ACRP Report 22: Helping Airport and Air Carrier Employees Cope with Traumatic Events

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ACRP

REPORT 22

AIRPORT COOPERATIVE RESEARCH PROGRAM

Sponsored by the Federal Aviation Administration

Helping Airport and Air Carrier Employees Cope with Traumatic Events

TRANSPORTATION RESEARCH BOARD
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AIRPORT COOPERATIVE RESEARCH PROGRAM

Airports are vital national resources. They serve a key role in transportation of people and goods and in regional, national, and international commerce. They are where the nation's aviation system connects with other modes of transportation and where federal responsibility for managing and regulating air traffic operations intersects with the role of state and local governments that own and operate most airports. Research is necessary to solve common operating problems, to adapt appropriate new technologies from other industries, and to introduce innovations into the airport industry. The Airport Cooperative Research Program (ACRP) serves as one of the principal means by which the airport industry can develop innovative near-term solutions to meet demands placed on it.

The need for ACRP was identified in *TRB Special Report 272: Airport Research Needs: Cooperative Solutions* in 2003, based on a study sponsored by the Federal Aviation Administration (FAA). The ACRP carries out applied research on problems that are shared by airport operating agencies and are not being adequately addressed by existing federal research programs. It is modeled after the successful National Cooperative Highway Research Program and Transit Cooperative Research Program. The ACRP undertakes research and other technical activities in a variety of airport subject areas, including design, construction, maintenance, operations, safety, security, policy, planning, human resources, and administration. The ACRP provides a forum where airport operators can cooperatively address common operational problems.

The ACRP was authorized in December 2003 as part of the Vision 100-Century of Aviation Reauthorization Act. The primary participants in the ACRP are (1) an independent governing board, the ACRP Oversight Committee (AOC), appointed by the Secretary of the U.S. Department of Transportation with representation from airport operating agencies, other stakeholders, and relevant industry organizations such as the Airports Council International-North America (ACI-NA), the American Association of Airport Executives (AAAE), the National Association of State Aviation Officials (NASAO), and the Air Transport Association (ATA) as vital links to the airport community; (2) the TRB as program manager and secretariat for the governing board; and (3) the FAA as program sponsor. In October 2005, the FAA executed a contract with the National Academies formally initiating the program.

The ACRP benefits from the cooperation and participation of airport professionals, air carriers, shippers, state and local government officials, equipment and service suppliers, other airport users, and research organizations. Each of these participants has different interests and responsibilities, and each is an integral part of this cooperative research effort.

Research problem statements for the ACRP are solicited periodically but may be submitted to the TRB by anyone at any time. It is the responsibility of the AOC to formulate the research program by identifying the highest priority projects and defining funding levels and expected products.

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Primary emphasis is placed on disseminating ACRP results to the intended end-users of the research: airport operating agencies, service providers, and suppliers. The ACRP produces a series of research reports for use by airport operators, local agencies, the FAA, and other interested parties, and industry associations may arrange for workshops, training aids, field visits, and other activities to ensure that results are implemented by airport-industry practitioners.

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FOREWORD

By Theresia H. Schatz
Staff Officer
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ACRP Report 22: Helping Airport and Air Carrier Employees Cope with Traumatic Events is a resource manual that provides valuable insight and practical guidance to address the difficult emotional and psychological implications in response and exposure to traumatic events. These traumatic events can be the result of human-made accidents, acts of terrorism, or natural disasters that have occurred at, in the vicinity of, or resulting from the operation of an air carrier at an airport.

This resource manual will be of assistance and value to airport management and administrative staff responsible for the well-being of their employees. For those airport and air carrier staff with first-hand experience in preparing for, responding to, and managing human-made or natural disaster events, this resource manual will be helpful in their advance planning and mitigating the emotional impacts before, during and after such traumatic events. It will serve as a guide to help understand and recognize the symptoms and signs for directing help to those impacted and how they may develop the resiliency to overcome the trauma. This manual will also be of help to representatives of agencies and other notable national, regional, or local entities directly involved with the psychological impact of similar events.

Human resiliency or the ability to bounce back after a psychological set-back is a valuable commodity for airports and air carriers. Catastrophic events, such as human-made accidents or attacks or natural disaster events can have long-term effects on employees that may disrupt their ability to perform even routine tasks. The ability of airport and air carrier employees to recover from a disastrous event with minimal psychological trauma is critical to business productivity and continuity of operations. Thus, there is a need to promote human resiliency among airports and air carriers. It was determined that research is needed to further guide airports and air carriers to enhance employees' ability to cope with the psychological effects of a traumatic event. Airports and air carriers can then adopt strategies and implement a variety of practices before, during, and after such events to improve and ensure employees' ability to cope with the event. This approach can mitigate the psychological effects of a traumatic event and expedite a return to normal operations.

The objective of this research was to develop a resource manual of human-impact considerations and practices for airport and air carrier managers related to human-made accidents or attacks, or natural disaster events. The manual rationalizes the need for airport and air carrier preparedness and describes critical considerations and steps that can be taken to mitigate employee psychological trauma before, during, and after such distressing events.

Under ACRP Project 06-01, the University of North Dakota conducted this research to address the critical issues faced by the airport and air carrier employees in reaction to, and their ability to maintain resiliency in the aftermath of a traumatic event. This topic, formulated under the category of Human Resources, is the first of its kind under the Airport Cooperative Research Program.

CONTENTS

SUMMARY

Helping Airport and Air Carrier Employees Cope with Traumatic Events

This guidebook addresses a gap in the psychological support of aviation employees who respond to traumatic events. Training programs for most airports, large and small, as well as general aviation organizations and smaller airlines do not typically address the stress that can follow man-made or natural disasters. Whether it is a weather phenomenon or an aircraft incident/disaster, every organization must develop a set of protocols and practice the response and the recovery phases for traumatic events. This lack of training can have significant effects on the health and well-being of the employee, as well as, possible legal implications for the employer.

This research project has identified and documented that many organizations practice the first-response activities associated with a traumatic event, but do little or no training for the recovery phase which may last a long period of time. The research team has identified many strategies which should edify and augment a mental health recovery plan including an accompanying training program, so that an employees' natural resiliency is enhanced, or those that are unable to return to normal function can be identified and receive the necessary mental health attention.

Highly trained employees are essential to airports and aviation organizations. It is very important for managers, as well as peers to recognize post traumatic stress symptoms that employees may display when they have attended to a natural or manmade disaster and to assist the organization's employees in coping with the psychologically traumatic events. There are many mental health options that one can partake. Most employers have Employee Assistance Plans (EAPs), there are contracted or community mental health providers, personal health care providers, and spiritual guidance.

Recommendations for developing training plans for Mental Health Recovery plans include the following:

1. Planning and preparedness,
2. Developing and deploying mitigation strategies,
3. Response to incident,
4. Recovery phase, and
5. Evaluation of the plan.

This guidebook is divided into an introduction and background, followed directly by the research team's recommendations for improving employees' resilience to trauma, as well as selected case studies that were derived from the field research. Separate from the guidebook, is the full research process documented in Appendices A, B, and C. The material in Appendix A: Comprehensive Literature Review, Appendix B: Research Methodology, and Appendix C: Data Analysis served as the foundation for the recommendations. It is

recommended that mental health providers, who are brought in to assist aviation organizations with their emergency recovery planning, read Appendix A: Comprehensive Literature Review and Appendix C: Data Analysis to provide the mental health provider the opportunity to familiarize themselves with the most up-to-date literature.

The research team, upon completion of the field research, strongly recommends each aviation entity incorporate recovery training in their emergency planning exercises, which integrates the mental health considerations found herein. It has been found through several studies dealing with various traumatic events, that the mental health considerations of an organization's employees is crucial during the recovery from a traumatic event, and for the continued well-being of an employee.

CHAPTER 1

Introduction and Background

Introduction

Disaster recovery in the aviation industry can have a dramatic mental health impact upon the personnel involved in the incident, as well as a wide range of people who assist in the investigation and recovery efforts after the incident. The purpose of this research project is to develop a resource manual to assist airport and air carrier organizations in the management of psychological trauma related to aircraft accidents, terrorist acts, or natural disasters. This effort is also aimed at further understanding and fostering human resiliency—the ability for a person to recover after a psychological setback and to resume their near normal level of performance. Catastrophic and human-based accidents are infrequent occurrences in the transportation industry, nonetheless it is imperative that organizations and their employees are prepared to handle the physical situation of a large-scale disaster, as well as the mental health considerations that may follow.

This research project examines an aviation organizations' ability to promote human resiliency and to provide guidance for those organizations to develop procedures and prepare for the impact of natural and man-made disasters they may one day face. The industry recognizes a variety of people who have experienced traumatic events, and this resource manual aims to educate organizations regarding the issues, findings, and guidance and appropriate assistance within the organization or region. The goal of this research is to prepare directors of airports and air carriers for the mental health recovery of employees, who have faced a traumatic event, and to promote and improve practices for employees' ability to successfully cope with such an event and build resilience. The lack of training can have a significant effect on the health and well-being of an individual, and may have legal implications for an employer, so careful planning and mitigation strategies need to be formulated for the longevity of any organization. The following is a short excerpt from a field interview:

> I am an analyst for the airline, and when I heard that one of our airplanes had crashed, I called my supervisor at the hub and asked what I could do. . . . In moments he called me back, told me to go get the 'crash kit' and head out to the scene. The crash kit was on a pallet in a storage room and I had to bring it to the scene with a front loader, and it turned out to be filled with body bags and toe tags. . . . I was not prepared for what I saw at the scene and still think about it today. . . .

The limitation of this paper regards the ability to make specific recommendations that apply to all situations, for individuals and organizations alike. Treatment programs for individuals recovering from mental health trauma are best designed by the professionals providing their care. Likewise, specific mental health recovery plans need to be tailored to each organization, as a function of their size, resources, and type of trauma. There are many types of traumatic events than an aviation employee may encounter; those can be, but are not limited to: disease, workplace violence, an aircraft incident/or accident, an actual aircraft crash, terrorism, or a single ramp event. For the purpose of their guidebook, a traumatic event could mean any of the listed examples.

Background

According to the FAA's 2008-2012 Flight Plan, "our skies are safe," the industry has achieved an incredibly low rate of commercial (airline) fatal accidents. In the past ten years the accident rate has dropped 57 percent. The FAA has implemented many new and enhanced safety initiatives in the past years with the hope of achieving the lowest rate practical.

Man-Made Disasters

In 2007, the National Transportation Safety Board (NTSB) reported a reduced accident rate in commercial airline operations (Part 121). There were 24 non-fatal accidents. One

fatality occurred on a non-Part 121 operator. The rate of general aviation accidents rose from 1,518 in 2006 to 1,631 in 2007; however the number of fatalities was down by 30 percent, the lowest in the last 30 years (NTSB, 2008).

The NTSB also reported no fatalities among Part 135 commuter operators, with on-demand Part 135 operations at 43 fatalities, which are up from 16 reported in 2006. The NTSB reports, "The U.S. aviation industry has produced an admirable safety record in recent years, however we must not become complacent, we must continue to take the lessons learned from our investigations and use them to create even safer skies for all operators and passengers" (NTSB, 2008, p. 1).

The aviation industry has inherent risk associated with it, which means that accidents will occur, but presently at a very low rate. The nation's airlines transport nearly two million passengers per day and employ nearly half a million workers (Air Transport Association, 2007).

According to the Air Transport Association's (ATA) testimony to Congress, "In 2006, Part 121 carriers transported 750 million passengers more than eight billion miles and logged 19 million flight hours on 11.4 million flights. There were two fatal accidents in 2006 which claimed 50 lives. This is an accident yield rate of 0.18 per 1,000,000 departures which is down by 30 percent from 2005" (2007). This downward trend from the early 1990s appears to be continuing and it is hoped that air travel becomes an even safer mode of transportation.

Natural Disasters

Natural disasters disrupt thousands of lives each year and can do unimaginable damage in mere moments. Whether the disaster is fire, flood, hurricane, earthquake, or tornado, the threat is immediate to human life, but the recovery process is long term. Recently, Hurricanes Katrina and Rita bore down on the southern United States engulfing the states of Louisiana and Mississippi, forest fires have greatly impacted the western United States, and tornadoes and floods have ravaged the Midwest.

The National Oceanic and Atmospheric Administration (NOAA) has a process of forecasting such events and has installed warning systems throughout the United States. The NOAA attempts to utilize these systems and technologies to mitigate loss, such as the significant loss of life associated with the Great Hurricane of Galveston, Texas, that killed an estimated 8,000 people in 1900; or, the Johnstown flood of 1889, in which an estimated 2,000 people were killed. However, natural disasters still pose a threat to all communities, and the long term recovery associated with a natural disaster can be debilitating.

In 1994, the Northridge earthquake in California is estimated to have cost over $23 billion, a flood in New Orleans in 1995 cost over $1.36 billion, the 1997 flood of the Red River Valley in North Dakota and Minnesota was estimated at $2 billion, and in 1999, 66 tornadoes ripped through Oklahoma, Kansas, Texas, and Tennessee costing nearly $1.5 billion in recovery. In 2004 and 2005, Hurricane(s) Ivan, Frances, Charley, Katrina, and Rita claimed 2,139 lives, and the cost of recovery for the areas that were adversely affected will not be known for some time. The damage of these Hurricanes was felt from the east coast to Texas.

The aviation industry is not immune to the effects of a natural disaster as the organizations involved may become instantly crippled, with effects felt throughout their local areas. However, airports and air transportation become a vital link to receiving needed supplies and restoring order by allowing disaster relief workers to begin their work. In the case of Hurricane Katrina, the New Orleans-Louis Armstrong International Airport was the staging point for all egress and ingress of the afflicted areas. The airport became the virtual lifeline to the people of southern Louisiana (Blanchard, 2008).

Disaster Readiness

Incident Command System

The Incident Command System (ICS) is a nationally controlled set of procedures, constructs and operating practices which dictate synergistic principles between responding emergency agencies. The system was first established in the 1970s in various formats and has since become the de facto standard amongst all federal agencies. At the core of the system is the principle of command and control, wherein the first responding agency maintains oversight and enacts other stabilizing protocol until resolutions or transference to a more appropriate entity (National Response Team, n.d.)

The key concepts included in the ICS are: Unity of Command, Clear Text (common terminology), and Management by Objective, Flexible/Modular Organization, and Span-of-Control. In the United States, ICS has been used for more than 30 years in both emergency and non-emergency situations. Presently, all levels of government and some private sector agencies are required to maintain differing levels of ICS training. ICS is used widely in law enforcement activities as it is perceived to elicit clear communication, accountability, and an efficient use of community resources. As part of the Federal Emergency Management Agency's (FEMA's) National Response Plan (NRP), ICS has been expanded and integrated into the National Incident Management System (NIMS).

National Incident Management Systems

In 2004, the Department of Homeland Security (DHS) Secretary, Tom Ridge, as directed by President George W. Bush, required all Federal departments and agencies to adopt NIMS and use it in their individual domestic event and incident man-

agement and emergency prevention, preparedness, response, recovery and mitigation programs and activities. In addition, the DHS also directed that those agencies support and assist state, local and tribal entities if they request Federal assistance (DHS, 2004, p. iii).

According to the DHS, "NIMS represents a core set of doctrine, concepts, principles, terminology and organizational processes to enable effective, efficient and collaborative event and incident management at all levels. It is not an operations incident management or resource allocation plan" (DHS, 2004, p. ix). NIMS is described as a framework for "interoperability and compatibility based on appropriate balance of flexibility and standardization" (nimsonline.com). This framework integrates what many regard as the best practices into a nationwide approach to event and incident management that is broken down into six major areas (1) command and management, (2) preparedness, (3) resource management, (4) communications and information management, (5) supporting technologies, and (6) ongoing management and maintenance (nimsonline.com).

The DHS reports that NIMS has undergone extensive vetting and coordination with the Federal government which has also included outreach to state and local officials, and the private sector. As a result, the NIMS program incorporates best practices at all levels of emergency management systems (DHS, 2004). Aside from this assertion, it should be noted that there is presently little empirical evidence identified indicating the efficacy of NIMS or the ICS.

While many incidents are handled by a single local jurisdiction, there are certain types of events and incidents and disasters that will require Federal aid. In order to meet these needs, and because of the diverse and expansive structure amongst governmental agencies and divisions, the DHS hopes NIMS will create successful coordination across all levels of government. It is hoped that NIMS will provide the effective coordination across the varied groups that may be involved in a major disaster, which will enable all groups to come together and offer a well-integrated, effective incident management system.

