimal, empirical research on first responders. There is a great deal of descriptive research also, but not much systematic study of first responders. We also need to comment about mental health support services for first responders. I do not know who would fund that. There are many questions that come with that. What if there is a bioterrorism attack here in Washington? Brian, is your office going to provide special services, special funding for the first responder mental health? Something other than identification of cases? It is a question for us to think about rather than respond to. Has someone systematically gone through and looked at DOD's pre-1970 studies where there were releases of non-toxic bacteria? Issues of how people might respond to epidemics can contribute to our understanding of how communities will respond.

DR. HOLLOWAY: Yes. If somebody is here from Fort Detrick they can correct me. There are three or four classes of studies. I have previously gone through that literature but there is nothing published that even reviews these studies. One type of study is simulant studies done in cities. The cities were largely unaware that they were done. That is, no one responds in any of those cases. There are experiments that were done in volunteers. There is a considerable documentation in some of those experiments of behavioral and psychosocial effects of particularly disabling agents, things like sandfly fever and other agents that have been utilized as disabling agents because, of course none of these studies were done with deadly agents. And there is some literature that is now emerging that gives descriptions of the behavioral responses in the Japanese program. These are from Japanese sources and from other sources.

DR. MARLOWE: The important thing is that these were all within controlled environments. Not the natural setting.

DR. HOLLOWAY: Yes, they are simulation studies.

DR. MARLOWE: We talk more about panic. I am unsure if anyone has done an analysis of both terrorist and natural phenomena looking at whether there was panic, and if so, what was it attributable to? What were the social and ecological conditions in which it took place? We know far more about military contexts like the Civil War than we do this kind of context.

DR. HOLLOWAY: The only source on that is Quarantelli's studies at his disaster center. He did examine panic and generally found that it was an extremely rare phenomenon.

DR. NORRIS: I would like to suggest a model. John Parachini and I were talking and I thought the book that you all contributed chapters to was a wonderful series of case studies of events that have occurred, but to my knowledge, the mental health side of that equation has not been done. In addition to outbreaks, epidemics, we also can look at hazmat exercises or real events. There are analogous situations that will help us look at some aspects of this. Although I am not sure how much of the historical information will apply, as you had pointed, Dave, in this new instantaneous communication age. In terms of the circles, we need to think of circles throughout the U.S. and probably the world when something happens, because that ambiguous aspect of things, as well as copycats. A high level of anticipatory stress will be out there. I think that changes the dynamics.

MR. PARACHINI: I found your data very interesting looking at an actual incident. All of our work is on the front end. Actually looking at cases we have found that we get an understanding of how the perpetrators think and act. What we do is totally different than what other people are talking about. It puts us in somewhat of an uncomfortable position because we are articulating a view that is not shared by the current dialogue. But at least it is rooted in evidence from the past. We think we see a difference between those perpetrators who conduct mass casualty attacks with explosives versus those perpetrators who conduct mass casualties with unconventional weapons. That begins to have important ramifications for who you look for, what you look for and what the consequences might be. I infer from the discussion I've heard here that the same might be true on the back end.

Lars' point about the human malicious component has a different effect on victims was extremely insightful, to me. In the new terrorism, many of the events are never claimed anymore. That is one of the features of the new terrorism. So if it is human malicious activity and it is not clear? At least with an explosion, we have some sense, although TWA 800 was a question mark for a while. But with a biological event, such as the event in the mid-1980's, it was not recognized for over a year. What the impact on people was about that and how you treat those sort of people on the back end, I would be fascinated to know.

The only way to figure that out is to actually look at some of the cases that there are and do the comparative case study work on the back end. It might reveal some very interesting things that are very useful, that at least provide a baseline. It doesn't necessarily tell you what will happen in the future ten years down the line. That will be quite a different place But at least gives a common baseline to start from.

DR. URSANO: The issue of the not claimed events, is a dimension that has not, to my knowledge, been included in psychosocial and behavioral studies. It clearly has both legal issues, as well as mental health consequences for those involved. To refer back to Josh Lederberg's comments yesterday about the culture that we create. The culture is built by our laws. The laws that we have create a culture in which certain events are allowed or not allowed. This particular type of event - of an unclaimed event - has particular effects.

DR. RADKE: I am thinking of how to extrapolate the simulant data to real experiences. We know that in vitro efficacy cause and effect studies are totally different than what we have experienced in invivo effectiveness studies. There was an event that Cameron Ritchie reported when she was at Fort Bragg where there was not a terrorist involved. On an extremely hot day in July a group of soldiers went out to spray the latrines and were cautioned that they might be exposed to DEET and were told what the symptoms were. One of the soldiers became overheated and began to respond, e.g., hyperventilated, lightheadedness, etc. He injected himself with atropine thinking he had been exposed to a nerve agent. Then the entire group felt they were exposed and all came in to the emergency room. It was a phenomenal event. I remember Cam thinking that she did not know what was going on. She was called down because they were uncertain that there was any exposure, but there was so much hysteria. That was without a terrorist event. It was a misperception of symptomatology in a group of young soldiers who did not understand that they were not exposed and that they could have a natural response to the conditions in which they were doing their work.

DR. ENGEL: My comment pertains to research. There is a great deal of historic knowledge around the room. We have to acknowledge that the larger medical response community isn't going to see that as very compelling research. And I think we should not accept it as very compelling research. I think we should learn from it. We should pay attention to it. But I think it is important that in any report that comes out we acknowledge upfront, for a variety of different reasons, that there is a paucity of systematic evidence of how to intervene in situations like this. Another reason to do that is from Brian Flynn's perspective. Although in a group like this we are groping for answers, we are trying to do the pragmatic thing. Brian is trying to gain resources to do the systematic research. We should not pretend that there is compelling evidence if there is not. We should just state right out that we need intervention studies, using analogous situations that will probably come to mind for most all of us, military, firefighting, police, etc. Situations where we can do randomized, controlled trials of different types of interventions and see how it works.

DR. CLIZBE: One recommendation I have builds on what you are saying. There is a need to develop research priorities. We can not do it all. What do we need to know first? The good news is that the American Red Cross is looking very seriously at going to donors to get funding for research in this area. But we do not know for certain what we should say are the most important research questions. To add simply as an example, I do not know maybe everybody else in the room does, is there some guidance for how long the psychological intervention is appropriate? One concern I have about Oklahoma City is whether it is appropriate for us to continue to fund mental health efforts for 10 years, or is there a point at which you stop? One recommendation is to establish research priorities and this group has the ability to do it.

DR. URSANO: That emphasizes the need for partnerships between the Red Cross and NIMH, SAMSHA, VA and DOD.

DR. NORWOOD: And Internationally. In Russia they have these incidents happening all the time.

DR. CLIZBE: There are some great resources that Lars is acquainted with that we may not be aware of. A second recommendation is to focus on public education. This has profound implications for the American Red Cross. I have heard the question about what and when we should communicate to the public. We need to know how far in advance to communicate or whether we should communicate at the time of the event How should we communicate with the public? Do we use the Internet? Do we use emergency radio? Do we give handouts to the emergency responders to hand out to the public? And what should we communicate? That has some very practical implications. I am prepared for the group to say, "Red Cross, forget about writing community disaster education information we do not want to touch that." That recommendation is fine, but we need to know if we should be working on this. If the answer is yes, then we need to know how, when, to whom and in what form we should communicate.

DR. URSANO: We can also ask by whom should communication be made?

DR. CLIZBE: Yes, by whom should communication be made is very important. It could be built into my "how". A third recommendation is the question of what kind of training should be provided to the non-emergency support responders, like Red Cross people. We have a grant to build a training center in Arkansas and this is being done. It is the Clara Barton Training Center located on a military installation to train Red Cross people. What are we supposed to train them in? What should be the content? I would put a higher priority on training emergency responders. We need to know what kind of training is appropriate for both mental health and non-mental health people like our Red Cross cowboys who are going to be tearing out to help somebody. What do we train them in? And what form of training? What do we train them not to do? For example, do we train them, "Do not put on a protective suit" or "I do not want you to go someplace where you would need a protective suit." These are questions that we need answered because we do not want to be in the way of the emergency responders. You guys have got your thing to do. The last thing you need is a bunch of Red Cross people falling all over you. But, on the other hand you do need some non-emergency

responders who are available to support you. We need guidance of what kind of training and model we ought to use for that.

DR. MARLOWE: The question is what can we learn, if anything, from the myriad of micro and mini episodes of Anthrax, Legionnaire's disease, etc. Those of you who subscribe to Promed know these are happening throughout the world and in a number of places in this country continuously. Can we learn anything about the effects on the immediate community, on the small group, etc.? Are these of value to study when we're dealing with perhaps a population of 100 or 150 who may have been exposed? Are there things that we might ultimately be able to generalize from?

DR. SHAW: I would like to get back to education and training. An effort has to be made to educate the civil leaders and not only the first level responders. One thing we have found after Hurricane Andrew is that you have to train the mental health professionals. Lastly are the support systems available. They also need to have some training.

DR. URSANO: What do you mean by support?

DR. SHAW: Backup components, primary care physicians, ancillary health workers, school teachers and counselors. I personally believe that ultimately the school system is a very important echelon for providing mental health services to individual sub-acute problems, particularly children, families. It provides a conduit for triage and identifying kids and families at risk. In many ways the school is an important organizational structure for a community, for families and for children. It becomes a very good conduit. I often think that schools are the institutions through which, by which, mental health services are really delivered to the community, particularly children and families. It really is a great site for triage and identification. Therefore, it is important to define further services that are needed. After Hurricane Andrew we divided up all the schools into catchment areas and had crisis intervention teams that were assigned to specific schools. We had both intrinsic and extrinsic crisis intervention teams. Some teams were assigned to specific schools. But we also had mobile crisis intervention teams that went to areas or school sites where they were having unusually acute problems. It is a wonderful backup service for delivery of services.

DR. NORWOOD: I was thinking along the same lines about not only the schools, but also the other naturally occurring elements of the community. We need to be cautious about devising a plan that relies too much on outsiders. If we can respond to the event adequately, deal with the stressors present, we should not have such a high psychiatric mortality rate that we need massive amounts of psychotherapists brought into the area. I was thinking about our studies where we've measured the help people have received, we have differentiated between help from your family, help from friends, co-workers, neighbors, and so forth. And then help from people outside their immediate circles. And almost invariably, it is the help from family and help from friends that buffers the effects of the stressor. Those are the resources that affect mental health. The outsiders, often do not help people in the way I think we want it to. We need to do a better job of thinking of ourselves as consultants to help the families and

the communities to help themselves and to not kind of go in with our professional hats and treat them.

DR. URSANO: What is needed is a family support plan and friends support plans – not just to give them support but a plan where they are the supporters.

DR. NORWOOD: Our role is to help them do this. We are consultants, not the agents.

DR. WEISAETH: One group of people who have been interested in training for bioterrorism, outside of the military and the police have been industrial leaders. The last five to ten years I have been involved with about 20 exercises as a part of their crisis management training. Today this is expected training for leaders. One of the scenarios that I had to train on when they established their crisis management groups, have been, for example, Stockholm or Oslo, and they have two unexplained deaths from an unknown infectious disease. It was one of the possibilities could be terrorism more than 1,000 people have already gone to work, and they are told that it will take 36 hours before we know what, the causal agent is. Then we have created a situation where some of them want to go home. Very few stay at work. This is strictly a training for leaders. This has been a learning situation for us. You can have all kinds of fantasies about what this might be. In the end it turns out it is Japanese encephalitis. For these people, because they have to stop an industry, so the consequences of an unknown infectious illness is severe, they have a high motivation for training.

DR. URSANO: Excellent comment. To my knowledge in Washington, D.C. there is no central spot where one would know if three persons on the Metro got sick: an employee on the Red line, and another employee on the Orange line, and another employee who is on the Green line got sick. There is no spot in which all that information is collected. Medical monitoring is a substantial issue, both for industrial leaders to learn more about as well as many other agencies. It seems to me, Farris Tuma ought to get with Evelyn Bromet and Fran Norris and be looking at the question of West Nile virus and some of the responses to West Nile virus or the potential for West Nile virus increasing. How New York, in fact, might be responding to that as one of these issues of outbreaks and how we respond.

DR. HOLLOWAY: I just want to switch the obvious. The obvious is obvious. We ought to make a recommendation that a surge capacity be provided and followed on. I've been told it is not there. It ought to be there.