Aviation Requirements—Disaster/Emergency Planning

Air Carriers (Part 121, 125, and 135)

The FAA currently requires all air carriers operating under 14 CFR 121, 125, or 135 to have established accident reporting procedures. These procedures must be published in the carrier's operations manual stipulated in 14 CFR 121.135, 125.73, and 135.23. Aside from this requirement, the FAA does not mandate any type of structured program dealing with issues of employee or operator resiliency after an accident; rather, the emphasis is keenly placed on an operator's ability to manage an acute emergency. 14 CFR 121.417 outlines the specific requirements needed by an air carrier in order to mitigate an actual emergency situation such as in-flight aircraft fires or hijackings, but does not list any post-event psychological or "trauma handling" regulations.

The Air Line Pilots Association (ALPA) currently maintains a Critical Incident Response Program (CIRP) for its pilot members (Steenblik, 2001). As part of this program, every member airline has a trained CIRP team which utilizes several trauma-related mitigation techniques. Their preferred methods of stress interventions include debriefings and "defusings" which typically involve interaction between those experiencing traumatic events and the peer-based CIRP-trained team (Steenblik, 2001).

Airports

In a review of the Airport Emergency Plan (AEP) advisory circular (AC/150/5200-31B) currently in draft format, it appears the Federal Aviation Administration has initiated a number of changes for airports. This draft, if approved, will replace an advisory circular from 1999. The substantial changes suggested in the new advisory circular primarily relate to the addition of National Fire Protection Association standards for equipment and training related to airport firefighters and the application of the National Incident Management System (NIMS) and Incident Command System (ICS).

The FAA cites that the recent terrorist attacks and natural disasters highlight a need to refine the airport emergency planning efforts and have all jurisdictions act together across all functional disciples.

> Under the Robert T. Stafford Disaster Relief and Emergency Assistance Act, Public Law 03-288, as amended, the elected officials and the communities that own and operate airports are legally responsible for ensuring that necessary and appropriate actions are taken to protect people and property from the consequences of emergencies and disasters. These communities must also develop emergency preparedness programs to assist the local and state emergency management officials in complying with emergency preparedness responsibilities. The Federal Emergency Management Agency (FEMA) has published the National Incident Management System (NIMS) and the State and Local Guide (SLG 101), *Guide for All-Hazard Emergency Operations Planning.* NIMS and SLG 101 provide emergency managers and other emergency services providers with information regarding the FEMA concept for developing risk-based, all hazards Emergency Operations Plans (EOPs) (FAA, 2008b, p. 3).

Section 8 of the advisory circular, AEP, outlines health and medical planning. It is evident that the advisory circular is oriented toward treatment, transport, and evacuation of injured persons, or the response actions; but, the plan does not address the actual airport workers' mental health issues that may arise from working during traumatic events. However,

section 6-8-2 (6) does address potential utilization of mental health agencies; the circular indicates that an airport should ensure that the appropriate mental health services are available for disaster victims, survivors, bystanders, responders and their families, and other airport caregivers during response and recovery (FAA, 2008b, p. 82).

> Services may include crisis counseling, critical incident stress debriefings, information and referral to other resources, and education about normal, predictable reactions to disaster experience and how to cope with them. There should be predictable reactions to disaster experience and how to cope with them. There should be specialized family crisis assistance available for those affected by a traumatic event or who become traumatized by cumulative stress related to the disaster experience (FAA, 2008b, p. 82).

The FAA introduces the idea of CISM, but clearly leaves the concept and its implementation up to each individual airport. It is not evident whether the FAA will direct an airport to implement any sort of mental health programs for airport workers. It should be noted that the FAA's advisory circular on emergency planning pertains only to FAR Part 139 airports, which are those airports that serve regularly scheduled air carrier (FAR Part 121) operations with aircraft operating with more than nine seats on board.

Under Federal Aviation Regulation 14 CFR 139 (FAR 139), those airports serving air carrier aircraft with more than nine seats on board, must have Aircraft Rescue and Firefighting (ARFF) capabilities on the airfield when the air carrier is conducting operations. The ARFF personnel must be trained to FAR specifications and must be able to respond to the midpoint of the farthest runway from the fire station within 3 min of the alarm.

Airports falling under FAR 139 must have an Airport Emergency Plan (AEP). This plan must specify how it would handle a myriad of emergency situations, including aircraft and natural disasters. Each airport must have their AEP approved by the FAA. In addition, each airport must comply with training standards that predicate a full scale mock emergency exercise every 3 years, and with those years in between, training must be satisfied with a "table top," or a classroom-type emergency exercise.

Those airports that receive general aviation traffic and nonscheduled air carrier operations have no emergency planning requirement under the FAA. A critical factor is to understand that under present rules, no airport is required to have a Mental Health Recovery Plan (MHRP) for employees post-disaster.

Aviation Entities Not Covered by Federal Regulations

Airports that do not serve FAR Part 121 air carriers are not required to have an emergency plan and are not governed by FAR 139. Therefore, if an airport is open to the public and receives general aviation traffic, there is no requirement for emergency planning and training. Many airports across the country have emergency plans, but there is no reporting or training requirement set forth by the FAA.

It is recommended that organizations that do not have a regulatory requirement look within their region to locate the appropriate resources. A small general aviation airport would be directed to look within their city, county, region, and state to determine which resources would be appropriate and necessitate the proper mutual aid agreements.

National Transportation Safety Board

The National Transportation Safety Board (NTSB) is a government agency tasked with the investigation of transportation accidents and incidents with the overall goal of making safety recommendations. In the process of investigation, they can request expertise from a variety of sources, including, but not limited to, the FAA, airlines, equipment manufacturers, maintenance organizations, air traffic control, meteorology information sources, and advocate groups. Their purpose is to identify the probable cause of the accident, issues related to safety, and to make recommendations to the appropriate agencies for actions which mitigate safety hazards in all forms of transportation.

While jurisdiction of the scene can vary by location (military installations) or activity (potential crime scenes), the NTSB is often the lead organization present during aircraft incident recovery and investigation. In that position, NTSB investigators provide guidance to the victims, families, and support personnel from the airlines, airport, and surrounding community agencies. While their original job tasking was primarily the investigation of the incident, their duties were expanded by the Aviation Disaster Family Assistance Act of 1996.

The mission of the Federal Family Assistance Plan for Aviation Disasters (2000) is to "provide psychological assistance and logistical support and services to victims and their family members." In the details of the plan, mental health support is also intended for individuals who are supporting the incident investigation as well. The responsibilities are divided into seven victim support tasks with primary organizations holding responsibility. The area of family care and mental health is delegated to the American Red Cross in the case of commercial air carrier disasters.

The American Red Cross activates trained personnel who staff operations centers with primary goals of providing assistance to those in need and coordinating and managing volunteers and organizations who offer counseling, religious, and other support services. The Red Cross is tasked with activating personnel to "provide crises and grief counseling to family members and support personnel." Additional direction in their plan directs the Red Cross to " . . . assess the needs and available resources of other agencies and coordinate with

them to ensure ongoing emotional support for workers during the operation . . .” While the primary focus in the Federal Family Assistance Plan for Aviation Disasters is to support the disaster victims and their families, supporting the emotional needs of support workers is also mentioned in the document.

The Office for Victims Assistance (OVA) is contained within the Federal Bureau of Investigation (FBI). According to the FBI’s website, this office is “responsible for ensuring that victims of crimes investigated by the FBI are afforded the opportunity to receive the services and notification as required by federal law and the Attorney General Guidelines on Victim and Witness Assistance” (2005). Additionally, the OVA is responsible for the Terrorism Victim Assistance Unit. This unit “provides emergency assistance to injured victims and families of victims murdered in terrorist attacks within the U.S. and outside the borders of the U.S. and serves as a permanent point-of-contact for terrorism victims within the FBI” (2005).

The FBI website also includes additional resources for service providers and victims of crime. One particularly noteworthy resource link provided is to the Office for Victims of Crime (OVC), an office within the Department of Justice (DOJ). This office publishes the Online Directory of Crime Victim Services which is located at http://ovc.ncjrs.gov/findvictimservices/. This directory “is an OVC resource designed to help service providers and individuals locate nonemergency crime victim service agencies in the United States and abroad. The directory gives individuals the ability to search by location, type of victimization, service needed and agency type.”

Critical Incident Stress Management—Aviation

The impact of stress on human performance is well documented; therefore, it is expected that aviation managers would be concerned with potential performance impairments among personnel during and immediately following a critical incident (Leonhardt & Vogt, 2006). Aviation personnel involved in critical incidents may have ongoing involvement with rescue, recovery, operational support of ongoing emergency activities, or normal company operations. Distraction, lack of confidence, and feelings of vulnerability are several of many symptoms that can have a significant effect on the safety of ongoing operations following a disaster.

A comparison of the industry sectors that actively use CISM shows that the aviation industry responds to critical incidents in similar ways. Emergency medical services, fire/rescue departments, and law enforcement agencies are probably the largest groups who routinely face critical incidents of natural and manmade disasters. The technical nature of aviation-related, safety-sensitive positions may not be well understood by “outsiders.” The psychological response mechanisms are well understood, however, and are common in all groups.

The aviation industry has unique aspects as well. While the nature of CISM services is to address these types of issues, individuals are expected to face events that are associated with physical trauma. While Post Traumatic Stress Disorder (PTSD) is a well-known diagnosis, training and experience will offer some familiarity (not immunity) with these types of reactions. The aviation industry, outside the fire/rescue and security forces, may have personnel who may have not dealt with the stress of a disaster at any level in the course of their careers. This is not to say they are incapable of managing the incident, but as a group, they may have individual training or recovery needs that differ as a result of their work experience. These include the relative infrequency of aviation disasters compared to fire/rescue/police operations; the potential for a large scale event; the potential of responsibility or blame for the accident on those who are now asked to be involved in the disaster support process; the large number of people (passengers, family members, rescuers, press, investigators, etc.) needing support services; and the intense press presence.

The aviation industry’s focus on safety leads to careful scrutiny of its personnel. Pilots and air traffic controllers must be medically screened on a routine basis to be in compliance with Federal Aviation Regulations. Conditions that would restrict their performance include many of those listed as symptom complexes for acute stress reactions, PTSD, or the variety of other psychological or medical complications that may arise. Self-evaluation of the impact of stress on an individual’s ability to function in demanding environments is difficult. Pilots and air traffic controllers may also face the dilemma of reporting psychological symptoms because revealing a mental health condition could later compromise their medical certification, and therefore their livelihood. In a safety culture where individuals are carefully monitored to minimize risks of performance problems, it may be difficult to identify impaired individuals in a proactive way.

As discussed by Bonanno (2005), a large percentage of individuals involved in critical incidents are able to continue to perform at adequate levels in spite of the symptoms they are experiencing as a result of their exposure to a critical incident; that is, these individuals exhibit resilience. While this finding is a very positive aspect of human behavior, individuals with resilience may be difficult to differentiate from those in whom distraction or other impairments may affect operational safety. Resilience is identified as an outcome rather than a finding based on the result of predictors prior to the event (Bonanno, 2005).

Factors that predict resilience have been identified. These factors may be considered for selection in high performance teams (e.g., military or exploration teams), but may not be seen as a viable screening tool for hiring in the aviation industry. While some individuals may exhibit resilience consistent with predictive factors, it is not operationally significant; the need for high reliability of human operators in these safety positions

(pilots, air traffic controllers, aircraft maintenance, security personnel, fire/rescue, or EMT departments, etc.) necessitates verification of their readiness-to-perform.

The high degree of impairment that individuals can suffer due to acute stress reaction and post-traumatic stress syndrome is quite evident (Leonhardt & Vogt, 2006). The need for individuals to continue to operate in the post-disaster environment, or to return to duty following a critical incident, necessitates a review of current evaluation and treatment programs.

Procedures Following an Aircraft Disaster

Initially, after an aircraft disaster has occurred, the efforts focus on life-saving and rescue operations. Most incident response protocols call for first-responders such as firefighters and law enforcement personnel to attempt to mitigate the loss of life. After these efforts are exhausted, the scene turns toward site preservation, so that an intensive incident investigation can proceed. It is important to note that during the entire process, from the onset of the incident through the completion of the incident investigation, there may be a vast number of people who are exposed to trauma-inducing stimuli.

The people who may be exposed to traumatic events after a disaster are partly determined by the location in which the disaster occurred. For instance, if the aircraft disaster occurred outside an airport boundary, airport personnel may not be involved with the scene. Typically, local law enforcement and other local governmental rescue workers will preside over the site. If the incident occurs on the airport proper, then the airport's emergency response as per its emergency plan will be enacted. This generally prescribes a procedure where ARFF will respond, and other airport employees will provide assistance as needed. It is quite possible that these employees will come in contact with and/or witness traumatic events which could lead to deeper psychological impact.

Figure 1 provides the typical flow of responsible personnel in an aircraft disaster. The chart divides aircraft disasters into two distinct categories, air carrier and non air carrier. Fur-

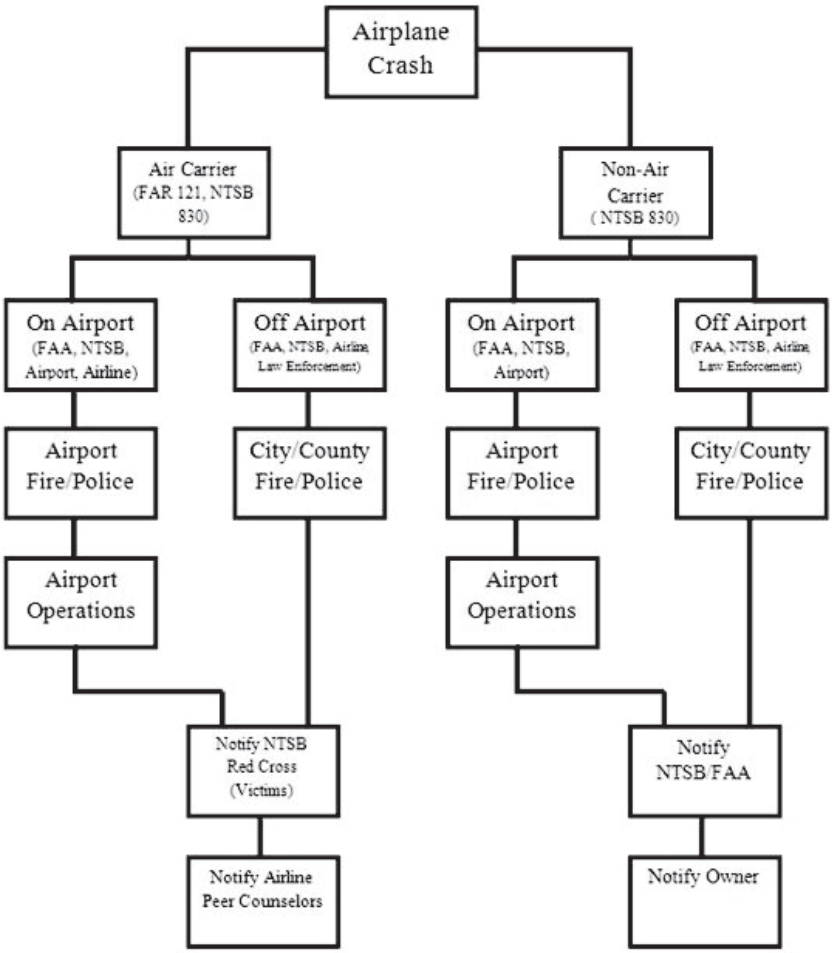

Figure 1. Flow chart outlining ICS-style procedures after an aircraft disaster.

ther classification is made between on airport and off airport incidents, as this will typically dictate responding personnel. After these classifications, the specific responding groups are identified, which culminate in reporting requirements to the NTSB under 14 CFR 830. Any of these groups, whether they are first-responding professionals, or other employees could be exposed to trauma depending on a variety of circumstances.

Mental Health Options

There are several different types of mental health care options for an individual to receive. An obvious avenue would be the Employees Assistance Program (EAP) which is generally accessed through the human resources department of an organization; another area to find care would be through the community, through private mental health care organizations, and through one's own personal health care provider. Many people also find that their spiritual affiliation is of guidance during times of difficulty.

In the following paragraphs, Palm et al. (2004) suggest ways in which to limit vicarious trauma reactions. They detail recommendations for interventions at the individual and organizational levels.