DR. URSANO: You are saying we need it?

DR. HOLLOWAY: We need it.

DR. URSANO: For mental health services?

DR. HOLLOWAY: Yes, and there needs to be a second part of the recommendation that says that as it is utilized, its actions need to be evaluated. I want

to introduce a little disagreement. I think it depends a great deal on whether we define things as failure if we use professionals for intervention or not. The most likely effect of professionals is stigmatization and more pathology. That is a very old history of professional activities. They frequently do more harm than good. Then they institute treatment for the harm they have done and then make money off of both. It is, of course, industry. The real problem about support for families, comes from the overall size of the event. If we postulate a very large event, the families themselves are destroyed. At least some of the terrorists I've talked to in the past, admittedly not using these kinds of agents, but using largely explosives, aim precisely at destroying such support systems. It is an extremely complicated issue - the use of professionals vs. paraprofessionals. The area in which I think professionals can do more good than not, to the extent that they have prepared themselves and learned the appropriate tools, is in the preparatory phase. More than that treatment phase. There is a great deal more that can be more done there in terms of good. The demonstration that psychotherapy works is very doubtful. Most of the psychopharmologic interventions of psychiatrists are questionable, and their capacity to do follow up studies is, at best, spotty. We have already had questions about this. How should we train the non-emergency personnel? How should we plan for the overall response? What are the overall resources that will cause the least harm? How do you avoid stigmatization? The professionals ought to be involved in how we prevent stigmatization from occurring at the front end. After stigmatization has occurred, you're already in the soup.

DR. URSANO: One of the things you are saying is that the communication of, "Your child has smallpox." has a tremendous effect on how the family and the community will respond to that child and that family.

DR. HOLLOWAY: The first communication is, "Your child has smallpox and by the way you're crazy." That is really not a very good outcome. And, of course, one of the real problems here is the problem that Lars talks about. We say that it is really striking that all of these very intelligent people out there have trouble knowing about the effects of anxiety as having an effect on them. Now, having worked in the acute circumstances on numerous occasions, let me tell you, one group that has a hard job recognizing the effects of acute, severe anxiety and fear is psychiatrists. Both as they are experiencing anxiety, and as they are experiencing threat. "This is something that happens to others." It is not happening to them. This is all part of how we prepare and train people to operate in those circumstances. And training, of course, thinks how do we communicate your child has smallpox. What is the follow on to that? In all of these areas I think professionals have a very large area of activity. But once we get to the treatment side of things, we have got problems.

DR. URSANO: Following on Lars' comment the issue of training professionals and the question of somatic symptoms of anxiety may be a particularly important theory of bioterrorism. I also want to hold onto Evelyn's comment much earlier for which we now have a research base. The entire issue of training professionals and how you attribute the cause of what is happening is clearly very critical. So merely training professionals to be silent about the cause, or at least introduce some discussion rather than say, "This is due to the terrorist event." "This is due to the West Nile virus

presently breaking out in New York City, and we're in Georgia, so the odds of that may not be too high, but I think that is what it is about. So let us just wait and see." It may not be a great idea. What do we say? Evelyn? Attribution?

DR. HOLLOWAY: Attribution.

DR. URSANO: Attribution of cause of symptoms.

DR. SHAW: I can give you an example of how we stigmatized people in Hurricane Andrew and very quickly had to correct it. We began to distribute "Facts for Families" from the academy. It defined post-traumatic stress disorder as a mental disorder. When we disseminated the information, families very quickly became very upset. We basically had to re-write our information sheet and called it a normal psychological response to a stressor. We really have to be careful even how we package information. Psychiatrists tend to pathologize.

DR. URSANO: This is the issue. Being cautious in the distribution of symptom information. Clearly there is lots of data that this is a two edged sword and will be even more so when we have complex symptoms of biological events in which the symptoms are subtle for the best professionals to identify. Or else they're so overblown that the question of stigmatization becomes high.

8

Conclusions & Recommendations

Moderator: Robert J. Ursano

I will review some of the items that have been discussed. Each of these, has a management component, an education component, a research component and a service delivery component.

- The importance of mental health needs of national leaders, as Lars has referred to, and also commercial leaders, the AT&T's of the world.

- David wanted to be sure that we did not forget clergy and churches. Robert and Brian's office are particularly sensitive to the role of ministry in these populations, both for the delivery of services and the identification of people. They are an important education target for the particular issue of bioterrorism. They are no more prepared than any of us are.

- The special role of the Internet or web based communication and information. In case of bioterrorism the number of experts are fewer. The role of the internet specifically in medical consultation for both individuals as well as community support.

- Larry, or maybe it was Josh, brought whether these should be a special T.V. channel. What is our "Connelrad" station these days? Does that still exist? Is anyone old enough to remember that? This is your "Commercial" station. We'll now have our emergency broadcast.?" Boy. So, do we have that on T.V.? I don't know.

- We had mentioned review of responses to hoaxes. Remember, Dr. Culpepper in the beginning said there are over 220 FBI hoaxes that have occurred. In fact, what are we doing to look at acute responses to hoaxes, the way to understand? Since hoaxes are going to continue to be a problem for us, we

need the increased interaction at the national level with issues of first responders including the International Association of Emergency Managers, the International Association of Fire Chiefs, to begin both the collaboration and mutual education process. There is similar school groups and ought to get a list of those.

- Ted also reminded us of the Texas City ship explosion in 1947. There may be other such disaster events that include potential contaminations that might be worthwhile looking at.

- Jon was commenting about the need to review our lists of experts. In most of our experiences, we take our list of 50 and look at your list of 50 and their list of 50, and 40 of them are all the same. Specifically the problem comes up, for example, DOD, a bioterrorist event that is accompanied with an outbreak of war. Adios, amigo, DOD resources are not available. They are, in fact, going to be deployed for managing the issues of combat and war.

- We have some serious resource issues involved when we think through what might actually occur, both the high probability and low probability events. I don't think we have even begun to think of what those are.

- Recognizing a discrepancy, we talked about the higher federal risk probability versus local risk probability for a bioterrorist event. This creates issues of how to sustain these activities. At the federal level the probability of an event somewhere may be of some moderate level, but the probability of any given community clearly is substantially lower. This needs to be incorporated into the thinking and management.

- We spoke of education on the effect of negative consequences. Fran was particularly eloquent on commenting about the fear of crime and its impact on individuals. A very important issue, particularly following an event. Following a bioterrorist event, what will be the impact of the fear of a bioterrorist event, in particular on the elderly, and the young. And how do we manage the negative consequences of fear of terrorism pre, during and post.

- The issue of how an event would affect other areas across the nation, not only the city which is hit. I wanted to be sure we commented about law and the role of law in maintaining, as Josh commented, the culture. We did try to get a lawyer to attend, but without success.

- It would be very interesting to hear legal questions on the issues of quarantine, which, as we heard, may have a small role, and also vaccination. These raise large problems. Law is another extension of the management of behavior. That is what we are all involved in, in some way.

- Josh commented on the importance of studying, learning more about and managing inspiration. How do we provide inspiration? How do we limit inspiration? What is the inspiration to bioterrorism?

- Evelyn's, I do not think we have fully exploited studies on mothers and children. Dealing with mothers after an event, special care for mothers, special programs for mothers because their effect on children is high.

- Pam commented that children are also a route back to the family. Children are a way to educate families as well as in the other direction.

- John and Jane were very helpful in commenting about the welfare inquiry system of the Red Cross. This sounds like something we ought to know more about since many people would want to track someone in their community. This has existed within DOD for quite a while. For example, at the Red Cross you can find out what happened to an active duty member.

- Hospital disaster plans are very important for epidemics. Our hospitals in DOD have something like that. But I think that most hospitals do not. There must be plans for the management of an epidemic and the education of primary healthcare providers in differential diagnosis and recognition of anxiety symptoms. The distinction of exposure symptoms and anxiety symptoms is important for bioterrorism. This was discussed by the panel with Lars, Fran and Evelyn. This includes the issues of severity of exposure versus belief of exposure. We might be measuring the wrong thing if we enter a disaster zone and only ask, "What was the severity of exposure?" This is not the only variable. The question "What is your belief about your exposure?" is also very important. We are not prepared to assess this systematically to aid in the delivery of services or other resources.

- Protecting children from mothers' contagion, was raised by Evelyn. This is very important. It is a unique way to phrase a question for our child issues. The positive and negative effects of special programs includes stigmatization versus provision of resources and specialists. Another element that is highlighted by bioterrorism is the increased sense of vulnerability in communities and individuals.

- Scapegoating, denial, and feelings of helplessness may be particularly related to the experiences of vulnerability. A research question as well as a clinical care delivery question is whether vulnerability should be a target for pharmacological intervention, the provision of resources, or management by leaders.

- We discussed target groups. The absence of the diversity in our own group here should heighten our awareness of the diverse groups in every community.

- What are the targets for psychiatric and psychological interventions? An important one that we talked about that isn't often explicitly stated is this issue of continuity of society and community. If that is our goal, why don't we say that? It doesn't only have to do with provision of mental health services. It has to do with some of these events, about how do we sustain the society's present.

- Increasing protective behaviors and the effects on individuals and communities before, during and after exposure is an important consideration.

- Post-event effects in communities and individuals. And that includes long term issues such as Gulf War illness as an example, has a long term effect following a potential exposure in which the belief of exposure is high. We've begun to think about Gulf War illness occurring in New York City, and dealing with a population of X million who believe they have been exposed.

- Targets of psychiatric and psychological intervention are to deter future events merely by being able to say we are able to deal with the consequences. We may or may not say that out loud but that clearly is one of the goals. By letting people know we can deal with the consequences of bioterrorism we are trying to tell people, "do not do it". Someone needs to say that out loud, probably a Brian or Robert, not necessarily someone at the provider level.

- The role of psychiatric interventions to mobilize rational responses of communities and individuals and how to provide for actualizing rational responses is important.

DR. URSANO: Now we will go around the table and each person can comment.

DR. WEISAETH: I have to remind myself that the family is always the unit when we think in terms of disasters. Split families, separated families, or exposed part families, etc. We could study the contagious versus the non-contagious infections and how that affects social support. We could actually do this on an everyday basis. We learned yesterday that there are certain types of agents that can create a contagious epidemic. It is an interpersonal threat and a completely different scenario from a non-contagious event.

MR. CORLESS: We have talked about developing the informal support mechanisms through families and basically through the public in general. We discussed this in connection with the pre-terrorism phase. We need to keep in mind that we attempted to do that back in the Cold War and developed a national paranoia associated with nuclear warfare - also a weapon of mass destruction. We must be extremely careful tying the pre-information we put out to the public to biological terrorism. I am concerned it could backfire on us.

DR. TINKER: As a communications person, I'm going to give you my sound bytes on this issue. I think we cannot forget the power of the sound byte, and I think John was right. He and Helen said, what is the who, what, why, when, where and how of this issue. And if we had the time, what I would ask everybody to do is write on a piece of paper one sentence. What is the one message that you would want to convey about this issue? The reality is that we live in the age of the sound byte. And sound byte on average media spot now is no longer than eight seconds. So what is it that you would want to say in eight seconds? And we span the information landscape everywhere from this sound byte to the depth of coverage. So that is the first point, and actually building on David's comment about compression. Compression in our information, compression in our thinking. Number two, what is the role of the media in shaping the public's perception about this issue for reinforcing the message as Brian was talking about. What type of support can we give them in terms of providing them with backgrounders, Q and A's, press kits, media kits. How can we put the science and the research in practice into a manageable, digestible format to where they can use it and they can get it out there very quickly. Number three, are we asking ourselves the best questions. And, as a communications person, I would want to know, what do we know about this issue? What is it that we don't know about this issue? What is it that we still need and want to know about this issue? And what is it that we may never know about this issue? And taking those four questions and somehow translating those into messages to the public. And do we have a core set of messages about this issue? Do we have a core set of three to five key messages for this issue? A couple of other points. Although my expertise in the area of bioterrorism is extremely limited my sense is that as a stand alone issue it is far less cogent then if it was actually linked to other social and public policy issues. This is a positioning issue, a framing issue, and a linking issue. How can we take this issue and link it to other social and public policy issues to where we can increase its visibility and saliency. Because as a stand alone issue it is not getting a great deal of air time. But there are ways, through front door strategies and back door strategies, of linking it to other issues. How do we put a human face on this issue? How do we help people personalize the risk? How would this impact my family, my friends, my colleagues?

There needs to be additional audience analysis as well as segmentation. We have been speaking about responders and providers. I think for the folks sitting in this room we have a very clear idea about what we know, but do we know how much the first responder knows? Do we know how much the healthcare provider knows? Do we know how much the public knows, and I really do not think we do. And just through some focus group research we could very quickly excavate that type of information and what people are thinking and feeling and wanting to do about the issue. The very important point that was made by both Ted and Larry, how could we use a virtual enterprise model to bring together people from around the country for resource sharing, for information sharing? And one of the terms that we have used is, how could we establish collaborations, either through demonstration sites or demonstration projects to where we could electronically link people around the country that either in real world situations, or even in hypothetical situations there would be an ongoing stream or dialogue of information about those issues.

MS. MONTGOMERY: It is important to build upon the interaction with school groups and organizations such as the "Core Crisis Intervention Teams", principal associations, and school system non-emergency responders on these issue. It is important to continue to develop and provide information on mental health services pre, during and post event. We should keep the information basic and simple so it is easy to understand and remember. We need to remind ourselves of mental health services available at the school and how to recognize children in trouble so we can provide psychological and counseling service. The school is important because this is where the children spend the majority of their time during the day. We need to remind ourselves about the belief that it cannot happen here. That was the thought process that went on at Columbine. The response of school systems nationwide is changing to keep pace with an ever-changing world.

DR. URSANO: Pam reminds me of another perspective to keep in mind. The child may not be the target but the child struggling with what is it like to have a sick parent during a bioterrorism event. We do not have a handout or a counseling program that deals with the children of sick parents.

DR. FLYNN: Or children with a dead parent.

MR. JARBOE: I would like to reiterate my observation that we must commit to educating the community. I know there are pros and cons to this regarding the mechanics of how to accomplish this task. I believe education is the key and there are many different ways of doing it. For example, our county is thinking about distributing a brochure to the community to address responses to chemical terrorism but without using the phrase, "chemical terrorism". It is important to mention the fact that we have a hazardous material response team in Montgomery County. We would explain that people probably have seen our trucks wash down or pick up spilled fuel or some other chemical event. We would explain that we are doing things and that people can expect to see us on occasion wearing special types of suits and rinsing down with water. We would explain that there may be times when you might be among those people needing to be rinsed down and we may ask you to remove your clothes or go into a little tent to be rinsed down and put on dry clothing so we can make sure you are alright. We are spending billions of dollars to prepare to respond to the unthinkable, but we are not giving the community an opportunity to have a say in its own destiny. That is not easy but we do it in the fire service. We certainly educate the community and tell them what they should do in the event of fire. We tell them what they can do to prevent fire. That does not always work but in some cases it does. We should have a similar mindset in educating people about what to do in the event of bioterrorism. One difference is that we do not have an extensive history of biological events in this country like we have history of fire deaths. We should go out to some of these community organizations and ask people what they think about us putting out something to their community. Or randomly sample the population and conduct interviews or distribute surveys asking people what they think about putting out information of this type. The question that always comes up in training sessions and meetings I have attended is what to do with people who might be contaminated with a chemical agent? Take them somewhere and have them remove their clothes off and shower immediately is one quick fix. However,

telling everybody to take their clothes off and get right into the shower is not going to happen. The only way to find out what would really happen is to ask people at random what they would do in this situation if asked to remove their clothes.

There is a need for more meetings like this one between people in different professions and from diverse backgrounds. We operate in our own "comfort zones", i.e., I have a certain area of expertise that you do not have and you have areas of expertise that I do not have. However, look at the expertise we could have if we combined our areas of knowledge and experience. Media is very important. About two years ago we attempted to convene a meeting with members of the media from the Washington, D.C. area to do two things. One, to give them a brief education on chemical biological agents so that when they do have a hoax they would be able to accurately inform the community about what was going on. In the B'nai B'rith incident one of the T.V. commentators said, "What is this Anthrax stuff?" If you do not know what you are talking about, do not talk about it. The problem is that the media is going to make it up if you do not give them the information. We wanted to give them information on the biological and chemical agents and show them what we have been doing in our county. Unfortunately only two or three people signed up so we canceled. I am looking at things from an emergency responders point of view because I have been to many emergencies. I have been a hazmat in this county since 1981 and in Oklahoma City. I have been involved in high rise fires and other incidents where we have found people burned to death. I have seen many things from the emergency responder perspective. But what makes it so that I can do my job is how well I prepare myself to do the job. When I became a paramedic a number of years ago I welcomed the opportunity to respond to a working code because I had the skills. I had a sense of competence and confidence to do the job. The way I fight fear is with knowledge. The more I know about a particular "enemy" and the more I can prepare for it the better I am at meeting that challenge.

DR. URSANO: Tim's comment about the history of "stand alone" versus "embedded" is very important. Perhaps we need a new model of bioterrorism that is more embedded in hazardous material responses. Then our real issue is disasters of hazardous materials. The idea of driving fire trucks or hazmat trucks through community neighborhoods is a wonderful way to increase familiarization. Our fire trucks drive through periodically checking the addresses in order to know where things are. We kind of wave and say, "hi", and get to know they are there. Wonderful idea for the hazmat issues.

MR. JARBOE: We respond to approximately 100,000 incidents a year so I think the community sees us.

DR. WISE: I am struck by how little we know, how many variables are involved, and how difficult it is to try to get a grasp on anything very concrete. It is a problem to come up with a plan when you are dealing with things you do not know much about, despite the fact that we have a group of knowledgeable people. The communications piece is obviously very important. One of the recommendations I would have for training first responders is make everyone like Ted. He is a very concrete example of

what could happen good. The issue of public education is a very important one. I think the group was getting away from it. I am concerned we devalue it because of our own fears. We have trouble handling some of our fears about what can happen. As a result we do not think the public can handle the fear they would have. We fear they are going to panic so we "dumb down" the issues for them. That is a researchable issue. How should we educate people so not to promote fear? We need to examine the issue of panic and fear. What can you do to inoculate people so that fear and panic are less likely to occur? Evelyn talked about the importance of what doctors say. Harry commented that doctors and healthcare providers can do a great deal of harm unless they are trained and educated in these situations. I harken back to an experience I had as an intern. One night when I was on call in the medicine service center I was called. A resident in charge of medicine called. His name was Sam, so they called him "emergency Sam" for a good reason. Everything he handled turned into an emergency. He said, all the interns and all the residents needed to come to the emergency room because we had two busloads of airmen basics, females who had been exposed to chlorine. It turned out that they were cleaning a shower, mixing some cleaning agents and chlorine and there had been a gas. The emergency room called all of us into this one room along with the young female airmen basics and said, "You all have been exposed to chlorine gas," and then named the one airman basic who had been admitted to an intensive care unit. He said, "she may be on a respirator soon." You could see hyperventilation begin. Suddenly two of the basic trainees fell out in the back of the room. It immobilized the hospital and we ended up admitting 90 people, nearly all young women, to the hospital that night. In retrospect there were only two people who were even in close proximity - most of the others were on another floor. What doctors say can be very important. How they handle a problem can be very important. Hopefully emergency Sams will not be on duty when bioterrorism victims because it immobilized a 1,000 bed hospital for a small gas exposure.

Triage is extremely important because the perception of illness or the fear of illness is going to present with the same symptoms as the patients who have actually been exposed. That differentiation will be very important, anything that can help the physician or the healthcare triage differentiate these is going to be critical information to have access to. Whether that be through a website or a poison control center that ER docs use all the time. That same kind of access to critical information can help them differentiate people that were truly exposed. It will be extremely important. In terms of mental health, in the general hospital setting, because these folks are likely to present at a general hospital and be admitted, it is important to remember that most mental health professionals are not comfortable in general medical settings with really medically sick folks. They often tend to see the folks as victims which may exacerbate their illness. In contrast, it is important to use the individual's strengths to help them mobilize their defenses in order to fight the event. In my 25 years of doing work with medical illnesses such as AIDS, transplants, cancers and trauma, the vast majority of patients do pretty well.

DR. ENGEL: There was once a bank robber named Willie Sutton. Willie robbed a whole bunch of banks. Finally when they caught him, they asked, "Willie, why do you rob banks for a living?" And Willie said, "Because that is where the money is." I want

to address one of my initial comments about the probability of events. Many people have commented on these comments since I originally made them. Some of you heard these comments as an argument that we do not need to do anything. That was not my message. My message is that we need to figure out where the money is, how much money there is and go there. We must determine our resources before we determine our response. Our response may be grossly unrealistic to the sort of resources that we have to bring to the response. Response dollars are using the medical analogy, in high consequence diseases, high consequence events, those that are the catastrophic consequences that we heard about. Those naturally grab people's attention and get a lot of attention. There is a great deal of dollar value in the lower consequence higher probability events where there is a public health impact. In these there is a threat of a catastrophic event that does not turn out to be nearly what people imagine that it might be such as Three Mile Island. Then the population ripple effect occurs. That is most likely what we will have to deal with. This is an important area where mental health can play a public health role. Particularly in communication where we can influence public health through communicating appropriately and structuring responses. We refer to what we communicate with words, however, we also need to think about the old adage, "Actions speak louder than words." I am reminded of when silicone implants were taken off the market even though there was no evidence that they particularly caused harm. The stakeholders out there became convinced that they were harmful and that was why they were removed from the market. We may see a similar issue with the Anthrax vaccination. So there is an opportunity for us to think about communication that occurs through policy actions.

Another area who has the incentive to respond. This again, goes back to the perceived probability that this will happen. That is where we should target our outreach efforts. The most important targets are first response people because those are the ones that perceive the probability as great enough to stay prepared. And so they are going to respond to our preparation efforts. The general population is going to yawn, because it is not a very high level perceived probability or priority. In short, in terms of response interventions, we cannot do everything. If we try everything, we will create confusion. Overrun our resources. I would urge us to focus first on things that we know will be effective, are feasible and not low. We should give those priority.

We must remember that we are not necessarily welcome people in these events. Mental health people are often seen by the general population as patronizing. We pat people on the head and say, "It is going to be all right. You're really not sick." If you are a policymaker for the general population that is not a politically very popular response. We are going to have to fight for resources. We have to figure out what statement of the problem captures people's imagination. From the general population's perspective, the most reassuring response is to put all your money into super biomedical interventions that are going to stop the biological threat.

DR. BROMET: The lecture we had Friday night was incredible. It reminded me of my professors when I was a history major in college. Dr. Smith ended by saying that he hoped we would make new mistakes and not repeat old mistakes. I am sitting here remembering that I started out in health education before I switched to epidemiology. I

cannot remember anything I learned in health education but I know we covered a great deal of this. I know that in many ways we are re-inventing what people in other fields think and talk about and what health education people do. So that was one comment I wanted to make. The other group of people who talk about this are people at NIOSH. They used to have a section that worked on hysterical epidemics. They certainly do a lot of stuff on toxicology, on toxic exposures and all the health consequences. I think we could probably learn a lot from them too. I'm sorry that they are not here.

Besides not repeating our mistakes there are some successes that have happened. We have not talked about them except to hint at them. One of the successes was what happened in Israel during the Gulf War missile crisis. People did not go bananas. It was remarkable. Yet it was an absolutely terrifying event. Hopefully they have dissected what made that a relative success from a society's point of view. Maybe we can learn something from these events. A number of years ago, NIMH developed this incredible depression awareness program where they disseminated to the general public, to general physicians and to psychiatrists, the symptoms of depression, and what is treatable and what is not. It was a relatively successful educational intervention program. Perhaps it could be a model. The issue of education is absolutely crucial.

While my talk emphasized chronic effects I think that the acute effects are even worse. The way the acute situation is handled is going to have an enormous impact. In all of the events I know about, the acute situation was handled by lies and deceit. The question is why does that happen all the time? Why is it necessary for public officials to feel like they have to be deceitful? I do not know the answer to that question. But if we are going to learn from past mistakes that is one mistake we have to try and understand because it is repeated over and over.

DR. NORRIS: I want to reiterate that I think this whole research and practitioner gap is very important. Meetings like this are very helpful. One of the reasons that always strikes me is because sometimes when I come down to the end, and I get to that implication section, I get really stuck. What does this really mean? I do not always know how to apply what I am learning to real world situations. It is harder than it seems. Sometimes when I hear what our solutions are, they sound like we could have come up with any of these solutions without any research. Okay, let us get more counselors, let us get more education, let us get more. How did research contribute to that? We need better ways of doing this.