The following is a list of actions which may limit vicarious trauma reaction at the individual level: spending time with other people outside of the work environment/staying connected and not isolating oneself; asking for support; engaging in activities that provide a sense of purpose; attending to physical health; maintaining balance between professional, physical and emotional aspects of life; attaining social support; accepting that emotional distress in trauma survivors is a "normal" reaction to traumatic events; limiting unnecessary exposure to the traumatic event by decreasing exposure through the media/newspaper; maintaining balance in the work situation; taking vacations; identifying personal limits; and talking to coworkers. Poor communication with coworkers has been shown to increase risk of adverse vicarious post-traumatic stress reactions.

The following is a list of actions which may limit vicarious trauma reaction at the organizational level: providing appropriate training for dealing with trauma and disaster; providing information about traumatic stress reactions; effective coping and possible interventions and encouraging use of natural social support systems; normalizing traumatic stress reactions, being encouraged to advocate for survivors or change policies to help survivors; ensuring manageable workloads; creating a respectful, supportive work environment; having access to support resources without fear of negative consequences; and encouraging vacations. Lack of social support in the work situation, poor communication, and poor support from supervisors has been associated with increased risk for secondary trauma, burnout, and fatigue.

Employees Assistance Programs

An EAP is an initiative undertaken by a company or organization which seeks to provide mental health assistance to employees who may be experiencing stress or trauma. Employees may utilize the services of an EAP, free of charge, for personal psychological traumas and other reasons such as substance abuse problems. One of the hallmarks of most EAPs involves some sort of anonymity or de-identification of participating employees, wherein employers are kept unaware of which of their employees are participating. In spite of the cost to employers, most research indicates overall employee productivity is maintained or even enhanced, and thus justified (Kirk & Brown, 2003).

Some EAPs offer a Critical Incident Response Management (CIRM) program, which can be utilized by individual employees after a disaster or crisis occurs (Freeman, 2007). CIRM could be utilized specifically to respond to an organizational-wide disaster. Paul (2006) found that EAPs can be effective when dealing with large scale traumatic events so long as the focus is split between the organization and the individual worker. Badenhorst (1992) further found that for maximum efficacy, an EAP response following a disaster should be tailored to specific circumstances, which include simplicity, proximity, immediacy and expectancy.

Central to EAPs is the fact that most mental health or counseling services are provided by trained and licensed mental health professionals. Other mental health recovery programs often involve some sort of peer-based counseling, but that is the exception rather than the norm in EAPs. One such EAP that includes peer-based meetings is the FBI EAP (McNally, 1999). While still utilizing professional personnel in its traditional EAP processes, their program also makes use of peer support. To date, the efficacy of such a "mixed-method" EAP regarding traumatic events has not been extensively evaluated but warrants further attention.

Timmons (2004) explains that traditional EAPs do not go far enough to support key personnel and their families in times of a severe or regional crisis. Furthermore, existing programs may not have the depth of resources needed for response. Some key areas of concentration for an enhanced EAP would be to have "an executive level champion, an organizational-wide awareness of program, and all personnel should participate in the initial training program" (p. 74). The article is careful to point out that there is no silver bullet for organizational survival during crisis events and that programs should be tested where appropriate. The human resources department of any organization should remain as the focal point of contact for supporting personnel and their families through the crisis, as well as providing ongoing support to the recovery process.

Organizational Structure and Communication Systems

Airports are unique due to their highly structured regulatory environment from the federal government to the local level of government involvement. The majority of airports are owned and operated by municipalities, city, and county governments, which would assume a degree of complexity and centralization. However, many airports are in the form of an enterprise system, or managed as a separate department, away from local government. Airports are also commonly owned and operated by quasi-independent authorities, which are also a form of public administration. It is quite difficult to put an exact definition on how an airport is operated and which type of organizational structure it has, as defined above. Airport workers are constantly training and upgrading their professional standards, so in that sense the industry is quite formalized; however, since the employees are highly trained, there is usually a lesser degree of centralized decision making. The independent divisions (maintenance, operations, fire department, and law enforcement) within the airport structure are normally self-governed.

An organizations structure, whether a complex set of reporting lines or not, is an important concept to consider when developing a mental health recovery program; and equally important is the method of disseminating and training the employees. Communication is the transference and understanding of information. There are several functions of communication; it can be used to control employee behavior, motivate employees, share information and express emotions of management. The following is a list of the many variables which must be considered when communicating (1) sender behavior; (2) receiver behavior; (3) feedback; (4) choice of media; (5) one-way vs. two way; (6) verbal vs. nonverbal; (7) defensive vs. non-defensive; (8) interpersonal communication; (9) formal vs. informal networks (grapevine); (10) small-group networks (chain, wheel, all-channel); (11) directional flow (down, up, horizontal); (12) gender differences; and (13) cultural differences (Greenberg, 2002).

These variables should be considered when communication networks of any kind are in use. It is important to recognize encoding and decoding issues may arise when sending and receiving information. This can stem from gender, cultural, and choice of medium used. There appears to be no "one best way" to ensure correct communications all of the time. It is important to choose a media that will provide the most richness for the individual(s) receiving the message and to determine the level of complexity in the message when making that choice. Another area for consideration is the speed and accuracy needed in the process. The basic assumption is that communication is "a continual balancing effort of juggling the conflicting needs for intimacy and independence and matching the medium with the message" (Greenberg, 2002, p. 204).

Human Continuity through Crisis

It is commonly known that most businesses pay more attention to the practical matters of a potential business interruption than planning for the people side of the business, yet it is quite apparent that personnel are the most valuable asset to a company in times of distress. Therefore, "human continuity" is a crucial variable in disaster planning for any organization. Determining what and how to respond to the human or mental health issues that may be present after a traumatic event are extremely important.

According to Nowlan (2008) businesses need to be well-trained to recognize the issues that may follow an event to prevent potential absenteeism, low morale, or impaired work performance. Nowlan (2008) identifies that companies can implement simple training exercises to mitigate mental health issues, and human resource teams should initiate table top exercises to provide effective support to managers when a crisis arises. Five specific areas that should be addressed by the company are (1) psychological impacts of trauma; (2) managerial responsibility; (3) how to support people recovery; (4) leadership in a crisis; and (5) being ready to support and listen after the crisis (2008, p. 42).

Managerial responsibility speaks to the ability of a manager to support their staff, even in times of personal crisis. Managers should be trained to spot symptoms of stress and be able to support the well-being of their employees and respond with the appropriate level of assistance (Nowlan, 2008).

Business Continuity Management (BCM) is a trend to ensure that companies reemerge and minimize lost productivity after a crisis. Whether it be pandemic bird flu, an e-coli outbreak, natural disaster, or other emergency, business leaders have come to an important realization that, "people are the most critical issue, and organizations have not thought through all the different aspects associated with people when a crisis happens" (Donston, 2001, ¶4). This is especially true for highly specialized organizations such as airports and airlines. People that work at airports across the country are highly trained individuals, and organizations cannot afford to lose such valuable employees in the wake of a crisis. Therefore, aviation organizations need to ensure the physical and emotional well-being of their human capital, as well as the physical structure of the entities.

Organizations need to recognize that there are several vulnerable stakeholder groups including staff, community, customers, suppliers and family members when trauma is present. It is advisable for companies to consider the well-being of all groups when attempting to return to normal operations.

Both family and community members represent a tremendous source for recovery for employees, which can aid in the recovery process and reduce down time (Paton, 1999). According to Paton (1999), local government agencies might pursue this cost effective strategy of establishing goodwill and consider a similar course of action. This course of action should be considered as a comprehensive human resources continuity plan, which considers traumatic impacts for its staff. This HR plan could use vulnerability data to screen staff so that the organization identifies the demands of key staff and what effects of trauma they may experience as a result of the event (Paton, 1999).

Paton (1999) identifies several factors that may constrain business continuity planning. Those include underestimating the risk of event occurrence and its consequences, overestimating the organization's existing capabilities, and ambiguity of employee roles and responsibilities. The goal of the plan should be to enable each organization to respond effectively to any type of event. Lastly, Paton (1999) explains that organizational effectiveness is influenced by several organizational characteristics and the degree of flexibility within the system. If an organization is rigid in nature and there are internal conflicts present, these variables will inhibit effective organizational response. Companies that display this type of rigidity may experience higher absenteeism, turnover, and performance decline. If the organization is more organic and flexible, the reconciliation of staff needs tends to occur more rapidly. The most important strategy for key executives is to "accept organizational ownership of the crisis and its implications" (Paton, 1999, ¶11).

Paton (1999) indicates that "a key factor in disaster recovery and safeguarding staff well-being involves training specifically to prepare for disaster work" (¶16). It is also necessary to train for an all-hazard event and that both technical and mental health preparedness is needed and the development of a well-thought response and recovery plan for the organization is essential. Management and managers play key roles in the recovery of any organization. It is vitally important that managers plan, manage, and practice recovery scenarios with their employees; this will identify the roles, tasks, and responsibilities for each employee group.

A disaster may render certain employees, or employee groups incapable of performing their jobs; it is the role of manager and human resources to understand this issue and find the appropriate support that is needed. Paton (1999) explains that recent thinking about support programs for staff is focusing on developing resilient organizational cultures. This would include "empowering staff and managers, and providing them with the knowledge, and skills to design and implement appropriate intrinsic risk-reducing and recovery strategies" (¶26). Due to the sheer magnitude of some events, this may prove to be a cost-effective strategy.

What Is Psychological Trauma and What Causes It?

The physical and psychological response to any demand—positive or negative—is *stress*. Positive stress includes responses to events such as getting a promotion, getting married, or graduating from college. However, the term *stress* usually describes responses to negative demands such as taking a test, getting divorced, or performing under pressure. When faced with a source of negative stress, people must evaluate the situation; determine the realistic level of risk (and differentiating that from imagined or irrational perceptions of risk); and then evaluate how they are going to cope with the situation based on their own personal resources (e.g., physical strength, the ability to think clearly in a crisis, basic problem-solving abilities) and the potential for support from others (e.g., emotional support, access to necessary tangible resources; Lazarus, 1966; Lazarus and Folkman, 1984).

The most extreme form of negative stress is *traumatic stress*—stress resulting from a traumatic event or situation. People experience traumatic stress in response to events such as natural disasters like earthquakes or hurricanes, motor vehicle collisions, physical or sexual assault/abuse, combat, industrial accidents, diagnosis of a life-threatening illness, life-threatening medical situations like a heart attack, terrorist attacks, torture, or as in the present discussion, airline disasters.

A commonality among these traumatic situations is that they all involve a threat to one's life or the lives of others. When people try to cope with such situations and are not successful in this coping, it can result in feelings of helplessness, rage, and resentment about the loss of control and random nature of these situations (Kardiner & Spiegel, 1947). In large-scale disasters, like the terrorist attacks of the World Trade Center on September 11, 2001, the devastation may threaten or destroy the existing social structure and order. The loss of social structure and particularly the lack of effective leadership and guidance in restoring social order and safety can contribute to the development of mental health problems of those involved in traumatic situations and particularly mass disasters (Noy, 2004).

As noted above, traumatic stress occurs when an event is perceived as life threatening to an individual or others and which severely challenges or compromises one's coping capacity (Noy, 2004). It involves activation of the *human survival response*—a physiological and psychological response that prepares the body and mind to fight, flee, or even freeze. In order to fight or flee, this response causes a part of the body's nervous system, called the autonomic nervous system (ANS), to prepare for these activities (e.g., fighting off an assailant or running away from a wild animal) by increasing heart and respiration rates, dilating pupils, narrowing attention and increasing vigilance, and increasing blood flow to muscles.

During an actual traumatic event, this response is considered a normal, adaptive survival response to a situation that is perceived as life threatening. If an individual is able to establish safety by fighting or fleeing, it will often decrease, although not eliminate, the risk for long-term negative effects of the stressful event. However, traumatic events may not accommodate these survival responses, and individuals must attempt to cope with a situation that is perceived as life-threatening, uncontrollable, and/or inescapable—a situation that carries a higher risk for longer-term problems.

Life-threatening, inescapable situations can result in a different physical and psychological response—freezing or becoming immobilized. Although this response is less well understood from a physiological standpoint, it appears that the stress response activates a different part of the ANS that immobilizes the body and decreases the experience of pain or fear (e.g., people going limp and psychologically numb when being mauled by a bear).

Psychological "numbness" is another way of describing what is more generally called *dissociation*—separating oneself psychologically from an unbearable situation. It fragments the personality in an attempt to minimize pain, and in this way could be considered an adaptive reaction, but can interfere with recovery to the extent that a person is then unable to integrate the complete experience of the trauma (Noy, 2004). Dissociation can occur at many different levels of severity with the most severe involving a complete "splitting off" from oneself—what was previously referred to as a multiple personality and currently referred to diagnostically as Dissociative Identity Disorder (American Psychiatric Association, 2000).

Psychological Reactions to Traumatic Events

A range of post-traumatic stress reactions can occur for individuals who experience or are exposed to trauma. For example North, Nixon, Shariat et al. (1999) examined the impact of trauma exposure on the frequency and types of post-disaster psychopathology that developed. Nearly half of the sample of 182 participants met criteria for one or more psychiatric diagnosis after the disaster. The types of psychiatric diagnoses included Major Depression, Panic Disorder, Generalized Anxiety Disorder, Alcohol Use Disorder, Drug Use Disorder and PTSD.

Subsequent investigators have also documented the impact of trauma exposure on the development of psychopathology. Depression and anxiety are often observed in the aftermath of trauma (Norris, Friedman, Watson, Byrne, Diaz & Kaniasty, 2002; Noy, 2004; Rubonis & Bickman, 1991) along with a spectrum of grief reactions (Bonanno & Kaltman, 2001). Further, post traumatic stress reactions and depression co-occur quite often following disaster. Another human reaction to trauma is the use of alcohol or drugs in attempts to cope with the traumatic memories and intrusive thoughts associated with the trauma (Ford, Hawke, Alessi, Ledgerwood & Petry, 2007).

Other work has documented that one of the most enduring effects of traumatic stress involves increases in physical complaints that are not usually limited to any specific organ system and are often medically unexplained (e.g., fatigue, headache). Further outcome studies suggest that a number of trauma survivors experience an overall decreased quality of life, more absenteeism from work, and impaired social relationships.

Post-Traumatic Stress and Human Reactions to Trauma

Although a wide variety of psychopathology can result from exposure to trauma, when an individual continues to experience a persistent traumatic stress reaction after the traumatic event has past, or post-trauma, it is called *post-traumatic stress* (American Psychiatric Association, 2000). Thus, a stress response that was adaptive and normal during a time of crisis becomes maladaptive when it persists after the traumatic event has passed. Post-traumatic stress is a human survival reaction or elements of this reaction that occur when there is no actual threat present—*a survival reaction that occurs at the wrong time.* When post-traumatic stress is severe and persistent it is called *Post-Traumatic Stress Disorder* (PTSD) as described in the *Diagnostic and Statistical Manual of Mental Disorders: Text Revision (DSM-TR)*—the standard reference used for classifying and diagnosing psychiatric disorders (American Psychiatric Association, 2000).

According to the DSM-TR (American Psychiatric Association, 2000) diagnostic criteria, to qualify for a diagnosis of PTSD, one must have: (1) experienced an event that is life threatening or perceived as life threatening, (2) witnessed an event that is perceived as life threatening to others, or (3) heard about violence to or the unexpected or violent death of others. The latter can involve such things as watching a traumatic event unfold on television (e.g., Hurricane Katrina or the events of 9/11) or hearing about the death of a loved one—referred to as vicarious or secondary traumatization (Palm, Polusny & Follette, 2004).

Further, one must exhibit persistent evidence (i.e., lasting *more than one month*) of (1) persistent *re-experiencing* of the traumatic event (e.g., intrusive memories or thoughts, flashbacks, nightmares); (2) *avoidance* of reminders or the trauma that can involve physical avoidance or psychological "avoidance" or numbness in the form of dissociation; and (3) *chronic hyperarousal* of the autonomic nervous system (e.g., difficulties sleeping, problems concentrating, hypervigilance, increased anxiety, exaggerated startle response).

One must also exhibit severe impairments in daily functioning (e.g., impaired relationships, employment problems)

in addition to the criteria just described. Individuals for whom these same symptoms persist for *less than one month* would be classified as having Acute Stress Disorder (ASD; American Psychiatric Association, 2000). As noted previously, dissociation or removing oneself mentally from an inescapable situation is one possible response to traumatic stress. There is evidence that if dissociation is present in the early or acute stages of the traumatic stress reaction, the risk is increased for developing subsequent PTSD (Birmes, Brunet, Carreras, Ducasse, Charlet, Lauque, Sztulman & Schmitt, 2003) although conflicting results have been reported (Wittman, Moergeli, & Schnyder, 2006).