DR. URSANO: You are highlighting that we need to more clearly identify and have research directed towards translation into practice. Rather than assuming that we make that jump.

DR. NORRIS: Absolutely. And the reverse is also true. For example, it has been said often today that education is important. Yet there are study after study after study that has shown educational interventions have very little impact. What ingredients are needed in order for them to have any impact at all. Does anyone remember radon? That is a good example because there were many educational campaigns a few years ago. Then it just died. Even in AIDS where there is a clear cut recommendation to wear

a condom. Educational campaigns are not effective unless they are combined with the concrete, "Here is how you do the behaviors," and make lists. We do a great deal of re-inventing the wheel and not using the research we have. If we can make those connections better it would help both sides.

MR. PARACHINI: I am struck on the value of doing case studies in this area. We have found that many of the case studies that we have been doing, even on events that are well known, we find all sorts of new findings. I am sure that would be true with this field and these problem. You have to keep going back and looking at the old points, because new information comes forward that changes the whole picture. As you look at this particular problem, you see a continuum of events from non-events, like West Nile virus, which rarely gets talked about as a terrorist event, to real events. We need to think about the full continuum of these events. As we think about the continuum, think about dual use actions that we can propose to address the problem. That way society gets some benefit even if the terrorist event never occurs. Society then does not spend that money, and develop those capabilities but not get any value from. If there is a way addressing those non-events or hoaxes that we can reinforce the norm that that is a bad activity and to discourage people from doing it. If indeed an event occurs, it is important to celebrate the heroes in a way that shows that we are a resilient society. We are sort of history management in a way that helps us prevent the event from ever occurring. That is the part that I work on. I am trying to see ways from this work that can help us prevent these events from ever happening.

DR. McCURRY: In preparing for the community response panel, going to a number of different community places, including some places that are not represented here, I was struck by the number of places and committees and money that is in the field of preparing for bioterrorism. And the number of invitations that I got! "Oh, you want to come to our exercise?" "Oh, mental health, you know, we'd love you on our panel." If there were money for people to be going out and doing what I was doing, and if we know enough to be able to know what to say in all these different groups, then, at least in the D.C. area, there are an inroads to a number of different things. At the conference about a month ago, on how the DOD will support civil authorities following weapons of mass destruction, was a prime example. At the conference, there were many political people, and military people but very few medical people - about three or four, none of which were mental health. They were delighted to meet someone from mental health and say, "Oh, please can you come to our thing next week."

DR. URSANO: That is a very good point. You could get a quite a bang for the buck by training and then funding in small amounts, practitioners from communities to join in this.

DR. TUMA: I want to follow up on something Brian said this morning about funding issues. I cannot lobby. But if I were not of that type, I would be encouraging people on the issue of communicating to the people who hold the purse strings. It is very important that we communicate, and involve the public health community, other professional associations and agencies to talk about what bioterrorism is. Perhaps it does have to be packaged and linked with larger social issues to get the people's ear and

attention to adequate resources for developing a national strategy, or even an international strategy in this area. The other issue on communications has to do with assuring flow of information into and out of situations. I think this is also incredibly important and something that FEMA and CMHS and some of the other federal agencies can assist with. Identifying credible sources of accurate information when there is an event, when there is a time for communication, is very important because so many well intentioned individuals want to offer assistance. There is often a lack of confidence in the information. That does not do us any good in assuring people's needs get met.

I need to speak to the research issues because I work at the National Institute of Mental Health and run a small research program focused on disaster mental health. The program has been there for quite a long time and has supported a variety of kinds of research. The agenda here is huge. I think some prioritization is critical. I would like to see some recommendations around that. There are needs, both at the basic and clinical levels. In terms of basic research we need to understand trauma, fear, emotion regulation; what goes wrong in the brain, for example. I think we can push a little bit forward and clinical research and talk about service systems research. There are needs in these areas right now that need to be addressed. There are questions about the role of preparation or preparedness and systems. There are obviously critical issues having to do with assessment and triage. These needs exist with our present models of disaster and mental health. We have a great deal of holes in this area that need to be addressed, yet alone transferred to issues of bioterrorism. The issues surrounding professional, paraprofessional family caregiving are enormous, and I think if we're talking about a national strategy, and several people have mentioned international, the discussion has to include non-traditional mental health providers and strategies for delivering care. Quite frankly, the resources are not going to be there in many communities in this country and elsewhere.

Back to the funding issue. I wanted to mention one of the programs that NIMH does have in place. It is called the RAPID Grant. It is Rapid Assessment Post Impact of Disaster. It is relatively small, both in terms of financial resources and duration. It is typically a one to two year grant, something like $50,000 in direct costs with some additional funds that can be tacked on, to look at acute responses, and initial efforts to assess and deliver treatment. The RAPID sets up strategies for collecting information which can lead to longer term studies. It has been very underused, I would think, given what we know, given the relative occurrence of different types of disasters and trauma in this country and internationally. It is difficult to do, but I would be glad to provide more information about that. The other program I want to touch on, given that several people have talked about the opportunity of learning from what is happened in the past, is the special application, which is for secondary analysis of existing data. It is quite a streamlined application that might lend itself quite well to some of the things that people have mentioned here about learning from past epidemics and outbreaks and incidents. Cases where people have tried to bring together different sources of information where we might learn something from that.

DR. RADKE: First I have a research thought. We should be thankful that there are not enough episodes or events of bioterrorism, so we do not have enough information to

understand. On the other hand, we could do a non-traditional meta analysis of the information that we do have. There are natural biological disasters like Legionella disease. There are terrorist events like Oklahoma City that we have observational studies of. If we did this non-traditional meta analysis, my assumption would be that we will understand what happens commonly in terms of mental health and behavioral health responses and what happens uniquely in the differences between a biological event and a terroristic event. That would give us some inferential ideas, even though we are sacrificing statistical analysis, give us some inferential ideas of how service delivery could be modified in the event of a biological terroristic event. We have not talked about applying the principles of a public health model to bioterrorism. Because it occurs in the public domain this is an obvious direction. We also have not talked about application of the principles of primary, secondary, and tertiary prevention. We could use that as a theoretical construct to understand the strategies we are recommending. Because of the stigma of mental health, communication of any strategy has to have four dimensions of soundness. What we communicate has to be clinically sound so that the prime, the first responders and the support responders can understand it. It has to be administratively sound because people who are going to administer or manage will have to understand what we are suggesting. It has to be politically sound because you need support. I don't care where you are, in what community, you need support of the politicians, of the elected leaders. And it has to be publicly sound because the public really has to believe, and have faith that this is not the traditional mental health, pat on the head, as Chuck was saying. Nor is it the pathologizing of the response like John was saying.

DR. FULLERTON: I have a couple thoughts which perhaps have to do with things that we cannot change. This follows what Tim was saying about what we know, what we need to know, and what will we never know. What are the things that we can change and what are the things that just represent "the nature of the beast"? For example, what is the nature of the "communication beast"? One example is that you are going to hear all sorts of different advice: "boil the water three minutes," "five minutes," "twenty minutes." The very nature of communication is that there will never be one consistent piece of advice regarding a given issue. With mass communication diversity may just be part of the nature of communication - diverse opinions, suggestions, advice and points of view about how to best get the job done. Perhaps the issue is teaching people how to deal with the diversity rather than letting the diversity affect the credibility of communications and communicators. In the example I gave above about how long to boil water a more general rule that could be taught and applied to different situations would be, "better safe than sorry". My thought when I heard the different boil times: "oh, I will boil it the longest time that the person says." In other words, how do people deal with diversity. To teach that that might be a normal response and that there is going to be diversity. I would like to raise the question about planning for people who are particularly vulnerable at the time of an incident, e.g., inpatients who are hospitalized for physical or psychiatric reasons, or people in jail who are incarcerated? Do we have plans in place for people who are not able to respond to communications?

I would like to address the issue of credibility. Evelyn's point about people believing what doctors say is very important. What are the cognitive and emotional elements involved in who is doing the communicating, how they are communicating and what language are they using to communicate important information? This has an important effect on whether or not people believe what they are being told and whether they will following the advise being given. The answer will depend, in part, on the audience. Learning more about identification may be helpful in understanding the mechanism underlying belief systems. Are people prone to believe someone who is similar to them in certain characteristics such as age, gender, race, or social position? These are the "building blocks" of identification. Is a woman likely to believe a woman doctor more than a male doctor? Is there a relationship between credibility and identification or similarity? Or is credibility build on differences between people, e.g., do people trust someone with more education then themselves or with similar education and beliefs? Understanding the mechanisms of credibility and identification are important to whether a person will believe what is being communicated and follow advise that ultimately may mean life or death in the a disaster situation.

DR. LEHMANN: In that I represent the VA, we do have a great deal of resources, education and experience that we can provide in disaster situations and we will continue to do that. I want to re-emphasize the issue that several people have mentioned about the importance of getting the information that we know, specifically the mental health impact of terrorism and bioterrorism in particular to the change agents and to the opinion agents at the local, state and national levels. We need to identify champions in all of these areas: in politics and the clergy, of all of our ethnic and racial groups, and in all of our professions. We need to emphasize as well some of the best practices that we can. Ted's program, Pamela's programs, I think are examples of that. We need to go out and preach the word to our own folks. We also need to preach the word that we need to assure that healthcare providers and mental healthcare providers deal with first responders. And we need to be clear that things like OMB's not allowing funding for the mental health aspects of healthcare responses is simply intolerable. To the degree that we say that mental healthcare is a part of healthcare, a current administration slogan, you cannot let stuff like that happen. I think the only way to change that is getting the opinion leaders to change it.

DR. HOLLOWAY: I generally agree with the general questions being raised. We need to further develop and confirm the efficacy of methods, to treat and we must validate normal responses to terrible events for patients and people who come in as casualties. It is an area where I think both studying past experience and looking at newer techniques should be brought forward. Secondly, in the area of interventions that we already favor in these areas, such as debriefing, cognitive behavioral therapy, or so-called neurolinguistic reprogramming and EMDR; in all of these techniques we need to establish efficacy and make sure the efficacy is well communicated. This will enable us to deal with current mythologies and assumptions in this area.

DR. MARLOWE: It is important to question the myths we have about how people are going to behave and what is going to happen in the event of bioterrorism. We need an inventory of cultural and social knowledge about the various ethnic and community

groups. What is the critical social "glue" at each phase of an event like this? Is there equivalently a critical psychic glue? Perhaps the social glue for the initial phase of the event will be television and neither family, friends, nor any other local institution. It will be the source of information you get. But we do not know these things. I have a comment about the funding issue. The politicians should know that they may keep you impoverished but if we have a bioterrorism event that is not met with full force they are going to pay a tremendous price because that is what the American people will expect.

DR. SHAW: When I think from a research point of view, and probably from a case history point of view, we really need to look at previous episodes of mass hysteria, contagion. What are the risks and protective factors that determine mass hysteria? It is much easier to prevent mass hysteria than to intervene once it has taken place. Secondly, I really feel that in disaster one of the tasks is to keep people out. We really have to be able to use the assets in the aftermath of the disaster in a way that can be orchestrated and utilized maximally for the local population. That means utilizing the community health clinics, the school structure, the churches. Very often, the universities can be very important in terms of orchestrating and providing education and training for local first responders. Lastly, down in Miami I felt a little bit out of the loop. I was very concerned that nobody was really addressing this problem which I had felt was a threat for some time. I am greatly relieved to see some of the good minds addressing this issue

DR. FLYNN: There are three very brief things I wanted to add to the list here. I would like us to fine tune this business of hoaxes a little bit. The probability of anyone of us in this room, most of us here being exposed to an event that turns out to be a hoax is very small. The probability of that happening more than once is almost non-existent, but that is very different from first responders. They have to go and respond repeatedly to this, so maybe when we look at hoaxes, we might want to look at differential effects based on an exposure, particularly of first responders. Second, as we move forward with this, I'd like us to consider two additional partners that haven't been here today. One is the Office for Victims of Crime and the Justice Department. They have terrorist events or criminal events, and they have some legislative financial responsibilities for caring for victims, so they're very much a part of this picture. And also the Office of Safe and Drug-Free Schools programs. I'm involved with them on a regular basis with our youth violence activities, and they certainly are key players in what happens with critical incidents in schools. We have talked far more about federal issues and local issues than we have state issues, and we need to make sure that in whatever happens, that states are full partners. The last time I saw Alan was when Robert and I gave a presentation to the commissioners about bioterrorism and scared the hell out of them. But then we were not able to follow up with much. Many of the resources that we had hoped to get in the budget that got zeroed out were to assist the states

DR. DeMARTINO: I want to outline what I think are the most serious public health, psychosocial and behavioral planning issues with which we are faced in this nation. Number one, the prospect of mass behavioral responses with an actual or highly credible threat of bioweapon use such as mass hysteria, mass evacuation, rioting, etc. is real. There is sufficient indirect evidence, I believe, to conclude that while such mass

sequelae are not inevitable, they are likely enough to (a) require study of what are the factors increasing and decreasing the risk of such sequelae, and (b) require federal planning based on such information. Number two, the short term social, economic, cultural and health sequelae of these type of behavioral sequelae. The worldwide experience is that if such short term behavioral sequelae occur, the costs to society at large may be severe. There is reason to believe that none of these societal sequelae, either social, economic, cultural or health are inevitable. They become much more likely and more costly in the absence of planning. And lastly, the long term social, psychosocial and behavioral sequelae of these events are unknown. The serious societal disruptions that are envisioned in worst case scenarios should be considered as closer to the disruptions of war and unchecked epidemic rather than a terrorist bombing, for instance. There is a compelling need to understand these long term ramifications. There is a clear need for national planning around them, to limit the potential and severity of these long term sequelae.

DR. URSANO: In closing, it has been a pleasure working with all of you. From our point of view this has been a very successful conference. We much appreciate your time and your contributions. We look forward to working with you all in the future to try and grapple with some of these important problems.

Appendices: Supplemental Material

Appendix 1

Agents of Bioterrorism

Randall C. Culpepper

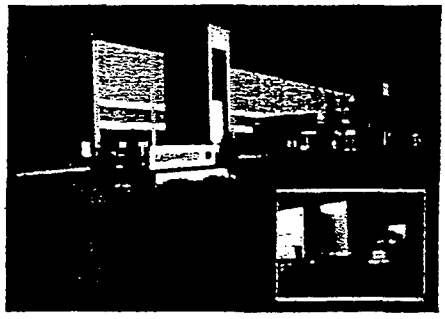
USAMRIID

Biological Terrorism: The Current Threat

CDR Randy Culpepper, MD, MPH
Operational Medicine
U.S. Army Medical Research Institute of Infectious Diseases

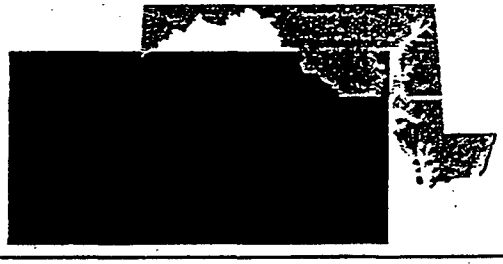
Planning for Bioterrorism
Behavioral and Mental Health Responses to WMD & Mass Disruption
Uniformed Services University of the Health Sciences
Department of Psychiatry
July 15, 2009

A Unique National Resource



Where are we located?

MEDICAL CHEMICAL AND BIOLOGICAL DEFENSE RESEARCH PROGRAM



Bioterrorism ??

- "Whoever shot the latest unidentified female victim ...whoever cut off her head, dismembered her, and bagged her torso for disposal in a Virginia landfill--may have been doing her a favor".
- ".... she's called out to an even more horrific death scene--an inoffensive old woman on Tangier Island who seems to have died of smallpox--the earlier victim had signs of the same ravaging illness, supposedly eradicated in 1977".

Kay Scarpetta

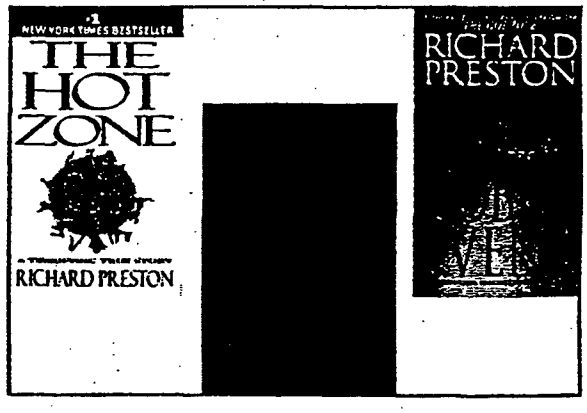
Richmond homicide squad

Virginia State Police

USAMRIID

FBI

CDC



The Changing World

Cold War

- For 50 years, military power was bi-polar
  - ✓Western free world
  - ✓Eastern block countries tied to the Soviet Union
- Threat was Mutual Assured Destruction

Now

- Classic threat has disappeared
- Nations with contrary idealogic and economic motives
- The global political environment is more complex, uncertain, and volatile
- Proliferation of Weapons of Mass Destruction

U.S. Vulnerability

February 1993: World trade Center bombing

✓Foreign terrorism in the U.S.

U.S. Vulnerability

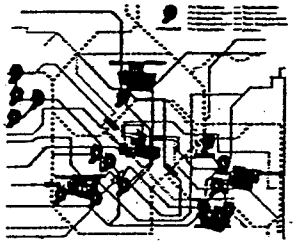
April 1995: Oklahoma City Federal Building bombing

✓Domestic terrorist threats and violence

U.S. Vulnerability

March 1995: Tokyo subway sarin nerve agent attack

✓Greater likelihood of terrorist's use of WMD



U.S. Vulnerability

June 1996: Dhahran, Saudi Arabia military barracks bombing

✓Reexamination of DoD security programs to protect its forces overseas

U.S. Vulnerability
Embassy Bombings

Bioterrorism

The premeditated, unlawful use or threat of use of microorganisms or toxins .....

- derived from living organisms to produce death or disease
- in humans, animals, or plants
- intended to create fear and/or intimidate governments or societies
- in the pursuit of political, religious, or ideological goals

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Protection

Through Integration and Teamwork

Intelligence
- Agent
- Delivery system
- Organization
- Time

Education & Training
- Health care providers
- Electronic communication
- Distance learning

Chem/Bio Defense Doctrine

Medical Countermeasures
- Vaccines
- Diagnostics
- Therapeutics

Physical Countermeasures
- Detection
- Individual protection
- Collective protection
- Decontamination

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Possible Bioterrorism Agents

BACTERIA
- *Bacillus anthracis* *
- *Yersinia pestis* *
- *Francisella tularensis* *
- *Brucella species* *
- *Coxiella burnetii* *
- *Shigella sp.*
- *Salmonella sp.*

TOXINS
- Staphylococcal enterotoxins *
- Botulinum toxins *
- Ricin
- Trichothecene mycotoxins
- Saxitoxins

VIRUSES
- Alphavirus encephalitis viruses *
- Variola virus (smallpox)
- Hemorrhagic fever viruses (Marburg and Ebola)

* Included in the former U.S. offensive program (destroyed 1971-1973)

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Bioterrorist Agents

Most Likely Candidates

Bacteria	Toxins	Viruses
Anthrax	Botulinum	Smallpox
Plague	Ricin	VHFs
Tularemia		VEE
Salmonella		

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Hypothetical Dissemination

50 kg agent, 2 km front, upwind of city of 500,000

Disease	Downwind reach (km)	Dead	Dead/Incapacitated
RVF	1	400	35000
TBE	1	9500	35000
Typhus	5	19000	85000
Brucellosis	10	500	100000
Q fever	>20	150	125000
Tularemia	>20	30000	125000
Anthrax	>>20	95000	125000

Health Aspects of Chemical and Biological Weapons, 1968 1970

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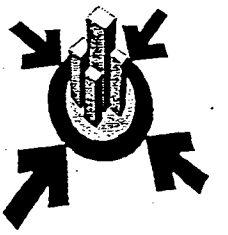
Future Bioagents
Genetic Engineering

- Resistance to antibiotics, vaccines, therapeutics
- Enhanced aerosol and environmental stability
- Benign agents altered to enhance virulence
- Altered imunogenicity
- Binary biologicals
- Chimeras

Types of Bioterrorist Incidents



- Announced (Overt)
- Unannounced (Covert)

BT Incidents

- "Announced" threat most common
- Directed against public institutions
- Unidentified letter or package
- Federal crime - FBI involved
- Microorganisms unconfirmed
- Hoaxes assumed to be real

- "Unannounced" attack
- Unexplained infections or deaths
- State public health labs and CDC
- Unusual cluster(s) of cases
- May be geographically distributed
- Undetermined causative agent

How likely is a Bioterrorist Attack?

"Not a matter of *if* it's going to happen, it's *when*"

Robert Blitzer
Former FBI's counter-terrorism section

Recent Bioterrorist Activity

- FBI
  - ✓Increased interest - few actual verified incidents
  - ✓Bio threats >>> chemical threats
  - ✓Over 220 current NBC investigations
- Sources of information for terrorists
  - ✓Internet, gun shows, survivalist fairs
  - ✓The Terrorists Handbook
  - ✓Kurt Saxon

Terrorist Organizations

Armed Islamic Gp.
Aum Shinrikyo
Hamas
Japanese Red Army
Khmer Rouge
Kurdistan Worker's Party
Abu Nidal Org.
Abu Sayyaf Gp.
Gama'a Al-Islamiyya
Harakat Ul-Ansar
Al-Jihad
Shining Path
Liberation Tigers of Tamil
Rev. Armed Forces of Colombia
Euzkadi Ta Askatasuna
Kach
Kahane Chi
Manual Rodriguez Patriotic Front
Mujahedin-E-Khalq Org.
National Liberation Army
Palestine Liberation Army
Palestine Liberation Fr
Pop Fr for Liberation of Palestine
Rev. Org - 17 November
Rev. People's Liberation Party/Front
Revolutionary People's Struggle
Tupac Amaru Rev. Movement

Terrorist Interest in BW Agents

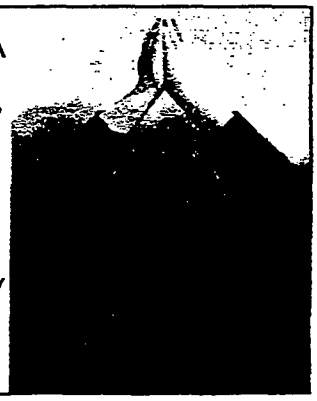
- Order of the Rising Sun
- Baader - Meinhof Group
- West German Red Army faction
- Bhagwan Shree Rajneesh cult
- Algerian vessel apprehension
- Aum Shinrikyo

Shoko Asahara

Aum Shinrikyo

SHOKO ASAHARA

- Venerated Master, Yogi, Pope
- Charismatic, Partially Blind
- Politically, Financially Ambitious
- Messianic
- Millenialist
- Directly Involved in Day to Day Cult Operations



Aum Shinrikyo
Tokyo Sarin Attack
March 1995

- 15 Subway stations affected
  - ✓Hibya Line had heaviest casualties
- 3,796 injured
- 1,000 require hospitalization
- 12 dead or dying

Biological Weapons
Aum Shinrikyo

- Asahara's first WMD interest
- Dedicated toxin production laboratory as early as 1990
- Two new labs: Kamakuishiki and Tokyo
- Produced and attempted to aerosolize:
  - ✓Botulin toxin, Anthrax, Cholera, Q-Fever
- Ebola Zaire - 1993

Aum Shinrikyo
Bioterrorism Activities

- April 1990 - Tokyo
  - ✓*Botulinum Toxin* released near Diet
- Early June 1993 - Tokyo
  - ✓Botulinum Toxin again sprayed from vehicle
  - ✓Timed to coincide with royal wedding
  - ✓Released around Imperial Palace

Aum Shinrikyo
Bioterrorism Activities

- Late June 1993 - Tokyo
  - ✓*Anthrax* spores released from office building in East Tokyo
  - ✓Foul smells, "brown" steam, pet deaths
- March 1995 - Tokyo
  - ✓Briefcase devices in subway intended to release Botulinum toxin
  - ✓No reports of any injuries

Future of Aum Shinrikyo

- Actively recruiting
- 50 seminars/month
- 15 offices, 16 training centers, 17 factories and other sites
- 100 hideouts/700+ live-in followers
- Back in the computer business
- Estimated income: $30 million
- Cult is buying real estate

Other Recent Bioterrorist Activity

- 2000-1999: Multiple anthrax letter-hoaxes nationwide
- 1998: Abortion clinics: anthrax letter "bomb" hoaxes
- 1998: Larry Wayne Harris, Las Vegas: anthrax vet. vaccine
- 1997: Counter Holocaust Lobbyists of Hillel, B'nai B'rith headquarters, Washington, D.C.: anthrax hoax
- 1997: James Dalton Bell: bot toxin & ricin
- 1995: Aum Supreme Truth, Tokyo: anthrax, bot tox, sarin
- 1995: Larry Wayne Harris, Ohio: Y. pestis (bubonic plague)
- 1993: Thomas Lavy, Canada: ricin
- 1992: Minnesota Patriot's Council: ricin

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Biological Terrorism
The Ultimate Weapon?