Symptoms of PTSD usually appear within the first 3 months following exposure to the traumatic event. However, a significant number of individuals may also experience delayed-onset PTSD (Buckley, Blanchard, & Hickling, 1996) in which symptoms may not appear for months or years (American Psychiatric Association, 2000). The duration of PTSD also varies. For trauma victims with early onset PTSD, PTSD has been shown to persist from months to years following the disaster (Galea, Nandi, A. & Vlahov, D., 2005). Even with appropriate treatment, PTSD can persist as a lifetime chronic condition with periods of exacerbation and remission of symptoms (Noy, 2004).

Early Intervention Issues and Strategies in the Acute Stages Following a Traumatic Event

Prior to the 1980s, there were no mental health interventions following disasters. In response to the needs of the Vietnam veterans in the early 1980s, Psychological Debriefing (PD) began to be routinely applied in circumstances involving traumatized victims of disaster and other adverse events. PD is a group of intervention methods that is applied within 48–72 hours following a trauma. Sessions encourage group participants to describe factual events and process the emotional components of the trauma experience. Its use rests on the belief that this immediate processing of the event allows the individual to reorganize the memory of the event so that it is recalled in a less traumatic way (Van der Kolk, 1997). Critical Incident Stress Debriefing (CISD), developed by Mitchell in 1988, expanded and further articulated a process for psychological debriefing (Everly & Mitchell, 2000; Mitchell, 2004; Mitchell, 1988; Riddell & Clouse, 2004) that was later termed Critical Incident Stress Management (CISM).

Katz et al. (2002) review the literature from 1966 to 2002 related to what interventions have been used for prevention and intervention during the first 2 months after an event. Their review of acute psychiatric interventions indicates that the primary focus has been on attempts to minimize the long-term effects of disaster trauma on its survivors. They note that several organizations have come up with intervention teams (e.g., US Navy Special Psychiatric Intervention Teams (SPRINT), the US Army Stress Management Team (SMT)). Also noted is the fact that these interventions have been generously applied in the absence of any scientific evidence that they serve the purpose of reducing psychiatric morbidity, and further note that the same has been true for most acute interventions that "are often performed post-trauma on the basis of good intentions and theorized benefits" (Katz et al., 2002, p. 208). Until more recently, these models have been routinely utilized in emergency and disaster situations despite a lack of evidence-based outcome studies demonstrating their safety, usefulness in the acute phase following disaster, and whether they decrease the risk for longer-term post traumatic reactions. In fact, it has been noted that debriefing is often the "default" in organizations dealing with disaster (cited in Blythe & Slawinski, 2004).

However, these methods and models are now questioned by many experts in the field. Due to questions about their effectiveness in decreasing distress and preventing negative long-term outcomes in those individuals exposed to traumatic events (Blyth & Slawinski, 2004; Greenberg, 2001; Pennebaker, 2001) and several large-scale meta-analyses that have not yielded positive findings regarding psychological debriefing and CISD/CISM (Rose, Bisson, Wessely, 2003; Rose, Bisson, Churchill & Wessely, 2005; van Emmerik, Kamphuis, Hulsbosch, & Emmelkamp, 2002), these methods have come under much scrutiny and criticism.

In review of debriefing methods, it is indicated that the application of debriefing is controversial and, although some show benefits in the short term, others report a worsening of symptoms. Some studies that do show benefits are not controlled, and when controlled these studies do show short-term but no long-term benefits in decreasing adverse long-term outcomes (Deahl, Gillhan, & Thomas, 1994; Hobbs, Mayou, Harrison, & Worlock, 1996; Kenardy, Webster, Lewin, Carr, Hazell, & Carter, 1996). These analyses suggest that at best psychological debriefing can help people feel better in the short term but that it has a negligible effect on long-term outcomes for prevention of PTSD and stress-related problems. In some cases, those who have received psychological debriefings have shown increased acute distress and poorer long-term outcomes than those that received non-CISD or no formal support. This fact suggests that debriefing may actually be harmful.

The debate continues, but most experts in the field have made some recommendations regarding how to best proceed. Namely, more well-designed studies concerning the short- and long-term effects of debriefing are needed to clarify the nature of the current controversy. Despite the fact that some studies have found CISM to have a positive effect and that most research on traumatic stress indicates that some form of reprocessing of the events is a necessary part of the recovery

process, most feel that the application of debriefing methods should not be the "default" mode for early interventions—especially in light of findings that it caused harm for some individuals (Blythe & Slawinski, 2004; Rose et al., 2003; Rose et al., 2005; van Emmerik et al., 2002).

While the authors of CISM claim its effectiveness, prospective clinical trials are lacking. Without evidence to show its effectiveness over that of the natural course of the disorder, which includes spontaneous recovery for some individuals, its effectiveness, while inherent, is not scientifically verified. Research involves self reporting and the assessment of return to work data. While program satisfaction is noted, it has not been correlated with improved performance or decreased incidence of mental health complications, such as PTSD. Statements regarding prevention of stress complications were not supported with data in their publication. The process may indeed be very promising, but clinical trials are needed to show statistical significance in operator performance as a result of this program.

Due to the fact that it may be impossible in the short term to conduct controlled studies on these early interventions, experts have come together to determine what we do know about what helps people cope with trauma and how that can be applied in disasters (Blythe & Slawinski, 2004; Hobfoll, 2007; International Society of Traumatic Stress Studies Resources, 2008; WHO, 2006).

Treatment Strategies

Much of the literature that addresses workplace critical incidents refers to manuals that provide procedures, support personnel, and guidance to manage the emergency (Federal Aviation Administration, 2008). These publications greatly assist individuals who may not recall proper procedures or may make an incorrect decision in the chaos of an emergency. With regard to personnel, publications and strategies are also available to provide guidance on critical incident stress management programs with the goal of improving resiliency and decreasing psychological trauma and its associated complications.

While reaching out to assist passengers, their families, and co-workers is a natural response in disasters, a wide variety of techniques have been used. Single session debriefing (CISD) programs were used, and while they enjoyed a high rate of satisfaction among the participants, the single session did not "prevent the development of negative psychological sequelae." These sessions may be useful in reduction of immediate distress and/or identification of individuals needing further mental health support (van Emmerick, et. al, 2002).

The International Critical Incident Stress Foundation (ICISF) supports a model developed by Dr. Jeffrey Mitchell in which a multiphase interaction with small groups and individuals would proceed through a stepwise progression, with the support of trained psychologist and professional peers. CISM in Aviation has been utilized by major groups in the aviation industry, including airport personnel, air traffic controllers, airlines, and pilot groups.

Individual and Community Resilience and Exposure to Traumatic Circumstances

It is interesting that so much of the research on disaster recovery has focused on risk or vulnerability factors related to the development of psychopathology because the majority of those exposed to traumatic circumstances do not go on to develop long-term problems. There has been less focus in the literature on PTSD, trauma, and disaster recovery that relates to the notion of "resilience."

Bonnano, Galea, Bucciarelli and Vlahov (2006) investigated resilience following the September 11th World Trade Center attacks. These authors defined resilience as the absence of psychopathology (i.e., 0 or 1 PTSD symptoms). The sampling was taken from all adults residing in New York City and the surrounding areas, and occurred six months following the September 11th attacks. Overall 65% of the sample showed no evidence of PTSD. They found that the percentage of individuals showing resilience decreased as the level of exposure to the trauma increased, but that it never dropped below 33%—even in the most severely exposed groups with the highest rates of PTSD.

Interestingly, as in previous work (Bonnano, Rennicke & Dekel, 2005), Bonnano et al. (2006) found that a "compound exposure" or exposure to the event under two different circumstances (e.g., saw the attacks occur on September 11th *and* were involved in rescue efforts) resulted in decreased resilience. This has some important implications regarding the selection of who will be involved in rescue efforts or in terms of training that focuses on increasing the stress resistance of those who may have repeated exposure to traumatic events.

Bonanno, Galea, Bucciarelli, and Vlahov (2007) investigated variables that might predict psychological resilience following mass disaster using a sample of adults with varying levels of exposure to the attacks of September 11th. This study defined resilience in the same manner as earlier studies with resilient individuals showing only 0 or 1 symptoms of PTSD. They also included measures of depression and substance abuse in examining resilient outcomes. The variables of interest included the following: demographic variables

(gender, ethnicity, education, age), measures of social and material resources (material, interpersonal, energy, and work resources), and levels of life stress prior to and after the traumatic event. Previous studies have shown many of these variables to be correlates of increased risk for PTSD.

First, Bonanno et al. (2007) found that resilient individuals had lower levels of depression and substance abuse than those with mild to moderate trauma or PTSD. Female gender was a robust predictor of decreased resilience, consistent with findings that female gender is a risk factor for PTSD. Older age predicted resilience with those over age 65 years showing significantly better resilience than young adults. Interestingly, this study found that higher education levels were associated with decreased resilience. Decreases in income, decreases in perceived social support, and the presence of chronic disease also predicted decreased resilience. Finally, people who had not experienced traumatic events prior to September 11th, who had no recent life stressors, and who had no additional trauma following September 11th were more likely to exhibit resilience.

Hoge, Austin and Pollack (2007) reviewed the literature on resilience and how it is associated with the development of PTSD. Hoge et al. (2007) reviewed the focus of earlier studies of resilience in children—identifying easy temperament, a warm relationship with an adult, social support, internal locus of control (self-efficacy), and positive self-esteem as important to longer-term resilience. The review of early research on resilience in adults identifies a focus on the notion of "hardiness"—considered a constant and stable personal resource (Kobasa, 1979).

Many aspects of the notion of hardiness are consistent with other factors that had been identified earlier such as self-efficacy and an internal locus of control as well as a willingness to take some risks or take on challenging activities. In their review, these authors note that, in addition to those factors noted above, positive distancing (accepting the next best thing to what one wants), hope, optimism, religious behavior, a sense of control, social support and active involvement in and maintenance of relationships, and psychological preparedness have been shown to be related to a greater sense of purpose as well as structured training experiences. Finally, successful past experiences with previous stressors has also been identified as potentially protective, possibly increasing self-efficacy.

Other researchers have also identified procedural problems in studying resilience. For example, Hoge et al. (2007) identify the difficulties of defining and characterizing the concept of resilience. Is it the "converse" of a risk factor? These authors suggest that certain factors seem to be more likely to be related to both risk and resilience (e.g., social support) while others would not (e.g., the presence or absence of developmental delays, male vs. female gender). Others suggest that resilience involves the notion of factors that "confer protection" and which may only show themselves when one is placed in a stressful situation (Rutter, 1987).

Hoge et al. (2007) suggest that it may be advantageous to define resilience as modifiable factors that are inherent within the individual—noting that this could include environmental factors in the sense that the focus is on how an individual interacts with the environment—utilizing or not utilizing resources. These authors also suggest that resilience is almost exclusively in retrospective experimental designs—measuring the characteristics of individuals who do not develop PTSD. For example, they note that "avoidant coping style" is identified as a factor that decreases resilience. Yet, avoidance is a primary sign of PTSD and thus retrospective studies cannot tease out this factor as an inherent characteristic of an individual from the effect of traumatic stress itself.

A recent critical review of the research literature on resilience identifies several methodological problems with some of the previous work in this area—much of which relates to what is meant by resilience, how it has been studied from a conceptual standpoint, and what conclusions have been drawn from and the implications of this previous work (Layne, Warren, Watson & Shalev, 2007).

This research differentiates the terms "protective factor" (a measurable attribute that decreases the susceptibility for being negatively affected by adverse circumstances or stressful events), "stress resistance" (the capacity to maintain adaptive functioning during and after adverse circumstances), and "resilience" (the capacity to apply adaptive strategies early on following an adverse event, such that one is able to bounce back following a period of temporary decrease in adaptive functioning). These authors specifically focus on differentiating stress resistance from resilience. Secondly, and perhaps more importantly, they assert that both are "domain specific." Specifically, in response to significant stress or trauma, a person may be resilient and competent in one domain of functioning (e.g., work) and at the same time show a deterioration of functioning in another domain (e.g., close interpersonal relationships). They further emphasize that resilience is not simply the absence of overt psychopathology, but rather that a person's adaptive functioning following a trauma or stressful event is similar to their previous level of adaptive functioning.

These authors also indicate that although resilience refers to the notion of bouncing back after exposure to trauma, they stress that people can expect to be changed in some ways by exposure to traumatic circumstances and that the notion of returning to previous functioning is "unrealistic"—suggesting other ways of thinking about resilience such as "acceptance of loss" or a "positive adaptation to enduring or ongoing change" (p. 515).

What does previous work in the area of resilience report regarding application to real-world disaster recovery and

interventions that emphasize resilience? In their extensive review, Layne et al. (2007) suggest that resilience-focused interventions can "compliment" trauma-focused (i.e., reduction of psychopathology/problem-focused) interventions. These authors indicate that resilience-focused interventions could include identification of those at a higher risk for developing particular adverse outcomes due to particular combinations of risk, vulnerability, and protective variables. Interventions could target reduction in risk and vulnerability factors as well as enhancement of protective factors.

Another recommendation by these authors includes dividing events according to a timeline: pre-, peri- and post event time periods. In this way, one could incorporate systematic preventive measures during the pre-event period in order to reinforce and build stress resistance. Such measures may be related to attempts to prevent the stressor from occurring (e.g., safety planning and disaster mitigation), building up a reserve of tangible resources to be used in the event of a disaster, or building resistance to stress in those most likely to have exposure to trauma (e.g., table-top training exercises; learning how to analyze problems to determine an appropriate course of action). During or shortly after the trauma (the peri-trauma period) systematic measures could be taken to enhance resilience (e.g., building self-efficacy, improving ability to solve problems, improving the ability to evaluate risks in particular situations). Finally, during the post-trauma period, interventions could target aspects of longer-term recovery in those who do not "bounce back."

CHAPTER 2

Recommendations

The research team encourages any mental health professionals to read the project in its entirety to glean the most up-to-date information pertaining to Employees Coping with Traumatic Events.

State-of-the-Art Model for Disaster Management

Seven steps will be introduced and explained that will guide an organization through the development of a mental recovery plan. There are also five very important intervention principles that are essential for a manager to instill when an employee has been involved in a traumatic event. The seven steps are the following:

1. Awareness and Cultural Integration.
2. Assessment of Mental Health Resource Availability.
3. Embedding Mental Health Practitioners.
4. Preparations of the Mental Health Provider.
5. Employee Training Program.
6. Establishment of a Mutual Aid Assistance Program.
7. Assimilating the MHRP into the Critical Incident Response Training or Airport Emergency Plan.

Introduction to the Planning Stage

In spite of the many defensive strategies and sound operating techniques employed, catastrophic aviation-related disasters occur. As any industry practitioner knows, it is vital to prepare for such events. Most preparation is aimed squarely on loss-of-life mitigation, scene preservation, and ultimately scenario reconstruction. However, an aspect that often gets overlooked involves the mental health monitoring, maintaining, and resilience of air carrier and airport employees. As with any critical incidence response, maintaining functional employee mental health is a vital component, and should be given due consideration prior to the occurrence of a catastrophic event.

Throughout the aviation industry, there are many different management structures in place at airports and air carriers. Delineating factors between such structures include size, resources, and number of employees. Clearly, a large organization with several thousand employees will have different resources available than smaller operations with an employee or two. Irrespective of an organization's scope, there are several critical planning tasks common to all operations that should be completed as part of critical incident response plans.

Step 1. Awareness and Cultural Integration

The first planning task of all organizations should simply be making all employees and any affected individuals aware that the organization will now be implementing an MHRP. Ideally, this should be stated in an employee manual or AEP. The concept should be introduced and emphasized via several communication channels including verbal, signage and written policy. By engaging in such emphasis, the concept of an MHRP can become interwoven with the organization's culture. In addition, this emphasis may help alleviate (but probably not eliminate) some of the well-documented phenomenon wherein some individuals are resistant to receiving mental health assistance.

Step 2. Assessment of Mental Health Resource Availability

In any disaster planning endeavor, it is critical to determine exactly what resources are available and which employees will be responsible for each of the necessary tasks. As previously discussed, most planning efforts focus on loss-of-life mitigation and scene preservation. As part of an MHRP, determining who will be responsible for overseeing the psychological monitoring of the plan is equally important. Ideally, a licensed mental health practitioner who is employed by the organization

would be the key person; however, it is very unlikely any organization would have the luxury of having such a person on staff.