Easy to procure

Inexpensive

Disseminate at great distance

Invisible

Detection quite difficult

First sign is illness

Overwhelms medical capabilities

Simple threat creates panic

Perpetrators escape before effects

Ideal terrorist weapon

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BW Agent Delivery Systems

- Line source
  - ✓Spray tanks: Ag Pilatus Porter
  - ✓Crop duster
  - ✓Mounted on aircraft, watercraft, motor vehicles
- Point source
  - ✓Explosive munitions
  - ✓Bomblets: Self-disbursing, non-dispersing
- Roadway contamination

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Portals of Entry

- Cutaneous
  - ✓ Effective barrier vs BW agents (ex. T-2 mycotoxins)
  - ✓ Abrasions, wounds, exposed mucosal surfaces
- Gastrointestinal
  - ✓ Food & water delivery
- Inhalational (aerosol)
  - ✓ 1-5 micron diameter particles
  - ✓ Focal infection (pneumonia)
  - ✓ Susceptible to aerosol delivery
  - ✓ Hematogenous metastasis, systemic illness

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Gastrointestinal Exposure

- "Potentially" significant route of delivery
- Food supply contamination
  - ✓MREs vs locally procured foods
- Water supply contamination
  - ✓Significant contamination unlikely
  - ✓Dilution results in nontoxic exposure
  - ✓Water treatment (chlorination, filtration) effective
  - ✓End-user supply: potential risk

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Medical Countermeasures

Minimize potential impact of BW

- Environmental Detection
- Protective Equipment
- Immunization
- Chemoprophylaxis
- Diagnosis
- Therapy

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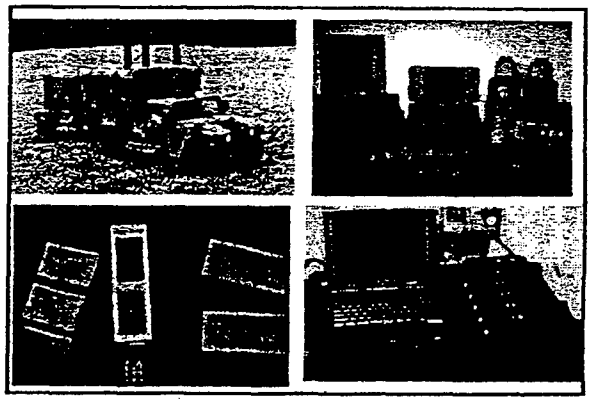


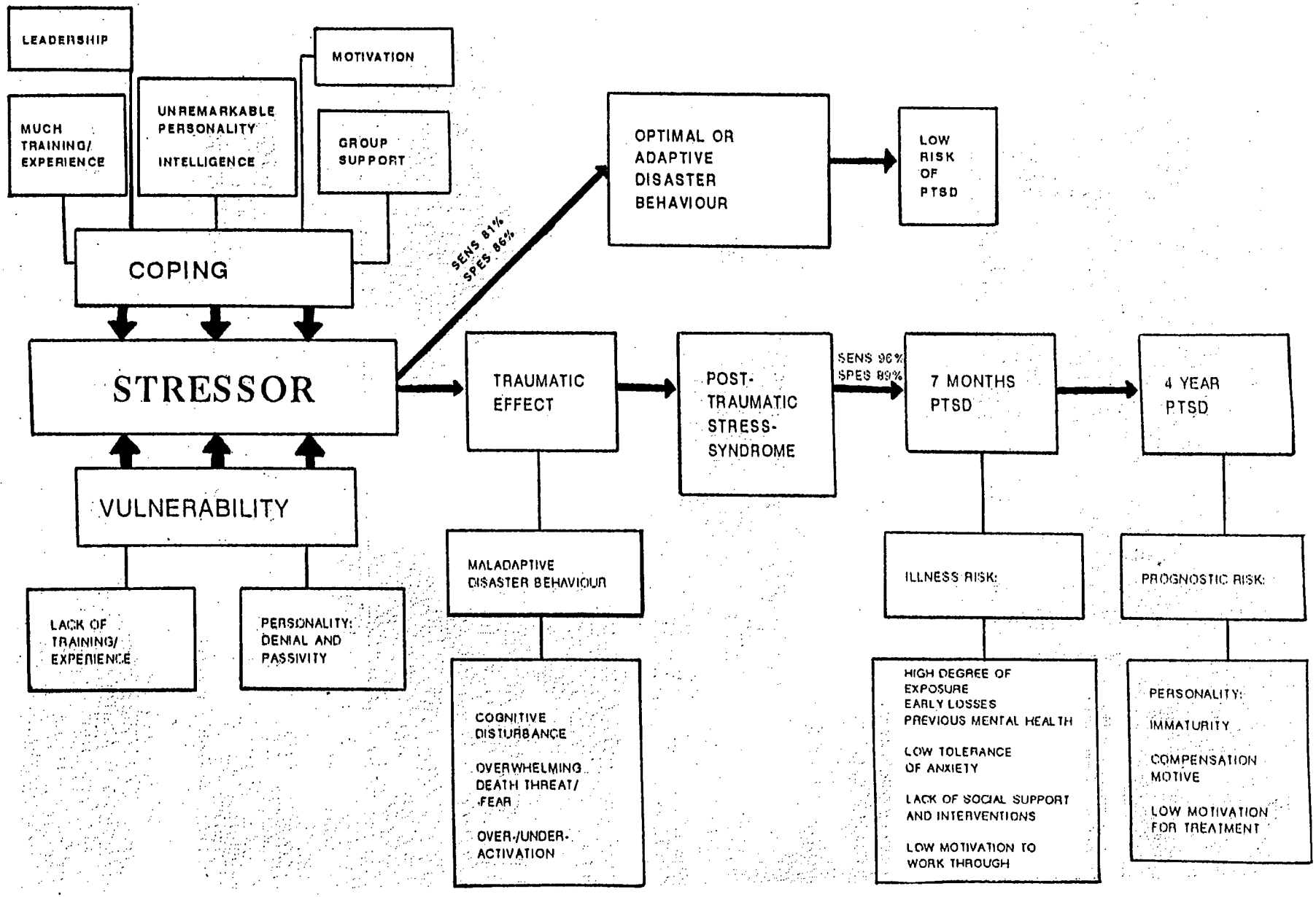
Appendix 2

Disaster Responses: Nuclear, Natural, & Human-Made

Lars Weisaeth

PSYCHIC TRAUMA

CAUSE	LIKELY RESPONSE
NATURE	Accepted, accidental, natural, fatalism. Nature is dangerous, but not evil. Limited fear/phobia. No threat to self-esteem.
HUMAN ERROR	Criticism for lacking preparedness & safety, for loss of control. Challenges self-esteem. Limited fear/phobia.
HUMAN NEGLIGENCE	Criticism, anger, loss of trust. Severe challenge to self-esteem.
HUMAN MALICE	Fight (anger, cycle of violence, etc.), flight (anxiety), surrender (shame). Attack on self esteem.


LEADERSHIP
MOTIVATION
MUCH TRAINING/ EXPERIENCE
UNREMARKABLE PERSONALITY
INTELLIGENCE
GROUP SUPPORT
COPING
STRESSOR
VULNERABILITY
LACK OF TRAINING/ EXPERIENCE
PERSONALITY: DENIAL AND PASSIVITY
SENS 81%
SPES 86%
OPTIMAL OR ADAPTIVE DISASTER BEHAVIOUR
LOW RISK OF PTSD
TRAUMATIC EFFECT
MALADAPTIVE DISASTER BEHAVIOUR
COGNITIVE DISTURBANCE
OVERWHELMING DEATH THREAT/ FEAR
OVER-/UNDER-ACTIVATION
POST-TRAUMATIC STRESS-SYNDROME
SENS 90%
SPES 89%
7 MONTHS PTSD
ILLNESS RISK:
HIGH DEGREE OF EXPOSURE
EARLY LOSSES
PREVIOUS MENTAL HEALTH
LOW TOLERANCE OF ANXIETY
LACK OF SOCIAL SUPPORT AND INTERVENTIONS
LOW MOTIVATION TO WORK THROUGH
4 YEAR PTSD
PROGNOSTIC RISK:
PERSONALITY:
IMMATURITY
COMPENSATION MOTIVE
LOW MOTIVATION FOR TREATMENT

Psychic traumatization

- The acute reaction:

  Disturbed or lost capacity to think

  Overwhelming or paralyzed affects
  (emotional anestesia)

  Reduced behavioural control

DISASTER BEHAVIOUR

- *Disaster training / experience:*
  Overall correct prediction rate 63.6%

- *High level of disaster training / experience:*
  sensitivity 81%
  specificity 86%

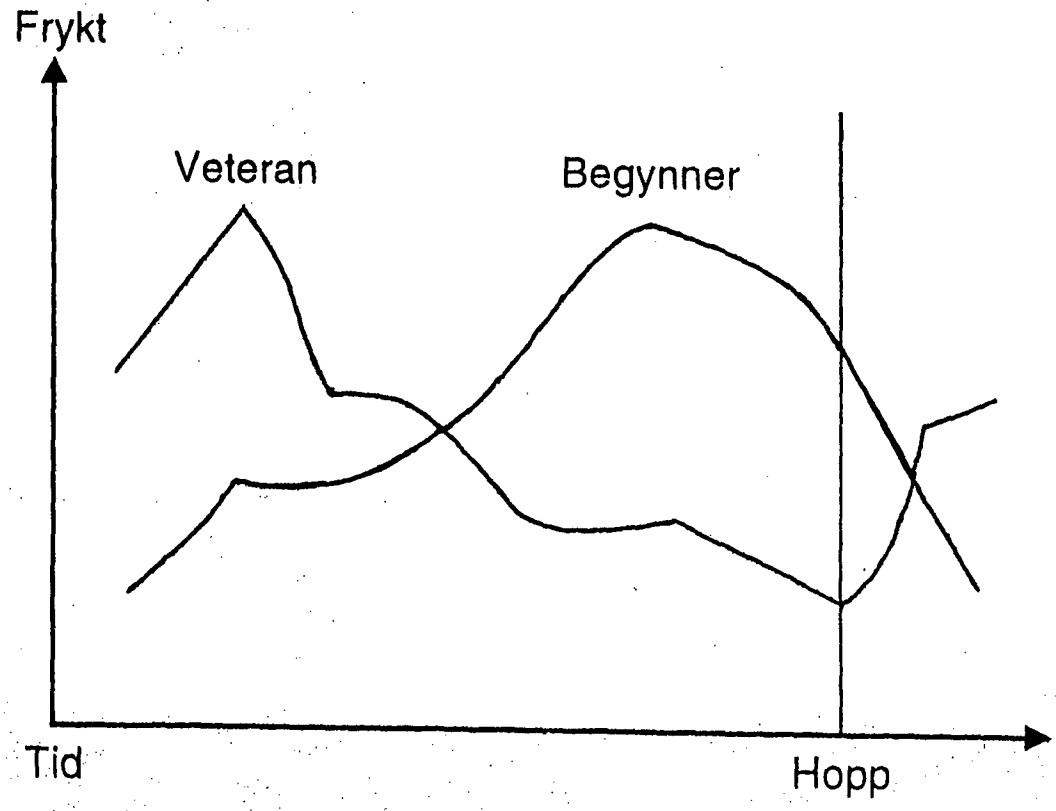
- *Positive predictive factor 70 %*

Dimensions of psychic trauma

1. Physical injury	-	severity, location
2. Mortal danger	-	severity, duration
3. Witness experience	-	emotional closeness, degree of helplessness
4. Attack on integrity	-	impossible choices, primary gain, humiliations, narcissistic blow