However, almost all organizations have access to Employee Assistance Programs (EAPs) or other mental health providers. An EAP is a program in which employees have confidential access to mental health providers to help them through psychologically stressful events, like chemical dependence issues and traumatic personal events. Usually, these programs are accessed when an employee needs help and is willing to make first contact. In the case of implementing an MHRP, it is recommended that a mental health care provider take more of a proactive status and actually seek out employees as part of the organizational team. Federal, state or locally governed organizations may be able to utilize a government-sponsored EAP (at least for the purposes of use during catastrophic events). Even if an organization does not currently have access to an EAP, it is highly recommended that the organization contracts with some mental health entity for the purposes of implementing an employee MHRP during critical incidents.

Step 3. Embedding Mental Health Practitioners

Many current mental health monitoring programs in place make use of peer-to-peer sessions, often termed "debriefings" or "defusings." Without a doubt, sound operating practices dictate that logistical and progress briefings be made so as to ensure all personnel maintain the appropriate levels of awareness and situation status. However, with regard to mental health assistance, there is mounting evidence that peer-to-peer counseling sessions may be ineffective for some individuals and even harmful for others. At issue is the possibility of an employee experiencing Post Traumatic Stress (PTS). The current evidence indicates that unless an employee experiencing PTS is evaluated and treated by a licensed mental health provider, an untrained peer counselor could potentially exacerbate the stress levels (albeit unintentionally) of the employee and prolong the episode. It is important to note that some employees report they greatly desire a peer-to-peer model, and believe such models have helped them in the past. However, the findings from the present study seem to belie this notion with some people and certainly demonstrate the requirement for more investigation into whether or not peer-based interventions should become the preferred treatment method.

In some cases, there is a stigma attached to seeking out professional mental health support from licensed providers. Given that the efficacy of peer-to-peer counseling is questionable at best, there seems to be a conundrum; how does an employer provide mental health assistance for their employees during a crisis when there is apprehension about seeking a professional and a peer may be unqualified to help? In order to overcome both obstacles, it is recommended that the employer embed licensed mental health professionals, preferably from the organization's EAP, as part of the internal team involved in a crisis. These professionals should literally "walk the scene" with all of the employees as everyone goes about their business of dealing with the catastrophe. Using this model as a component of an MHRP has proven to be effective and accepted by most employees.

Step 4. Preparations of the Mental Health Provider

The embedded mental health provider should acquaint themselves with all of the available assessment and therapeutic techniques recognized as efficacious when treating PTS or other associated trauma.

Step 5. Employee Training Program

As part of the planning activities, all employees should be taught basic crisis management techniques and how to recognize symptoms. While peer-to-peer counseling should be limited, knowing how to recognize some symptoms in co-workers and advising the embedded mental health team member of such signs could prove helpful. In addition, a basic description of the cause, prognosis if left untreated, and long-term care principles regarding traumatic stress should be emphasized.

Step 6. Establishment of a Mutual Aid Assistance Program

Some airports participate in mutual aid groups whereby in the event of a natural crisis (hurricane, flood, etc.) other airports not affected will send personnel to staff critical functions. Certainly, this gives the ability for the airport to function, and, often airports are a vital asset during natural disaster recovery efforts. However, there is also a mental health component to participating in a mutual aid pact. Employees who work at an airport experiencing a natural disaster are often affected by the same disaster in their personal lives. They may be caught in a dilemma between continuing to work so as to support the airport's function or abandoning their posts so that they can deal with their own families and personal situations. By participating in a mutual aid group, an organization could help enable employees to deal with their personal situations and not make a difficult, stress-inducing decision between work and family.

There are two groups in existence at present. They are the Western Airports Disaster Operations Group (WESTDOG)

and the South East Airports Disaster Operations Group (SEADOG). Contact with WESTDOG can be made through the Dallas-Ft. Worth International Airport (DFW) and contact with SEADOG can be done through Pensacola International Airport (PNS), Savannah/Hilton Head International Airport (SAV), or the Gulfport-Biloxi International Airport (GPT). Presently there are no known mutual aid programs between air carriers, and it is unlikely one could emerge due to competitive issues, operational complexities, and regulatory oversight. However, intra-company mutual aid pacts should be considered between stations.

Step 7. Assimilating the MHRP into Critical Incident Response Training or Airport Emergency Plan

The final step in the pre-planning phase is to fully integrate MHRP concepts into any disaster/incident training undertaken by the organization. In the event of full-scale disaster simulations, the MHRP should also be simulated, practiced, and evaluated so as to equip an organization with the necessary knowledge prior to an actual catastrophic event. As an example of such training, an organization could designate some employees to play a role of an overstressed employee by having that person exhibit certain symptoms that should be recognized by peers and evaluated by the embedded mental health provider.

Figure 2 outlines each of the steps for the planning phase of a MHRP.

Mental Health Recovery Planning and Development

A comprehensive guide to planning the mental health response was developed by the state of New York and includes a thorough review of a range of possibilities to consider. Each entity should explore the following areas while developing their individual plan.

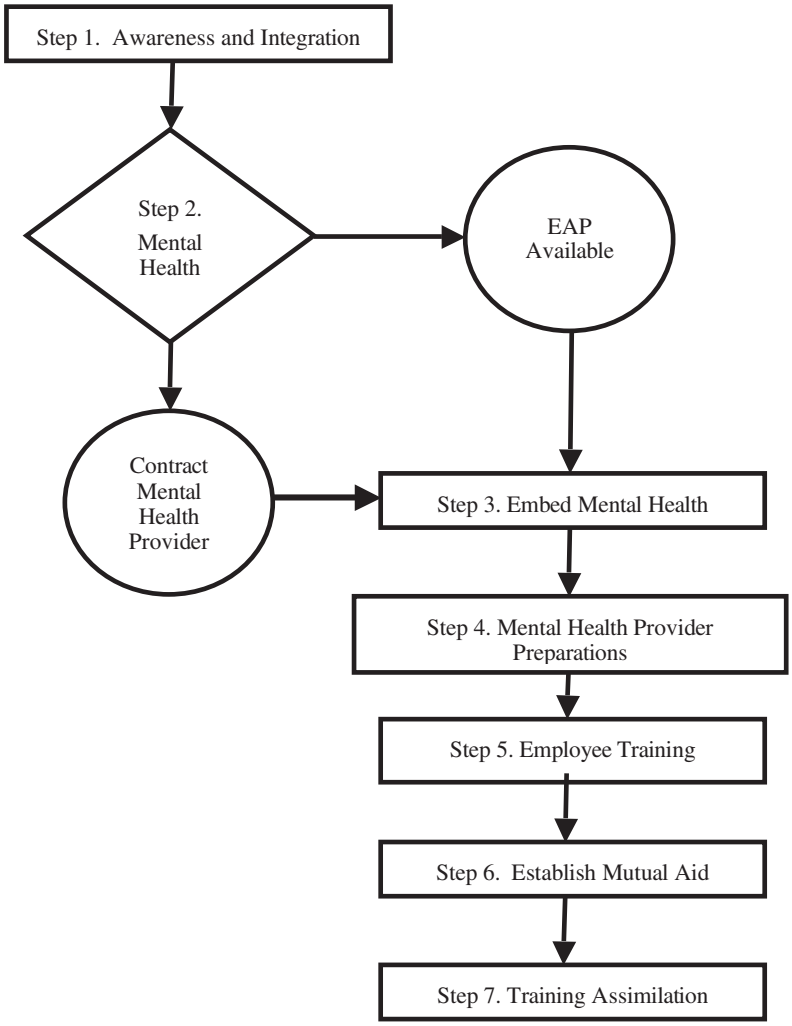

Figure 2. MHRP planning steps.

1. **Planning/Preparedness**
   - Convene a Disaster Mental Health Advisory Committee.
   - Review the AEP.
   - Review the disaster mental health plan of your local American Red Cross and other disaster mental health response agencies in your community.
   - Develop a comprehensive airport disaster mental health response and recovery plan.
   - Develop Airport/Community disaster mental health response teams.
   - Establish a Memorandum of Understandings (MOU) with community partners.
   - Participate in Community/Regional disaster drills and exercises.
2. **Mitigation**
   - Identify high risk areas and populations within the airport work groups and its contiguous borders.
   - Develop disaster-related educational brochures (i.e., psychological impact of disasters and how to seek help, recover, etc.) and distribute to high risk areas and populations.
3. **Response**
   - Activate response protocols for airport disaster mental health teams.
   - Coordinate resource deployment and service provision with other community-based disaster mental health teams.
   - Assess mental health needs of the affected airport and community.
   - Initiate early phase supportive interventions.
   - Identify high risk populations and implement the appropriate early phase interventions.
   - Distribute public mental health educational materials.
   - Collaborate with local government around risk communication.
   - Re-assess and evaluate mental health needs of the affected community.
4. **Recovery**
   - Assess and evaluate the intermediate and long-term mental health needs of the airport community.
   - Identify community/regional resources to provide intermediate and long-term mental health and substance abuse treatment.
   - Train mental health/health practitioners in long-term mental health and substance abuse treatment interventions.
   - Implement supportive interventions for airport Disaster Mental Health teams and other disaster personnel.
5. **Evaluation**
   - Conduct periodic disaster drills and tabletop exercises, as in compliance with FAA regulations, and participate in other community/regional/state drills.
   - Following a disaster or a drill or exercise, convene an "after action" committee to review preparedness, mitigation, response, and recovery issues and activities and make necessary updates and changes.

This list of planning elements has been adapted from the New York State County Disaster Mental Health Planning and Response Guide. The full plan can be viewed as a part of the case studies listed in this Guidebook.

Five Essential Intervention Principles

A number of researchers, professionals, and national and international organizations have articulated some recommendations and guidelines for managing trauma in the aftermath of disasters [Blythe and Slawinski (2004); Alexander (2005); Bisson, Brayne, Ochberg, & Everly (2007); Bisson & Cohen (2006); International Society of Traumatic Stress Studies Resources (2006); and The World Health Organization IASC Guidelines on Mental Health and Psychosocial Support in Emergency Settings (2006)].

Hobfoll, S.E. et al. (2007) represents some recent work done by a group of international experts from a variety of disciplines relevant to disaster mental health. This group was formed to address the needs of individuals traumatized by disasters in lieu of the lack of controlled studies in this area in order to articulate some "evidence informed" recommendations. The project resulted in the identification of five essential elements (Figure 3) of mental health interventions performed in the aftermath of disasters. These principles state that promoting (1) a sense of safety, (2) calming, (3) a sense of self- and community efficacy, (4) connectedness, and (5) hope are all important.

Figure 3. Five essential intervention principles (Hobfoll et. al, 2007).

This following checklist contains the five essential intervention principles that Hobfoll et al. (2007) introduced and are further explained for the emergency planner to consider:

1. Promote a sense of **SAFETY.**
   - Negative post-trauma reactions persist under conditions of ongoing threats.
   - Introducing a sense of safety reduces survival reactions over time.
   - The perception of safety is also important.
   - There are a number of cognitive interventions for decreasing exaggerated perceptions of dangerousness.
2. Promote a sense of **CALMNESS.**
   - Prolonged states of emotional arousal can cause:
     – Sleep, concentration, and decision-making dysfunction;
     – Unrealistic perception of dangerousness; and
     – Avoidance.
   - Major criticism of psychological debriefing:
     – Increases arousal at a time when restoring a sense of calming in important.
3. Promote a sense of **SELF-EFFICACY.**
   - Self-efficacy: having a sense or belief that your actions are likely to lead to a positive or desired outcome "I can do this."
     – Individual and
     – Collective/group→organizational.
   - Following trauma, people are at risk of losing sense of competency to handle problems they face.
   - Important to feel one can cope competently with the specific trauma-related events/tasks.
     – Normalize emotions and
     – Solve problems.
4. Promote **CONNECTEDNESS.**
   - Social support facilitates information sharing, problem solving, normalization, and emotional support.
5. Instill **HOPE.**
   - Trauma results in shattered world view, catastrophizing→ "all is lost" situation.
   - Instill a sense that outside sources will act benevolently.
   - Interventions to decrease exaggeration of personal responsibility for causing event.
   - Decrease catastrophizing.
   - Normalize reactions.
   - Stress that most people recover on their own.
   - Emphasize strengths of individuals and organization.

Response to Actions to Assist Psychological Recovery

Psychological trauma results from the exposures people experience before, during, and after incidents occur. Identifying individuals at risk for psychological trauma may be challenging, as the context and nature of the exposure may not be evident. For example, providing information though radio contact with an aircraft prior to the crash may not give the individual the visual picture most people associate with a traumatic event, but the individual may experience symptoms that need support.

If you are imminently involved with a disaster, a helpful initial process identified in the Hobfoll article, described earlier in this chapter, may be of assistance in your initial response to victims, recovery and rescue workers, or others who may be at risk. Actions to consider during emergency operations include the following:

1. Identify individuals at risk and their organizational supervision.

   While disaster victims and airport personnel directly involved in rescue operations are the immediate concern, also consider personnel from maintenance, security, dispatch, gate agents, baggage handlers, and air traffic controllers to list a few. Remember small organizations (e.g., contract maintenance or security) within large airports may be forgotten and may not have support or policies to assist them.
2. Identify resources for mental health support.

   Organizations that provide mental health support should be contacted as they may have specific guidance and/or personnel to support your operation, depending on the nature and the scope of operations. These organizations may be within organizations (e.g., Employee Assistance Programs), contract groups or through mutual aid (Fire department or affiliated airports). Development of a MHRP will list support groups (Red Cross for victims/families, etc.)
3. Assess the needs of the affected community.

   Identify the conditions and exposures of the teams working in the rescue, recovery, and investigation of the disaster. Unique issues may need physical support that assists coping, such as temperature management, lighting, or personal needs (food, communication with family, etc.). Consider the challenges faced by individuals tasked with jobs outside their training and experience, such as maintenance personnel tasked with cleaning a fatal accident scene.
4. Initiate early supportive measures.

   Prepare crews who will work with the recovery effort whenever possible, as this will help them focus their efforts and minimize uncertainty. Pairing crew members with someone experienced in the operations appears to be helpful, as well as providing individuals to offer mental health support on site to workers as needed.

   Do not expect NTSB, FAA, or other groups to provide mental health support for your staff. While their assistance during operations does help your team members, the mental health support embedded in their organizations is not intended to support individuals external to their group.

5. Identify high risk groups and individuals for additional support.

   The ultimate goal of a team would be to self-monitor the individuals, supporting and relieving colleagues as needed. This was identified as a key element by a number of well-developed recovery and investigation teams. Education and support are needed to prevent additional trauma and provide additional supportive measures, such as time off, counseling, etc.
6. Continue to monitor personnel and effectively communicate.

   Listen, and provide answers, to individuals involved in the recovery operations, as uncertainty was found to be a significant factor in aggravating stressful work. Make lists to keep concerns from being forgotten.
7. Assess the intermediate and long term needs.
8. Evaluate the effectiveness of the plan after each training session and disaster.

This list is but a shell of the plan needed to support an organization, but as with operational disaster action plans, it must be tailored to the specific needs and resources of the organization. Excellent examples of Mental Health Disaster Recovery Plans are available to review and use as a template to develop your individual plan. Please see the New York State County Disaster Mental Health Planning and Response Guide: A Guide for County Directors of Mental Health and Community Services attached as a case study to this guidebook and available at http:/www.omh.state.ny.us/omhweb/countyguide/.

Lastly, there is "no one size fits all" approach, therefore careful consideration of your employee's perceptions and mental health regarding the incident, and the organization structure, culture, and communication network is critical in framing your response to the traumatic event and realizing the best possible course of action for all involved.

CHAPTER 3

Case Studies

1. Airports Helping Airports

The following information is taken from several interviews and documentation provided by the airports involved with, or that have been the recipient of the airports mutual aid plan from the Southeast (SEADOG) and the Western United States (WESTDOG).

Natural disasters in the United States were at an all-time high in 2004–2005; several hurricanes took aim at the southeastern United States, and a group was started to provide technical aid in restoring airports' normal operations. Hurricanes struck several coastal and inland cities, and while there was warning that these storms were to make landfall, no one ever really knows what the exact amount of damage will be, or what the recovery efforts will entail.

The following is an example of "airport mutual aid"; for the purpose of anonymity, "airport A" and "airport B" will replace the actual names of airports discussed in the following example:

As a hurricane approached airport A in 2004, airport B offered assistance; and, as the storm made landfall, airport B's personnel and equipment were staged well in advance to be in position to help airport A return to normal operations. Following the disaster, there were well over two dozen personnel on site representing seven different southeastern airports in the United States.

The director from airport A cited the following benefits to this "airport mutual aid":

1. The workers that came to their aid were experienced "airport personnel" that were very familiar with the dynamics of an airport environment.
2. The process allowed contact with the outside world during a feeling of isolation.
3. The mutual aid workers made it possible for airport A's personnel to tend to their own personal/family situations.
4. Employees of airport A could focus on getting back to normal operations with the additional personnel, supplies, and equipment brought into the airport, as work may serve as a coping strategy.

Following this disaster in 2004, airports in this area of the United States recognized the need for airports to come to the aid of one another, due to the uniqueness of the airport industry, following a natural disaster. The other airports have the needed equipment, skilled personnel, and ability to restore the operations in a time when normal operations are desired. SEADOG has been initiated since this first usage of "airport mutual aid."

The southeast portion of the United States is the target of hurricane season on an annual basis; this group (SEADOG) has been enacted several times since 2004. Each time, the logistics become refined, and there are lessons learned and put into practice for the next activation of the group. The group is informal in nature, and airports that participate do it on a voluntary basis, as there is no formal structure in place. The FAA, TSA, and parts of FEMA have recognized its existence; the group also has yearly meetings to further develop the program.

The western United States airports have formed a similar mutual aid group since 2007. WESTDOG was formed to offer assistance in times of natural or man-made disasters. Like other mutual aid organizations, the participation is voluntary.

As part of the WESTDOG plan, there are four central elements at its core:

1. Airports are critical infrastructure and play vital roles in area recovery from large scale disasters.
2. Individual airports have limited capacity and personnel to recover from catastrophic events, and will be in need of highly skilled and specialized employees that may not be able to respond to their particular airport.
3. Airport operations are highly specialized; therefore, the creation of "airport centric" skills and resources is desirable.
4. This system will harmonize with existing local mutual aid agreements under the National Incident Management System (NIMS) plan.

These factors lay the foundation for airports to become involved with "airport mutual aid." There is sometimes little

to no warning about a disaster, whether it be natural or man-made, and the operation of an airport is critical to the region's recovery. Therefore, having skilled workers and reliable equipment and supplies staged to aid in the airports return to normal operations cannot be overstated.

2. Leadership, Communication, and "Continuity of Care"

The following case study is taken in part from an in-depth personal interview with Hilary Fletcher, County Manager for Pitkin County Colorado as well as other data sources. Pitkin County is located in the west central part of the Rocky Mountains; the County covers 818 square miles and has a full time population of 15,000. The primary population centers are Aspen and Snowmass Village. Ms. Fletcher has been the County Manager since 2001, she has worked in various capacities for Pitkin County since 1988. She has a master's degree in Public Administration from the University of Colorado at Denver.

> On March 29, 2001, about 19:01:57 mountain standard time, a Gulfstream III, N303GA, owned by Airbourne Charter, Inc., and operated by Avjet Corporation of Burbank, California, crashed while on final approach to runway 15 at Aspen-Pitkin County Airport (ASE), Aspen, Colorado. The charter flight had departed Los Angeles International Airport (LAX) about 17:11 with 2 pilots, 1 flight attendant, and 15 passengers. The airplane crashed into sloping terrain about 2,400 feet short of the runway threshold. All of the passengers and crew members were killed, and the airplane was destroyed. The flight was being operated on an instrument flight rules (IFR) flight plan under 14 Code of Federal Regulations (CFR) Part 135.
>
> The National Transportation Safety Board determines the probable cause(s) of this accident as follows: the flight crew's operation of the airplane below the minimum descent altitude without an appropriate visual reference for the runway. Contributing to the cause of the accident were the Federal Aviation Administration's (FAA) unclear wording of the March 27, 2001, Notice to Airmen regarding the nighttime restriction for the VOR/DME-C approach to the airport and the FAA's failure to communicate this restriction to the Aspen tower; the inability of the flight crew to adequately see the mountainous terrain because of the darkness and the weather conditions; and the pressure on the captain to land from the charter customer and because of the airplane's delayed departure and the airport's nighttime landing restriction (NTSB, n.d.).

Upon occurrence of this incident, the county fire/rescue and sheriff's departments responded accordingly. The airport is a small commercial service airport with its own fire/rescue department; they also sent employees to the scene. The climatic conditions were wintry and starting to darken while the terrain was uneven and characterized as unforgiving. This made the rescue work challenging. The first responders quickly ascertained that, of the 18 people on board, there were no survivors. Accordingly, the mission was refocused toward recovery.

It is very clear that fire/rescue, law enforcement, and airports (per FAR Part 139) continually practice emergency exercises where there are survivors and the rescue of these people are practiced over and over and refined with lessons learned. It has become apparent that very few entities practice the recovery phase of a fatal incident. After it is determined there are no survivors the rescue and law enforcement departments release the scene to investigators. Often times office workers, road workers, human services, environmental, and risk management personnel are tasked to do recovery work, due to the size of the effort, small size of the their organization, or proximity to the event. Most people do not seem to shy away from helping out, but may experience things that are not normal in the regular course of their employment.

There are specific tactics of scene preservation for the agencies that arrive and investigate; there are certain protocols for the coroner's office to be followed, and soon after a tragedy, the families of the victims will be arriving on scene and will try to cope with a difficult situation. When organizations practice emergency response, they attempt to include all aspects of foreseeable situations. Accordingly, it is hoped that when a traumatic event occurs, the responding agency is well-versed; however, it seems the transition from response to recovery is not always a well-rehearsed scenario.

Being able to effectively communicate and lead an organization during non-traumatic times is challenging, but being able to provide consistent leadership and communication are essential in guiding the organization through response, to recovery, and to regain normal operations. The following case study is a representation of exemplary leadership, which created a reliable communication network, and kept a watchful eye on the employees of the organization.

Communication when a traumatic event occurs is much more than just generating press releases for the local media. It entails communicating with the local and national media; offering family member assistance; making transport and burial arrangements; and certainly not trivial, attending to the mental health needs of the response and recovery workers. Many of the workers had not received formal training for witnessing fatalities that an accident could produce. As evidenced with this county, a plan was quickly developed for communicating **within** the organization, and making sure the employees received the best possible mental health follow-up care.

Lessons Learned

1. Leadership

The top level leader had over twenty years of progressive experience with public administration working in key positions with legal, risk management, and public information. These key areas of the administration provided a solid foundation of knowledge areas and a network of professionals from

which to build. As her career track progressed she volunteered to take on areas that exposed her to higher levels of crisis and emergency work, which allowed her to build upon her leadership skills. The county has now initiated recovery training with the use of the ICS program and utilizes this methodology whenever possible. This enables each key employee to practice the ICS protocols and make adjustments for their organization when necessary.

It appears that preparation is vital as some people cannot be on the front lines of a crisis, while others may thrive. It is important to tally these skill sets before a trauma, rather than attempting to gain this information during a trauma. While practicing the recovery phase of an incident, a leader can put capable people into the front line positions.

According to Ms. Fletcher, "it is crucial to empower different employees at different stages in the recovery phase to build employee confidence during a crisis. She describes a critical stress incident as, (1) an event with sudden unexpected and overwhelming emotional triggers; and (2) an extraordinary event that interferes with an individual's ability to psychologically cope."

2. Communication

While a tragedy is unfolding, communication becomes essential, not only with the local and national media, but moreover with an employee group. Misinformation occurs during normal operations, but during a crisis this can become magnified. The plan utilized at this airport called for all communications to stop in the command post once an hour in order to regroup and strategize what the next move was or how to handle the preceding hour's problems.

The strategy employed in this case study was to identify the most proficient office managers of the different departments. This tactic appeared to identify "master multi-taskers," who can answer phones, schedule meetings, run the copier, and send emails all nearly simultaneously. While the supervisory staff is tackling individual key situations, the mid-level office managers can initiate and maintain an internal communication network so that all employees are given the timely and needed information to get their organizations back to "normal operations."

3. Continuity of Care

The concept of "continuity of care" was developed exclusively by the County Manager and Human Services department depicted in this case study. The key elements of the recovery plan were (1) community care, (2) organizational care, and (3) employee care.

The County Manager, in her 20 years of dealing with traumatic events, came to the realization that there seemed be a lack of knowledge and training in emergency management protocols for the recovery phase. In the aftermath of this aircraft incident, it is widely practiced that all organizations engage in some sort of group "defusing" or "debriefing," referred to by most authors as a Critical Incident Stress Debriefing (CISD). The event may be either voluntary or mandatory by the organization, and it usually involves a session or sessions where the incident is discussed. There are usually mental health professionals and/or clergy available for employees to discuss their feelings regarding the trauma. These sessions are usually held fairly soon after the actual event.

Some people feel that firefighters and law enforcement have their own internal mechanisms for dealing with tragedy and in some ways are "just wired different." In this particular incident, 44 non-public safety workers were involved in the aviation aftermath; it took two years to officially close the incident. On the day after the crash, the County Manager and Human Services Director drafted an extensive program that they strictly followed to manage their employees through the program. It was specific and focused, because they did not want to lose any employees due to an inability to cope with what had happened or what they had witnessed. During her 20 years of public service, the County Manager had experienced many traumas and knew that critical events could become overwhelming. The program included the following:

1. Organizational Employee Care "Continuity of Care Plan"
   - The County hired a mental health care professional (MHCP) that specialized in post-traumatic stress (PTS).
   - The MHCP was on site for a week, roving between locations and departments.
   - The MHCP was given the names of the 44 employees that responded/worked the accident.
     - The MHCP physically checked on the employees, and was available for private consult.
     - The MHCP rotated through departments so that all employees had access.
   - The MHCP led training sessions with the supervisory level so that the employees knew what post traumatic stress was and the signs their employees may exhibit. All supervisors were required to attend.
     - Supervisory contact with employees was daily (for two weeks), then every other day, then every third day, then once a week, then every two weeks, then once a month.
     - Supervisors were required to document their contact with the employees to the Human Resources Director.
     - Worker's compensation was offered.
   - The county wrote a brochure and sent it all employees.
   - The county Human Resources department contacted family members, spouses, or significant others of their employees so that they would be familiar with the symptoms of PTS, and provided them numbers to contact in

case they needed assistance (this system actually produced one employee referral).
  - Employees utilized counseling services.
    - The county set up an open-ended agreement (counseling and financial) with the local counseling center.
  - The County Manager personally recognized each (44) employee that had a part in the accident recovery and each employee received three comp days, no matter their role in the efforts (this was done for the purpose of validating and acknowledging employee participation).
  - The County Board of Commissioners was tasked with personally thanking each employee that was involved in the recovery efforts.
  - The recovery phase of this critical incident lasted approximately 1 year.
2. Community Care
  - Initiated contact with local counseling center for community access.
  - Encouraged bystanders, witnesses, responders, and air traffic controllers to use the counseling center.
  - Responded to calls from family and friends of citizens at the scene.
  - The County provided the community educational information and held meetings pertaining to critical incident stress, and how to recognize symptoms of stress.

The following are concluding remarks from the interview:

- The area of concern seems to be the transition from response to recovery mode and dealing with the human relations impact. It is important to provide mental health recovery internally as at some point operations will return to normal, but employees will have to live and work with what they have witnessed.
- An organization should ensure that the lessons learned while employees are working this type of event are recorded and implemented into their emergency plan once the immediate event is concluded.
- It is the general lack of information that makes people unsettled.
- When communication doesn't flow and an organization is in crisis, the level of stress can become extreme.
- It may take a few days for the NTSB to get on scene, as well as the American Red Cross. Family members will attempt to come to the scene as soon as they can.
- The Incident Command Structure (ICS) works; it should become engrained in every organization. Employees should study the ICS by taking courses and using it in everyday events just for practice so it becomes natural.
- In a small community, resources may be exceeded, so mutual aid agreements should be utilized.
- Emergency planning and drills should be incorporated into the recovery transition.
- Managers should be aware that public safety workers are not accustomed to lengthy efforts but rather are better suited to short episodic events.
- General Aviation (GA) is typically not prepared for this type of accident; the commercial air carriers have plans in place, but not GA.
- The legal entity (County) should have emergency financial allocations at its disposal for clean up, hiring critical workers, consultants, etc.
- An organization should build strong and reliable relationships both internally and externally.
- The incident became a National media event, due to its highly visible location (Aspen), so organizations should be ready for an intensive public focus.

3. A View from Those with Experience

The following case study was taken from two interviews with aircraft incident investigators with experience over several years and many incidents. They participate in these duties as members of the Airline Pilots Association (ALPA), bringing their expertise in flight operations to the party system used by the National Transportation Safety Board in their incident investigation process.

The discussion with these individuals is important in that they have experienced the psychological trauma of the incident, as well as observed and supported those individuals who are experiencing this type of psychological trauma for the first time. While their insights may not be scientifically based, we feel it does reflect a common operational experience in the activities surrounding the recovery efforts in an investigation.

ALPA representatives asked to participate in an aircraft incident investigation can have varying levels of training and preparation. Individuals in this case study received training from multiple professional entities in incident investigation (e.g., Air Force, university, NTSB, ALPA courses, etc.), in addition to their experiences in multiple investigations. At the time of the interview, both ALPA members were conducting an incident investigation course for ALPA pilots involved in the organization's safety program, with the expectation that these individuals potentially would be called to face an incident to investigate.

Preparation

The investigators noted the importance of preparation for individuals working in and around an aircraft incident scene.

The work is very unique, with many specialists and agencies quickly converging on the scene. Individuals uncertain of their role and responsibilities are likely to become hesitant and overwhelmed with the traumatic scene. The investigators cited several examples where training recovery personnel prior to the event would not only assist them in accomplishing their tasks, but to support healthy adaptation to the stress associated with this work.

The NTSB investigators felt that recovery personnel need a sense of duty, knowing they are part of a team to prevent this tragedy from happening again. The destructive nature of an aircraft disaster can incapacitate workers and lead to personalizing the trauma and feeling a sense of helplessness. "It's a disturbing sight to see the consequence of errors or malfunctions. People identify with that . . ." One investigator quickly admitted that some aspects of the recovery process (e.g., recovery of human remains) were emotionally more difficult for others than for himself. He states he has learned to tolerate this particular duty by acknowledging "evidence comes in many forms and this is just one of them." Both investigators felt recovery teams in the field had to focus on their purpose to collect and preserve evidence, with the goal of identifying the cause of the disaster.

Preparation of the recovery team should include knowledge of the NTSB incident investigation process, the design of team structures, and policies to allow an individual to work within the system to accomplish their goals. Both investigators interviewed noted training was important to keep individuals working the scene to be better able to maintain focus on their specific jobs and not disengage or become overwhelmed during periods when they were idle. The investigators related incidents where individuals who were not well-trained or would become overwhelmed at the incident scene, and that focusing on their specific job was one attempt to make the event less personal.

Another point made in the interviews was that an individual who is prepared to face difficult images of a disaster scene can avoid what they consider triggers to their stress. Some sights, smells, and/or situations can remind or create memories among the observers. This may be difficult or impossible to predict, but some investigators are familiar with common smells or sights at disaster scenes. These may trigger memories of feelings from prior incidents. This was a common theme with both individuals interviewed.

One investigator said that body part recovery was not an issue for him as long as he viewed the material as evidence, but that one trigger point in the field for him is looking at the victims' personal effects, this causes stressful reactions and unpleasant memories. It is apparent that trigger points for stress reactions may be difficult to identify proactively.

Another story related was an incident investigator who had no apparent triggers but later found that children's clothing on the incident scene would trigger stress reactions. This trigger point developed following the birth of his first child.

It is apparent that ALPA's preparation also included planning the mental health support for surviving airline crew members they are representing, family of injured or deceased crew, and the investigators themselves. ALPA's CIRP was developed to address and decrease crewmembers' psychological stresses during and following an investigation. This program is discussed in more detail in the following section.

Connectedness

Both interviewees noted that connectedness with others involved in the investigation or at home were important factors in maintaining their personal mental health. In their observations of others involved in incident investigations, they observed outcomes that ranged from significant impairments and withdrawal from aviation to resilient individuals who returned to work, apparently without problems.