Lars Weisæth, Kontoret for katastrofepsykiatri

Effekt av trening på opplevelse av frykt for risikofylt situasjon. Fallskjermhopping (Epstein 1982)



SCARED CHICKEN TODAY

PREVENTS

DEAD DUCK TOMORROW

Appendix 3

Disaster Responses: Nuclear, Natural, & Human-Made

Evelyn J. Bromet

Overview of Mental Health Findings on Toxicologic Disasters

- **Sources of Evidence**
- Events involving radiation exposure
- Other human-made disasters
- Studies of industrial disasters
- Occupational exposure studies
- Environmental exposure studies
- War exposure studies
- Silicone breast implant patients

- **Common Effects**
- Widespread, persistent, unexplained health complaints
- High rate of stress reactions and comorbidity
- Severity of exposure not a risk factor
- Enormous societal conflict and relentless debates about extent of damage and whom to blame
- Unresolvable due to limitations of scientific knowledge and delayed effects on health

Similarities in the TMI and Chornobyl Studies of Psychological Effects of the Accident

- Similarities in research context
- Designed by interdisciplinary research team
- Mothers of children born around time of accident
- Assessment 10-11 years later
- Mothers were similar in age and marital status
- Measures of anxiety, depression, hostility symptoms (SCL-90)
- Questions about perceived effects of the event on health
- Studies funded by the National Institute of Mental Health

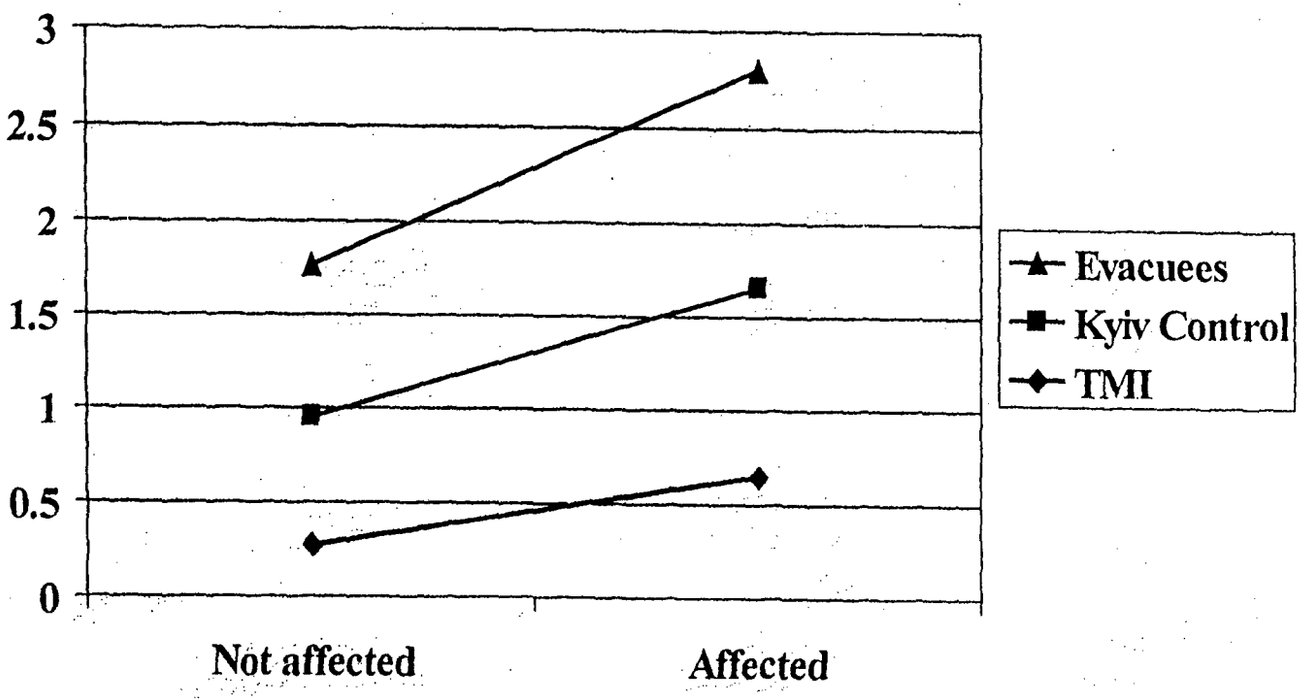
PARALLELS BETWEEN TMI AND CHORNOBYL ACCIDENTS

- Occurred during the night (28 March 1979; 26 April 1986)
- Intangible
- Evacuation delay
- Incomplete disclosure by authorities
- Prolonged contradictory reports by news media
- Rumors about effects on plants and animals
- Distrust in government authorities
- Wide array of symptoms attributed to event
- Fears about future health effects
- Lack of resolution

ATTITUDES OF TMI AND CHORNOBYL SAMPLES

	TMI (N=156)	EVACUEES (N=300)	CONTROLS (N=300)
WORRIED ABOUT YOUR HEALTH BECAUSE OF...?	YES 42.9 UNSURE 17.3 NO 39.7	VERY 44.7 SOME 51.3 NO 4.0	VERY 15.2 SOME 65.2 NO 19.6
WORRIED ABOUT YOUR CHILD'S HEALTH BECAUSE OF...?	YES 51.9 UNSURE 20.5 NO 27.6	VERY 58.3 SOME 40.3 NO 1.3	VERY 29.8 SOME 59.9 NO 10.4

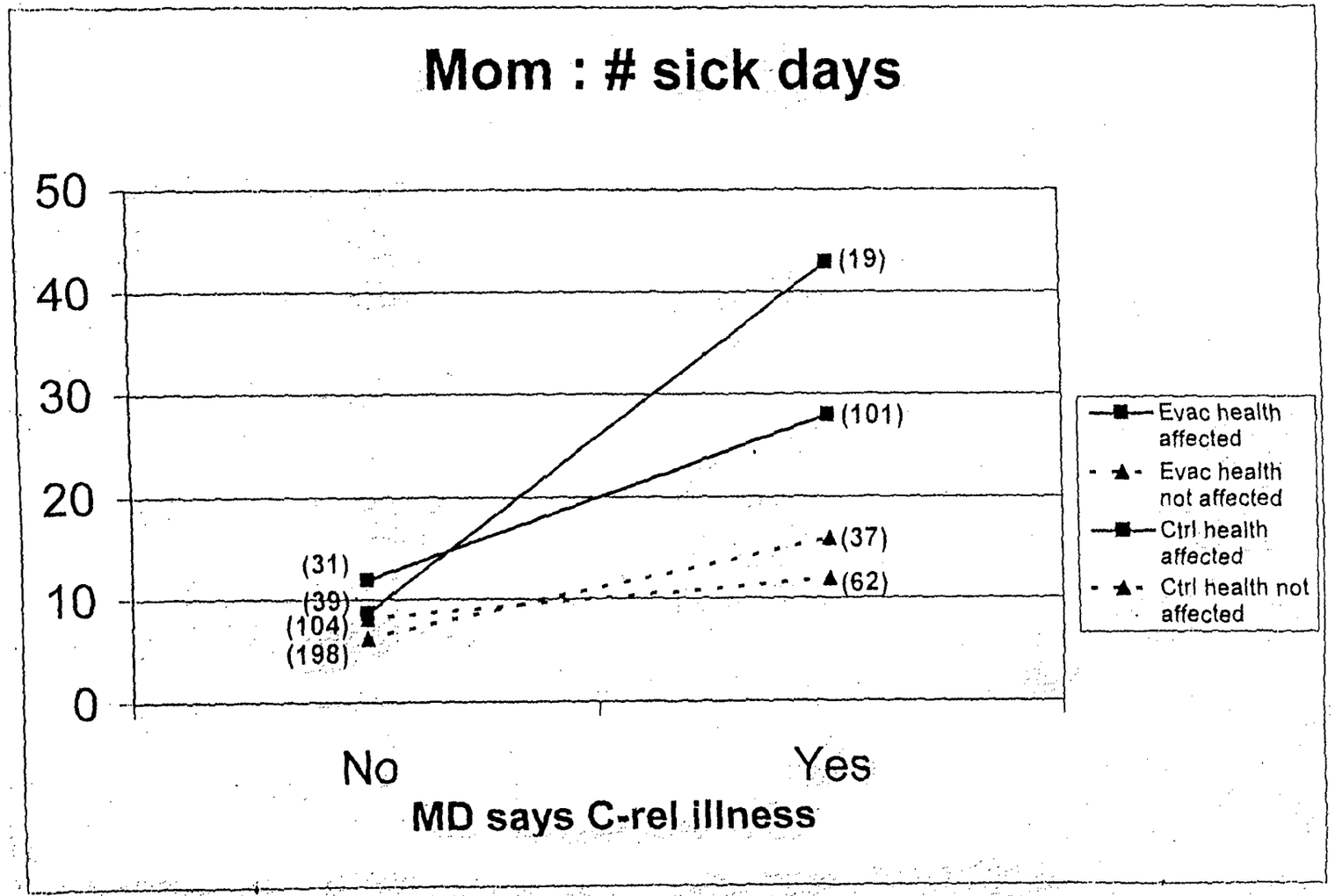
Relationship between believing health affected by accident and anxiety score



F(Group) 41.46 $_{2,746}$ p<.001

F(Health) 55.60 $_{1,746}$ p<.001

F(Interaction) ns



GRP - ns; Health Affect .000; MD .000; MD x GPR .01; MD x HLTH .000

Conclusions

- Mental health impact of TMI and Chornobyl was profound and long-lasting.
- Chornobyl catastrophe far exceeded TMI in magnitude and complexity, and accordingly, its psychological impact was far greater.
- Public health surveillance should monitor the mental as well as the physical health effects of such events.
- More research is needed in non-western settings that includes both culture-specific measures and internationally used measures of psychological morbidity and risk factors.
- Populations especially affected by these events, such as mothers of young children and clean-up workers, require long-term interventions aimed at both improving mental health and at risk factor reduction.
- Future research should evaluate the effectiveness of these long-term interventions.

Appendix 4

Disaster Responses: Nuclear, Natural, & Human-Made

Fran Norris

Post-Disaster Mental Health:

Why Do We See Such a Diversity of Outcomes?

Fran H. Norris
Department of Psychology
Georgia State University

Disasters and Psycho-Social Functioning:
Why Do We See Such a Diversity of Outcomes?

Even the most cursory review of the literature on disasters and mental health will reveal a diversity of outcomes across communities and across individuals within those communities. Risking over-simplification, I believe I can summarize this literature on psychological outcomes in terms of three hypothetical patterns. The first pattern is a very typical, normal stress reaction to all kinds of losses and perceived threats. Symptoms first increase but then decrease and, within a few months, they return to baseline levels. The fact that this is normal makes it no less interesting because there is still much to be learned about why it is that most people, most of the time, are able to mobilize sufficient resources to cope successfully with adversity. If this was the only pattern known to follow disasters, there would be no need to intervene. Naturally occurring processes are probably sufficient. Crisis intervention services might help to hasten the process and reduce human suffering in the short-term.

The second hypothetical pattern does not necessarily differ from the first in its severity or nature but the distress does not fully dissipate. There is a sense of "not getting over it." While this pattern does not qualify as psychopathology, it does imply a decline in quality of life or well-being. My impression, formed on the basis of my own research as well as that of others', is that this pattern is a common outcome following major disasters. We need to learn more about why it is that some people, some of the time, are not able to access sufficient resources to recover as completely or as quickly as we would hope. This pattern, while not as severe as some, is important because of its prevalence. It is probably the pattern for which it is most useful to think about community-level interventions that either bolster the overall level of resources available or that seek to replace lost resources more rapidly.

The third hypothetical pattern differs from the first two in that these individuals reach some criterion level of disturbance. The disorder does not necessarily become permanent but it often does. This pattern, while the least common of the three, is important because of its severity: Who are those that respond so adversely and why? This pattern is probably the one for which it is most useful to think about individual-level interventions that reach out to victims and provide them with ongoing medical or psychological interventions.

In a nutshell, then, the mental health research generally suggests that most disaster victims will experience mild-to-moderate but transient psychological disturbances, that some disaster victims will experience more lingering, though subclinical, disturbances, and that a minority of disaster victims will experience disturbances that are more severe and clinically significant.

Probably what most investigators who are concerned about mental health issues want to know is when to expect which outcome. The recovery process following disasters is quite complex because we have to consider event-level dynamics, community-level dynamics, and individual-level dynamics. In a minute, I will present a model that represents my thinking about these dynamics. It is an extension of the Social Support Deterioration Model that my colleagues and I have tested using data collected after a number of natural disasters, including floods in the U.S. and Poland and hurricanes in the U.S. and Mexico. We have found considerable evidence that despite an initial mobilization of help in the communities, there is subsequently -- and somewhat paradoxically -- a decline in perceived social support and social embeddedness. There are a number of reasons for this deterioration: people move away, expectations are violated, fatigue and irritability augment the potential for interpersonal conflict. Importantly, when it happens, this decline in social support is one path through which disasters appear to exert more lasting effects on mental health.

This figure illustrates my current thinking about these dynamics. The model points to five key constructs (the circles) and seven inferred processes (the paths). The model's most fundamental assumption is that an individual's mental health rests on the quality and quantity of his or her material, social, and psychological resources; see the path from vulnerable resources to emotional distress labeled "protective appraisal." This model has been influenced by Hobfoll's definition of stress as a state that ensues when: (a) resources are threatened; (b) resources are lost; or (c) resources are invested without a gain. From this perspective, not only is distress viewed as the logical consequence or endpoint of resource depletion, stress itself may be defined as process of losing resources. Exposure to disaster sets the process in motion, often with a sudden, forceful blow; see the path from severity of exposure to vulnerable resources labeled "resource loss."

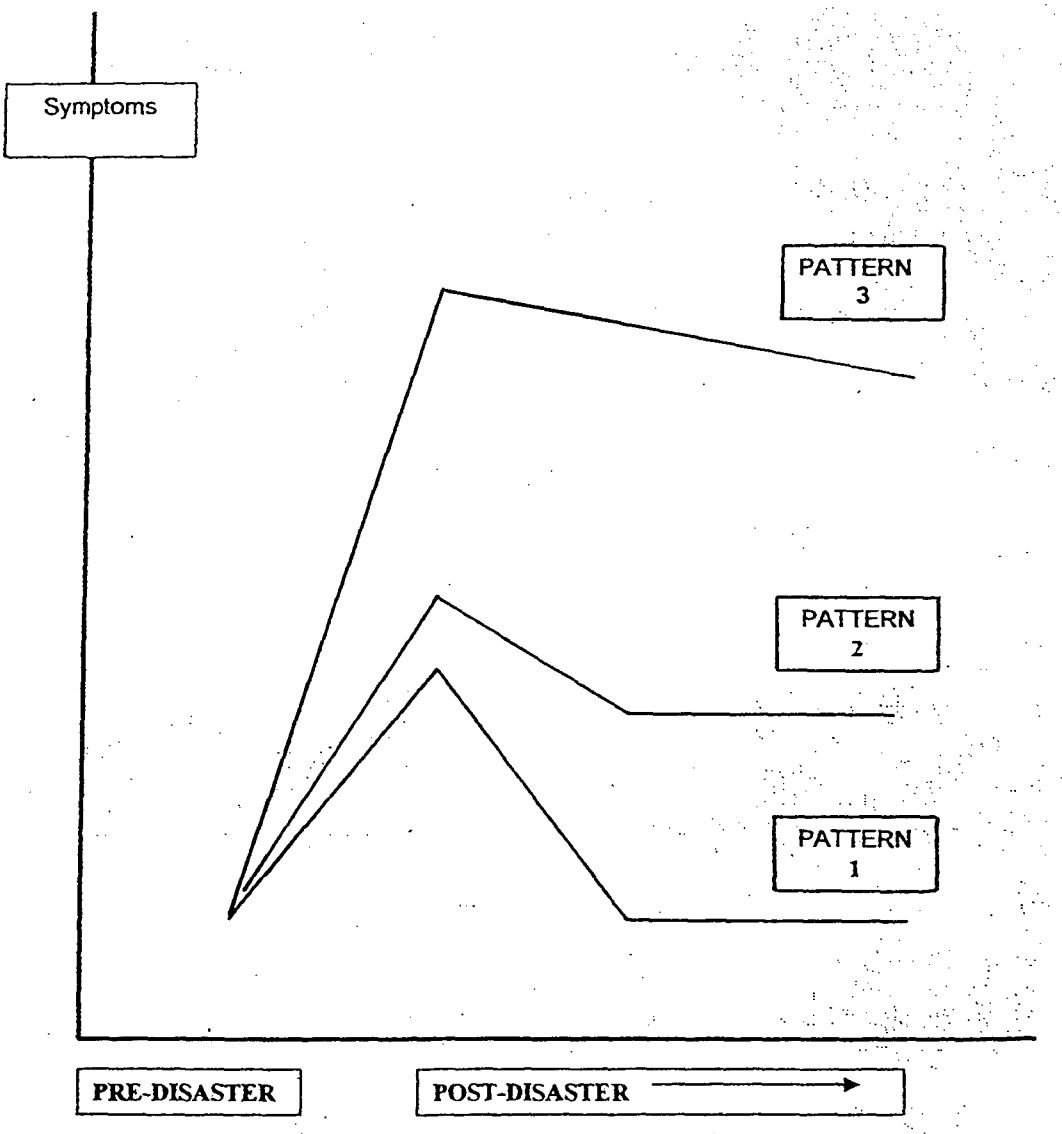
This model makes a distinction between resources that are vulnerable to trauma and those that emerge in response to trauma. Vulnerable resources include housing quality, perceived social support, and hope – in other words, they are our appraised material, social, and psychological resources. Emergent resources, on the other hand, include received social support and coping efforts. If distress is defined as resource depletion, the cure is obviously resource replacement; see the path from emergent resources to vulnerable resources. Emergent resources do not directly prevent emotional distress but operate by preventing or replacing loss; In other words, received social support is fundamentally important for protecting mental health because it is the primary vehicle we use to replace or enhance resources. Like resource loss, resource replacement is better thought of as a process than an endpoint. But whereas resource loss can occur in an instant, resource replacement takes time.

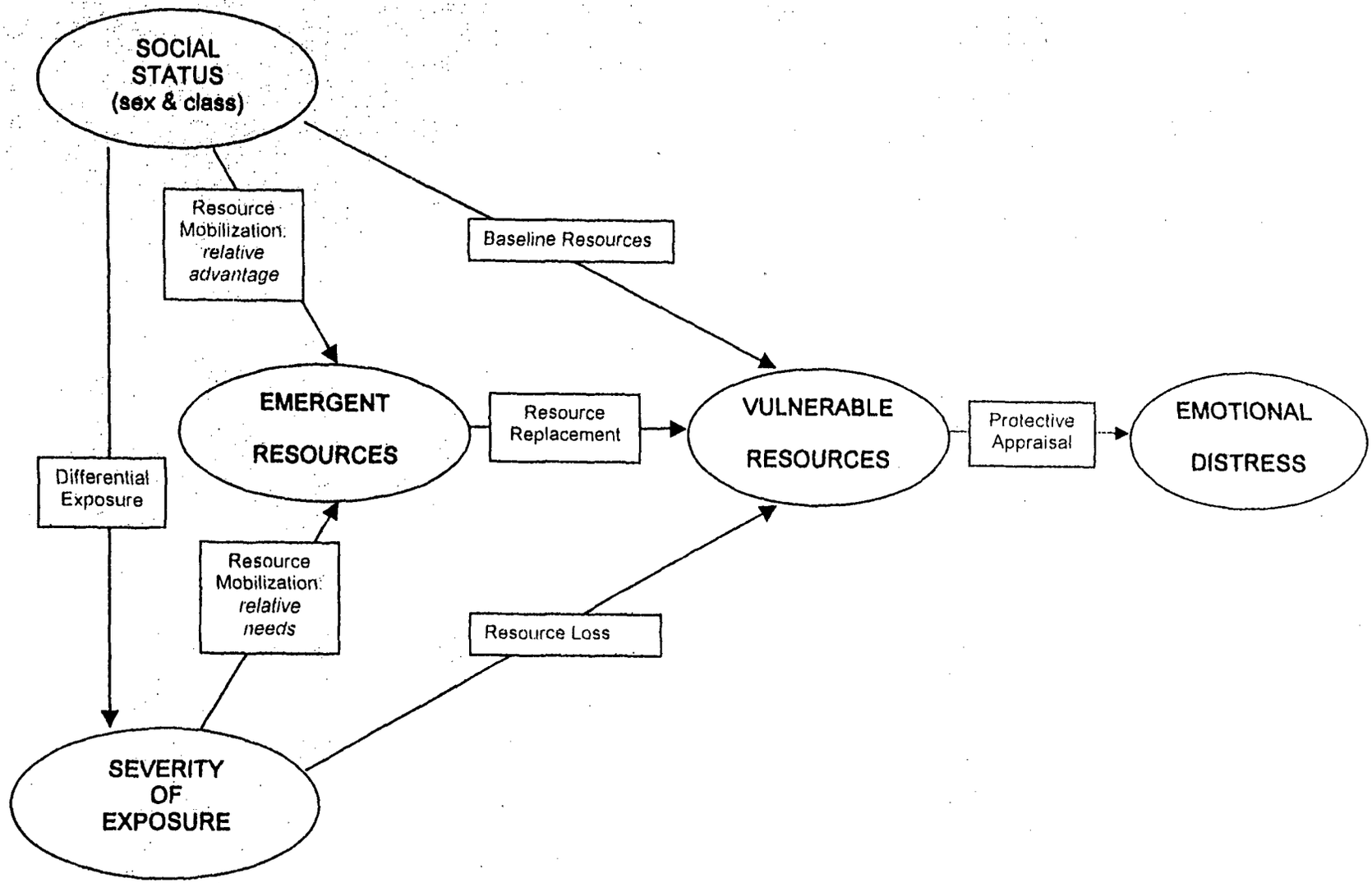
Resource replacement cannot occur until help is mobilized. Any time resources are scarce, various rules come into play that influence their distribution. This is especially true in the aftermath of disasters, when one's friends and families may be victims as well and unable to provide everyone with all the help each needs. Previous research points to two basic processes that determine support receipt. The rule of relative needs means that the most help should go to those who need it the most. This is represented in the model by a positive relation between severity of exposure and emergent resources. The rule of relative advantage acknowledges that one's position in the social structure also influences one's access to resources; see the path from social status to emergent resources. That is, one's embeddedness in the community, political connections, and social class also determine the availability and accessibility of resources.

The effects of social status are rather pervasive in this model. Not only does the individual's position in the social structure potentially influence the resources received but sometimes it may influence his or her severity of exposure; see the path from social status to severity of exposure. The poor, the less educated, and ethnic minorities are generally more likely to live in undesirable, at-risk areas and to reside in less safe homes. Women may be disproportionately exposed to certain disaster-related stressors, and men to others.The remaining path from social status to vulnerable resources represents differences in resource levels due to gender, ethnicity, and class that are not fully explained by either severity of exposure or resource mobilization.

I believe this model lends some insight into why we see such a diversity of psychological outcomes on the population level following different disasters. In many ways, everything I've said here was implied in the very parsimonious definition of disaster that Quarantelli provided some 15 years ago: A disaster is a social and political event where the needs of the population outweigh the resources available to meet those needs. Not only do communities vary in the severity of their trauma and losses, but they differ dramatically in their abilities to mobilize resources. Often resources are adequate to offset the effects of even quite serious events, although the equity of resource distribution remains an issue. But what happens when there are few resources? You can't mobilize resources that don't exist. We clearly need to explore mechanisms through which we can provide not only food and basic medical care to stricken populations but also the kinds of psycho-social resources that are needed to replace those that have been depleted. Despite the important progress that various investigators have made in understanding post-disaster mental health, we know relatively little about how to intervene. I believe this needs to become a high priority for all of us who are concerned about the well-being of disaster victims. Thank you for allowing me to share my thoughts with you today.

Hypothetical Patterns of Psychological Outcomes over Time




SOCIAL STATUS (sex & class)
Resource Mobilization: relative advantage
Baseline Resources
EMERGENT RESOURCES
Resource Replacement
VULNERABLE RESOURCES
Protective Appraisal
EMOTIONAL DISTRESS
Differential Exposure
Resource Mobilization: relative needs
Resource Loss
SEVERITY OF EXPOSURE