Both investigators interviewed noted a variety of coping mechanisms were used (alcohol use, withdrawal, humor, and focusing on the job at hand) and often shared within the groups. Investigations of major disasters are known for long hours of continuous operations with associated fatigue. The investigators noted that recovery team members would often look after each other and suggest breaks for individuals they detected needed a reprieve. While some group members would resist the suggestions early in group formation, with increasing camaraderie, team members would respect the suggestions more. The development of a team that watched after each other was deemed an important development.

One investigator noted the intention of a group leader was similar to military operations—to form a cohesive group and to promote each person looking out for the welfare of the other members. This would apply to operational as well as mental health support. This is also the basis by which the CIRP provides an individual to monitor ALPA team members for signs of psychological stress during and after the investigation process. The CIRP member is assigned support duties and remains onsite with the ALPA team during the investigation to provide support and referral for professional mental health support services.

The CIRP is multi-faceted, but its central premise is to address the needs of crew members involved in incidents or ALPA members on investigation teams. Peers, imbedded with the investigation team, are trained to identify stress-induced problems that would need referral to appropriate health care professionals. Both ALPA members interviewed strongly supported using peers as initial contacts, citing greater acceptance of the situation as they are "talking with someone who went through this already."

One ALPA member noted that teams working with cockpit voice recordings would request a pilot who knew the incident pilot, in order to assist with voice recognition and operational questions. This work was done in Washington, D.C., removed from the incident site and other ALPA support personnel. Listening to the voices of colleagues during the incident is considered to have a high potential for personal reactions and psychological trauma. In response, ALPA now dispatches mental health support personnel (CIRP) to accompany pilots involved in this type of work.

When discussing situations in which individuals did not receive needed help, the ALPA investigators strongly felt a professional mental health support program would have been of assistance, if available onsite.

Other Issues

These investigators acknowledged they are often told of incidents with immediate orders for departure to the scene. Although the travel time, organizing an arrival to the scene, and verifying that the site has been secured creates a hectic schedule, they note they don't have time to prepare for the investigation psychologically. One investigator recalled a phone call notifying him of an incident that was in progress at the time of the call. A pilot was riding a tug to the aircraft crash and fire within minutes of the impact to notify ALPA investigators of the incident. Crash/fire/rescue, security, medical personnel, and airport workers may also find they have little time to prepare for the trauma of the incident scene.

Important Points

These investigators believe that some individuals working in this field are susceptible to psychological trauma as a result of their experiences. It does not appear to be predictable to the investigators as to who is at risk. It is also noted that susceptibly can change according to the circumstances of the incident or issues surrounding the individual.

Preparation through training and simulation are considered valuable not only for work effectiveness but as a coping mechanism. Simulation of the chaos and pressure in some incident investigations are difficult to replicate in the training setting and make the experience of incident investigation a learning experience in itself.

Triggers that remind or create unpleasant memories or stress reactions are important to recognize, as avoidance appears to be possible for some individuals. Foreknowledge of this topic is considered worthy of discussion in a training program.

Camaraderie can create teams who monitor each other's performance and ability to cope with the situation, providing support when needed. Coping mechanisms, and especially methods that are counterproductive, should be discussed with incident investigators during training programs.

ALPA's CIRP has strong support from the two members who are familiar with the program. Both feel peers designated as mental health support team members are an effective measure when used onsite, in real time, and are known to the team during the experience.

4. Innovative EAP Builds Employee Resilience

The following information was taken from an in-depth interview with an organization that regularly works with traumatic events. This organization has outsourced their EAP.

Employee retention is a very important aspect in any company, but when the personnel are a highly trained, specialized group of individuals doing very specialized tasks, it becomes critical that the employees are retained and are given the opportunity to build their resilience. Most organizations have EAPs in place; they are normally stand alone outside resources that are not within reach during the normal course of business. Efforts are usually needed for an employee to access the needed resources, and in some cases there are time gaps in receiving the benefits. Another divisive issue is that some employees feel there is a negative stigma attached when reaching out to one's EAP and therefore some employees do not ask for the help that is needed.

The organization that this case study depicts has deviated from the standard EAP process and has chosen to integrate their EAP contractor into their employee relations from initial training events up to and including regular field work. The EAP contractor will venture out to the organization headquarters, as well as, in field visits and specialized site visits while the employees are actually working a disaster.

This integration allows the employees to form personal relationships with the EAP contractor and accordingly, this person may also play a peer role to the employee. This is especially unique, in the fact that, some people like to talk about particularly disturbing events with someone who has actually been to an event of such magnitude. The importance of this integration is the psychological first aid that can be given and received on-scene. A licensed mental health worker can assist the employee, and the employee has had the opportunity to establish rapport and a trusting relationship with the EAP provider.

Essentially, the EAP has been inextricably woven into the protocols of the organization, and there is organizational-wide acceptance of the mental health provider, thus wiping away any stigma that may be negatively attached to the situation. An employee working a traumatic event has the benefit of working alongside the EAP contractor, and the contractor is able to assess the employee on site. The EAP contractor becomes a

quasi-peer as well as a credentialed mental health professional. The organization is confident with the level of mental health assistance their employee is receiving as it is simply more than psychological first-aid administered by a lay person.

Employees appear to benefit from this plan for many reasons. The EAP contractor is involved in training scenarios, management briefings, and on scene work. The EAP contractor is seamlessly involved in the employees work experience, and as such, the value lies in the EAP contractor being able to "check-in" with employees during the course of work, after hours, and in an office setting if necessary. An appointment two weeks down the road in a professional setting is often-times unneeded, due to the mental health aid that was given in the field, when requested, or when it is most appropriate.

The EAP information is also housed on an internal webpage for the organization's employees. If the employee accessed the intranet, then EAP information for a variety of issues is easily accessed. The EAP has become embedded in the organization, which may make it more cost-effective, in that the organization is able to retain its highly trained workforce in face of traumatic events.

A less than obvious benefit of having an external EAP is the issue of confidentiality. This organization feels that having an outside vendor allows the employee increased anonymity with accessing mental health support. There is a built-in barrier between the management and the provider as well.

The EAP contractor is also able to help an employee's family and encourage self-care for the employees. It is hoped that this creates an atmosphere of employee resiliency where the employee knows the stigma of mental health support has been erased. Accessing the EAP is encouraged and supported by the entire organization. Using this model of assistance, the organization hopes to demonstrate that each person in the organization is valued by allowing and encouraging each employee to build their own resiliency; then the work of the entire group is less burdensome.

5. Home Grown Resilience

The following case study is taken from an in-depth interview with an airport manager with fifteen years experience, twelve of those at the executive level of a small general aviation airport in the Midwest. The airport manager is the only full-time airport employee located on the field and has been involved in three fatal incidents over the past 12 years. This case illustrates the personal, group, and organizational resilience that this individual has been able to cultivate as a result of experiencing traumatic aviation events.

The airport in this case is a small non-Part 139 general aviation airport facility that is city-owned and operated. The airport manager is the only full-time employee on the field. There is no FAA requirement for emergency preparedness, but over the years, the airport manager has fully developed an emergency plan for the airport, and has, in cooperation with the city-operated fire department, held a full-scale disaster scenario.

Upon the second fatal general aviation airplane crash, this airport director had a desire to become more cohesive with the responders within the jurisdiction, the airport manager approached the city fire chief, and the chief agreed that this individual would greatly benefit from firefighting and rescue training. The airport manger began training with the fire department and is now a fully certified member of the city fire department, in addition to being the airport manager.

Over the past few years, the airport manager has been responding to the same calls as the fire department and building camaraderie and trust with the fire department employees. The airport manager has responded to house fires, automobile incidents, and fatalities. This extensive training and the response to traumatic events has enabled the airport manager to become personally resilient in the face of traumatic events.

While building this trust and connectedness with the city fire department, the airport manager decided to build a training scenario for the airport and the fire department which involved a supposed aircraft incident (as required for a FAR Part 139 commercial service airport) and with the approval of the fire chief, ran the incident at the airport. This exercise enabled the fire fighters to become familiar with response activities surrounding aviation and the need for site preservation for the NTSB or FAA.

The airport manager has been able to determine the direction of personal needs in order to build internal strength and resilience while affiliating with a group and receive group resilience, all the while under the guise of organizational resilience from the city. Being a singular employee at the airport can be a daunting, yet exciting proposition. However, when traumatic events occur, people need to have a support network and a feeling of connectedness.

By seeking additional training from the fire department, this airport manager began building resilience on an individual level. With the advanced training, this manager then began to build trusting and cohesive relationships within the fire department, exemplifying group resilience. In the end, by bringing together the fire department and the airport, this indicates organizational resilience.

Hobfoll, et al. (2007) identifies five essential elements of trauma intervention that an organization can offer in order to enhance an employee's resilience (1) safety, (2) calming, (3) self- and communal efficacy, (4) connectedness, and (5) hope. This airport manager was able to bring together these five elements by understanding what objectives needed to be met in order to satisfy a personal need. The airport manager determined at the second aircraft fatality that there

was an internal need to be more prepared and connect with the fire department.

The airport manager connected with the fire chief and began training with the fire department, thus building self- and communal efficacy. This provided an atmosphere of connectedness, and after working with the fire fighters on non-airport fire department calls, the manager found peaceful resolutions and an ability to cope with the after effects of a traumatic event. All of these elements combined provide a safe and calm atmosphere in the midst of chaos.

Lessons Learned

1. Determine who will handle the media for the airport during the event.

The airport manager was on scene as an official, but also as a city fire fighter. This made the response activity go quite smoothly; however, upon return to the office the media, and others barraged the terminal and phone lines for information. Who is to give out fatal information? When building scenarios and training events for traumatic events, make contact with the department or person that will handle the media and notifications on behalf of the airport. If the airport is small (1 employee) then someone from the local jurisdiction may be delegated to handle this duty.

2. Determine who will handle victims' assistance activities.

Victims' families may want to visit the area and be brought to the site of the incident to aid in their grief process. While this is an important step for families it is not a comfortable position to put the airport sponsor in. At the point of initial investigation, the airport has no idea of the NTSB outcome and there may be liability, so careful planning should ensue. There should be a determination of what neutral party in the response effort should handle the victims' family members. If the scene is on the airport property, then accommodations for access will need to be considered. Make direct contact with the American Red Cross for your region.

3. Be cognizant of anniversary dates and memorial requests.

It is not uncommon for family members to want to visit the site of the incident in the preceding years on the anniversary of the event. This will trigger phone calls and emotions surfacing, or reliving the event for the airport worker. Also, there have been several airports around the country that have been asked to put a permanent marker or memorial on the incident site. This, too, will cause emotions to resurface surrounding the trauma. Careful consideration and planning will need to be taken to have the appropriate resources in place to deal with requests of the family and possible mental health implications for employees.

6. Example Mental Health Recovery Plan

This Mental Health Planning Document was retrieved from ***The State of New York's Office of Mental Health.*** *It provides a comprehensive review of the planning and resources needed to develop a mental health response guide. While it is not an "airport-specific" plan it illustrates many different facets to consider while developing an organizations individual plan. It is available at http://www.omh.state.ny.us/omhweb/countyguide/.*

The New York State County Disaster Mental Health Planning and Response Guide: A Guide for County Directors of Mental Health and Community Services

The ***County Disaster Mental Health Planning and Response Guide*** provides specific information and resources to assist the county Director of Community Services (DCS) in the development of a comprehensive county mental health disaster plan. The Guide follows the disaster management continuum and takes into consideration the important aspects of Planning and Preparedness, Mitigation, Response, Recovery, and Evaluation.

It is recommended that the DCS review the community's plan routinely so new information in the field of disaster mental health may be integrated into the plan in a timely manner. Key contact information for vendors, volunteers, employees, and others should be reviewed every 6 months and the plan updated accordingly.

1. General Overview

1.1 Planning/Preparedness

- Convene a county Disaster Mental Health Advisory Committee.
- Review the county's Emergency Management Disaster Plan.
- Review the disaster mental health plan of your local American Red Cross and other disaster mental health response agencies in your community.
- Develop a comprehensive county disaster mental health response and recovery plan.
- Develop county disaster mental health response teams.
- Establish county MOU with community partners.
- Participate in county disaster drills and exercises.

1.2 Mitigation

- Identify high risk areas and populations within the county and its contiguous borders.
- Develop disaster-related educational brochures (i.e., psychological impact of disasters and how to seek help, recover, etc.) and distribute to high risk areas and populations.

1.3 Response

- Activate response protocols for County disaster mental health teams.
- Coordinate resource deployment and service provision with other community-based disaster mental health teams.
- Assess mental health needs of the affected community.
- Initiate early phase supportive interventions.
- Identify high risk populations and implement the appropriate early phase interventions.
- Distribute public mental health educational materials.
- Collaborate with county government about risk communication.
- Re-assess and evaluate mental health needs of the affected community.

1.4 Recovery

- Assess and evaluate the intermediate and long-term mental health needs of the affected community.
- Identify community resources to provide intermediate and long-term mental health and substance abuse treatment.
- Train mental health/health practitioners in long-term mental health and substance abuse treatment interventions.
- Implement supportive interventions for DMH teams and other disaster personnel

1.5 Evaluation

- Conduct periodic disaster drills and tabletop exercises.
- Following a disaster or a drill or exercise, convene an "after action" committee to review preparedness, mitigation, response, and recovery issues and activities, and make necessary updates and changes.

2. Planning and Preparedness

2.1 Convene a Disaster Mental Health Advisory Committee

The involvement of and collaboration with a wide variety of public and private agencies and organizations is strongly encouraged. Planners may find it useful to sort the planning process into "topic" specific task groups or subcommittees addressing such areas as legal issues, recruitment and training issues, operational and deployment protocols, "special incidents" planning, etc. A vibrant and comprehensive mental health disaster plan is highly correlated with the collaboration and diversity of participants involved in its development. Effort should be made to invite participants from multidisciplinary backgrounds and experiences. Representatives from the following list of public and private agencies and organizations might be invited to serve on the overall advisory committee or its topic specific task groups:

2.1.1 County/City Stakeholders

- Office of Emergency Preparedness.
- Department of Health/Public Health.
- Office of the Medical Examiner.
- Department of Health and Human Services.
- Department of Human Resources Management.
- Department of Information Technology.
- Department of Legal Affairs/Risk Management.
- Law Enforcement, Fire, and Emergency Medical Services.
- Business Community.
- School Districts/Universities/Colleges.
- Correctional Facilities.
- Airport Administration Officials.

2.1.2 Regional/State/Federal Stakeholders

- New York State Office of Mental Health (Field Office).
- New York State Department of Health (Regional Office).
- Regional Resource Center/Hospital Bioterrorism Preparedness Program.
- New York State Office of Alcohol and Substance Abuse Services (Regional Office).
- New York State Office of Mental Retardation/Developmental Disabilities (Regional Office).
- New York State Emergency Management Office (Regional Office).
- New York State Office of Mental Health Psychiatric Centers.
- U.S. Department of Corrections (Federal Prisons).
- U.S. Veterans Affairs.
- U.S. Military Installations.

2.1.3 Other Public/Private Agencies and Organizations

- American Red Cross.
- Salvation Army.
- Academic Medical Centers.
- Community Hospitals and Healthcare Facilities.
- Mental Health Associations.
- Home Health Agencies.
- Tribal Nations.
- Nuclear Power Facilities.
- Faith Organizations.
- Transportation Companies (rail, bus, air).
- Private Schools/Universities/Colleges.
- Business and Industrial Community.
- Veterinary Associations.

- Special populations (those agencies or advocates representing children, elders, individuals with emotional and physical challenges, various ethnic/cultural populations such as Hispanic, African American, Asian, Mennonite, deaf/hard of hearing, etc.).
- Private Residential Care Facilities.

2.2 Review Your County Disaster Plan

The county's mental health disaster plan is one component of each county's overall community-wide disaster plan. To obtain a copy of the County Disaster Plan, contact the County Emergency Manager or Director of Emergency Preparedness. Each county plan should include a general overview of the authority of the County Department of Mental Health during the event of a disaster. In reviewing the county's disaster plan, pay particular attention to the following issues in a county:

- Potential disaster hazards and risks.
- Disaster history.
- Special plans (or Annexes) which identify specific roles, responsibilities, or procedures the County will engage in related to the type of disaster. For example, many counties have elected to develop special plans in the event of the following:
  - Aviation or other transportation accidents.
  - Weapons of Mass Destruction incidents.
  - Radiological/Nuclear incidents.
  - Hazardous Materials (HazMat) incidents.
  - Public health emergencies (such as SARS, Influenza, and other communicable diseases).
- Review data on the geographical and population demographics of the county as well as data on the risk groups below. The DCS may also want to collaborate with the county's Geographic Information Systems (GIS) group to map out specific risk groups:
  - Rural vs. urban communities.
  - Individuals living in flood plains.
  - Individuals living on earthquake fault lines.
  - Children, elderly, deaf/hard of hearing.
  - Schools, colleges, and universities.
  - Ethnic/cultural populations.
  - Religious communities.
  - Group homes or assisted living facilities (mental health, substance abuse treatment, MR/DD).
  - Nuclear power and other energy facilities.
  - Business and industry, especially those which may be high risk targets for acts of terrorism.
  - Disaster/emergency relief personnel.

2.3 Review Disaster Plans for Local Disaster Response Agencies

A county's local chapter of the American Red Cross is responsible for meeting the short-term or immediate disaster related needs of a community during times of disaster. A community may also have other organizations that have disaster-related service missions. Identify such agencies and request and review copies of their respective disaster plans. Identify opportunities to collaborate and reduce redundancies in service provision, where appropriate.

2.4 Develop a Comprehensive Mental Health Disaster Plan

Preparing for, responding to, and recovering from disaster is predicated on a comprehensive disaster mental health plan. Development of this plan should include representatives from across professional disciplines as well as those from the public and private sectors. Once the plan is completed, it should be shared with and reviewed by a wide audience, especially those who have direct responsibility for carrying out specific tasks and roles identified in the plan. Listed below are key elements of a mental health disaster plan. Further information regarding these key elements may be found in the U.S. Department of Health and Human Services, Substance Abuse and Mental Health Services Administration (SAMHSA), Mental Health All-Hazards Guidance Document, 2003 [see Comprehensive Literature Review, Appendix A].

2.4.1 Mental Health Disaster Plan-Key Elements

- Statement of Purpose
  - A statement of the general purpose of the plan and how it is intended to be used.
- General Assumptions
  - This information should include an overview of the responsibilities of the County Department of Mental Health, highest probability scenarios, as well as special considerations having significant impact on planning, including vulnerable populations, special facilities, etc.
- Concept of Operation
  - Include the County DCS's approach to an emergency situation: jurisdictional responsibilities; sequence of action before, during and following an event; requests for aid, etc. This section is intended to be relatively brief, providing only the most general overview, primarily for readers of the plan who will not need the level of detail contained in the remainder of the plan.
- Citation of legal authorities and reference documents
  - Reference the specific legal authorities that enable the County Department of Mental Health to fulfill the elements of the plan or to maintain existing services. In the event the County Department of Mental Health mobilizes and deploys paid staff and volunteers to provide disaster mental health services on behalf of the County, reference should be made in the plan as to what legal authority authorizes such deployment and how employee or volunteer liability will be covered in the event of a disaster-related accident or injury.

- Organization and Assignment of Responsibilities
  - Identify tasks (within the County Department of Mental Health, other County Departments, outside agencies) to be performed and positions and organizations responsible for carrying out these tasks.
  - Identify who is responsible for modifying and updating the disaster mental health plan and how often.
  - Identify the level of integration of preparedness and coordination of operations with other important components of local government (i.e., health/public health departments, substance abuse agencies, criminal justice agencies, mental retardation/developmental disabilities agencies, etc.).
- Administration, Logistics, Legal Issues
  - Policies and procedures regarding releasing personnel home, holding personnel in place, recalling essential personnel, and facilities evacuation (for County Department of Mental Health personnel and facilities).
  - Procedures for record keeping of program activities, expenditures and obligations, human resource utilization and situational reports.
  - Procedures for the management of both pre-identified and spontaneous volunteers.
  - Procedures for feeding, sheltering, transporting, and supervising personnel.
  - Procedures for the repair/replacement of essential equipment (radios, computers, cell phones).
  - Arrange for personnel to have identification badges and address and resolve potential access issues with law enforcement or other related agencies.
  - Address issues of licensing, personal, professional and organization liability, patient records management, informed consent, confidentiality, emergency evaluation or commitment laws, and duty to report laws.
- Communications
  - Procedures and methods for notifying county mental health personnel, facilities, services providers, and appropriate others.
  - Alternative plans in the event of failed communication capability.
  - Identify the availability of technical consultation.
- Public Information
  - Identify policies and responsibilities for dissemination of public mental health information.
  - Identify external populations that may need special warning and procedures for implementing such warnings (i.e., deaf and hard of hearing populations).
  - Describe the relationship with the county Public Information Officer.
  - Identify the availability of public information material (fact sheets, guides, multiple languages, access to services, etc.).
  - Identify a process for distributing educational and other materials to mental health service sites.
  - Identify experts and resources outside the County Department of Mental Health that may be utilized as consultants or advisors during times of disaster.
- Evacuation
  - Develop evacuation procedures for county mental health offices and facilities.
  - Identify alternate sites and facilities.
- Collaboration with Other Agencies
  - Coordinate with American Red Cross Disaster Mental Health Services.
  - Coordinate with community hospitals, mental health centers and other mental health service providers.
- Resource Management
  - Identify how the County Department of Mental Health will find, obtain, allocate, and distribute necessary resources (i.e., personnel, transportation, communications equipment, mutual aid, management of spontaneous volunteers, etc.).
- Special Response Plans
  - Develop special response plans for high risk events or incidents in which the County Department of Mental Health or its facilities has special jurisdiction or responsibility (i.e., aviation disasters, nuclear power facility accidents, weapons of mass destruction events).
- Continuity of Operations
  - Describe how the County Department of Mental Health will maintain or re-establish vital functions (those services mandated by State or county regulations) of the department during the first 72 hours following an event that seriously compromises or disrupts normal operations.
  - Identify and address procedures for restoring vital records and data management within 72 hours.
  - Procedures for the identification of essential personnel, staff notification, staff and family support, and staff transportation.
  - Identify alternate locations for essential operations.
  - Identify alternate sites for vital records (e.g., duplicate copies of the disaster plan, personnel rosters, etc., should be located off site should existing sites be destroyed or are inaccessible).
- Other Planning Considerations
  - Identify a plan to prepare and support County Department of Mental Health personnel during and following deployment (i.e., physical health, mental health, family support).
  - Ensure the County Department of Mental Health's role in disaster training, drills and exercises.
  - Collaborate with county's GIS department to map high risk geographical areas and populations.

  - Develop a list of federal, state and local mental health and substance abuse treatment facilities, contact names, and telephone numbers (including alternate modes of contact).

2.5 Develop Disaster Mental Health Response Teams

A county disaster mental health response team provides a significant resource to the community. Following a disaster, the majority of those affected will experience a range of reactions that can be both stressful and impact personal functioning. Disaster mental health response teams provide important supportive mental health interventions that may mitigate both the acute and long-term psychological consequences of disaster. Consideration must be given to the key issues listed below in the development of a county disaster mental health response team:

- Risk Management: If utilizing volunteers, address professional liability issues such as malpractice, workplace injury, etc. If utilizing County Department of Mental Health personnel, address how employees will be compensated for time worked as well as limitations on employee number of work hours/days.
- Selection Criteria: Team members should meet minimum educational standards as well as possess documented experience in providing disaster mental health or other trauma-related support services.
- Application and Review Process: Team members should complete an application highlighting his/her education and clinical experience. Requiring letters of reference is highly encouraged. A thorough review process should be conducted and include the identification of any criminal or legal history as well as a review of the member's professional license for any professional misconduct or sanctions.
- Recruitment: Teams should be representative of the community in which they are deployed. Teams should be comprised of members from various cultural/ethnic backgrounds, represent a range of academic mental health disciplines, and possess rich clinical and practical experience. Below is a list of potential recruitment sites:
  - Local public/private mental health and substance abuse treatment facilities.
  - Community-based private practitioners.
  - Professional associations—State/local branches (i.e., American Psychiatric Association, American Psychological Association, American Counselors Association, National Association of Social Workers, American Psychiatric Nurses Association).
- Training: The skills required by disaster mental health response team members are not typically offered through traditional clinical graduate mental health programs. A rigorous training protocol highlighting the necessary intervention skills and response protocols should be provided for disaster mental health workers prior to joining the team. Team members should be provided with ongoing training and education to maintain and enhance their disaster mental health response skills as well as to keep abreast of changes in the field. The following trainings are recommended and encouraged:
  - Disaster Mental Health: A Critical Response curriculum (UR/NYS OMH/DOH)
  - Disaster Mental Health Services curriculum (American Red Cross)
  - Risk Communication (NYS DOH)
  - Incident Command System (FEMA)
  - Other Supplemental Training
    - First Aid, CPR, Disaster Health Services, Disaster Casework (American Red Cross).
    - Training to enhance skills in crisis intervention, grief counseling, death notification, mass casualty/fatality, and special populations
  - Training spontaneous volunteers in disaster mental health or in mental health interventions with special populations may need to be offered during the disaster relief operation so that spontaneous volunteers may be utilized to augment insufficient or depleted human resources.
- Position Descriptions: All team members should be provided with a position description clearly outlining their roles and responsibilities on the response team. Descriptions should be developed for the following positions:
  - County Mental Health Director
  - Response Team Coordinator
  - Response Team Leader
  - Response Team Member
  - Other positions as determined.
- Credentialing: Team members should be credentialed prior to joining the team. This involves verifying the professional license of the individual and the clinical training necessary to work with those impacted by disaster. Once verified, team members should be provided with identification badges. A process for routinely verifying and credentialing volunteers, especially spontaneous volunteers, should also be developed. It is advisable not to deploy spontaneous volunteers unless their educational and clinical backgrounds can be verified.
- Tracking: Monitoring the availability of team resources is imperative to effective disaster response. Methods should be developed for tracking the recruitment and training of team members. Tracking should also include a mechanism for identifying members who may volunteer with more than one response team in an effort to reduce redundancies in available disaster mental health response resources across agencies. It is important to

clarify deployment priorities and expectations for those members who do volunteer with multiple relief agencies.
- Mobilization and Deployment Process: The county mental disaster health plan should include a comprehensive mobilization and deployment process so mental health interventions may be offered "to the right people at the right time." These processes should ensure that team members are deployed to safe environments and their activities monitored from a risk management perspective. Spontaneous or "self" deployment should be discouraged. It is highly recommended that team members be deployed to a separate, off-site volunteer processing center prior to deployment to their work assignments.

2.6 Establish Memorandum of Understanding with Community Partners

A Memorandum of Understanding (MOU) should be developed between the County Department of Mental Health and any agency or vendor identified in the plan that provides disaster mental health services or human and/or material resources to carry out the activities of the plan. These MOUs should clearly articulate the roles and responsibilities of the partner agencies and the mechanisms and procedures for carrying out such duties. MOUs should be reviewed and cleared by the County's legal and risk management department.

2.7 Participate in County Disaster Drills and Exercises

Counties are often required to hold community wide drills or exercises on a yearly or biyearly basis as required by the State Emergency Management Office. Other county or community agencies may also be required to hold similar drills and exercises (i.e., County airport, nuclear power facilities, hospitals, etc.). The County Department of Mental Health should take the opportunity to participate in these drills and exercises with the goal of evaluating the operational aspects of their plan in addition to building relationships with community and county partners.

3. Mitigation

3.1 Identify High Risk Areas and Populations

The County Department of Mental Health must work in collaboration with the County Office of Emergency Preparedness to identify potential high risk disaster areas or populations within the county or its contiguous borders. These areas should be mapped and routinely reviewed by disaster mental health team members. Individuals from these high risk areas and populations can face significant psychological stressors in the aftermath of disaster. Efforts should be made to reach out to high risk groups and areas and provide pre-disaster education which has been found to be successful in potentially mitigating acute and long-term psychological consequences of disaster. Disaster mental health research, though limited, suggests the following populations may be at heightened risk for developing significant stress reactions or psychiatric illness following disaster:

- Children
- Female gender, especially married women
- Adults in their middle years, especially parents, pregnant mothers
- Frail elders, especially those with physical health complications
- Ethnic minorities
- Individuals with pre-existing psychiatric or substance abuse disorders
- First responders, especially law enforcement, firefighters, emergency services with insufficient training and experience.
- Poverty, lower socioeconomic status (SES).

3.2 Develop Disaster-Related Informational and Educational Brochures

Providing information to individuals about disaster preparedness and the anticipated psychological consequences following disaster may be an important preventative approach to mitigating such reactions. Informational brochures addressing personal, family and work life disaster planning, common post-disaster stress reactions and community resources available to meet the disaster related-needs of those impacted by disaster are important areas to highlight prior to disaster. These materials should be available in multiple languages specific to the population-based needs of your County.

3.3 Develop Operational Protocols to Manage Spontaneous Volunteers

Disaster history and experience suggests that a significant number of individuals will spontaneously present as volunteers following large scale disasters. Establishing protocols to screen, train, and deploy these spontaneous volunteers is critical to the disaster mental health operation. Counties must also address risk and liability issues inherent in volunteer management.

4. Response

4.1 Activate Response Protocols for Disaster Mental Health Team(s)

An effective response protocol is predicated on the clear and concise descriptions of the roles and responsibilities of those involved in the response. It is highly advised that the County's disaster plan incorporate a process by which the County DCS is notified and advised of local disaster events. This communication allows for the timely assessment and provision of immediate mental health interventions that can potentially mitigate acute, intermediate and long-term stress reactions in the community. The mental health disaster plan should include response protocols for a limited-team versus a full-team deployment. Team members should be advised

as to the nature of the event, where they will report for their briefing and work assignment, and other issues that potentially impact their safety and security.

To maintain resource and scene management mental health response teams should be deployed according to the circumstances of the incident, availability of service sites, and number of victims involved. Many times, the "sense of immediacy to respond" and the response chaos inherent in disaster results in mass deployment. Care should be taken to provide service across the disaster response and recovery timeline and only once the need is assessed, verified and logistical arrangements have been addressed. Staggering team member deployment will also prevent exhausting your resource pool prematurely.

Prior to service site deployment, team members should be provided with appropriate identification and oriented to what is known about the event at that point in time. Specific information regarding victim demographics, safety and security issues, the service delivery plan, and other pertinent details of the incident or response should be provided. Team members should also be advised and provided with the names of their administrative (work site) and technical (clinical) supervisors and clear expectations and protocols regarding the use of such supervisors. Expectations regarding telephone contact and periodic updates with county disaster mental health administrative leaders should also be addressed.

4.2 Coordination with Other Community Disaster Mental Health Teams

As mentioned earlier in the planning and preparedness section, efforts should be made to identify other disaster mental health teams or resources located in your county. Further effort should be made to coordinate response to avoid duplication of services, or more importantly, disruption or absence of such service. At times, disaster mental health teams from outside the community may self deploy or be requested to augment local county teams. In these situations, coordination and clarification of roles and responsibilities is also important to address and resolve.

4.3 Assess the Mental Health Needs of the Impacted Population

Information concerning the psychological impact the disaster has had on a community and the potential long-term effects should be gathered as expeditiously as possible. In collaboration with emergency response officials, selected team members may be deployed to gather information from community representatives regarding the impact the disaster has had on "at-risk" populations previously identified.

4.4 Initiate Early Phase Supportive Interventions

In the initial aftermath of a disaster individuals will be primarily focused on addressing their immediate disaster-related needs such as receiving first aid for injuries suffered in the disaster, locating lost or missing family members, obtaining food, water, and clothing and seeking shelter. While not all disaster victims will require extensive mental health intervention, some individuals, based upon the circumstances of the disaster as well as their own individual characteristics (see page 10), may require more focused mental health support. Early phase supportive interventions usually involve providing basic comfort care while assessing the individuals for stress reactions that might signal future psychological complications. Pre-disaster training for response team members should include orientation and skill development in approved disaster mental health interventions as those indicated below. Interventions that exceed the provision of basic supportive care may in fact be harmful.

Early Phase Supportive Interventions

- Psychological First Aid
- Crisis Intervention
- Bereavement Counseling

4.5 Identify High Risk Populations and Implement Appropriate Early Phase Interventions

While the majority of individuals impacted by disaster are likely to experience some stress reactions, many of these reactions are usually transitory and typically resolve within a short period of time. There are, however, some disaster survivors who will go on to develop more significant psychiatric complications. Previous disaster research has suggested certain disaster characteristics or those of certain individuals could place someone more at risk for developing severe stress reactions (see page 10). Efforts should be made to identify high risk populations and provide them with supportive interventions that could mitigate long-term psychological consequences. Reach out to individuals who may represent such risk groups and work collaboratively to address these issues.

4.6 Distribute Public Mental Health Educational Materials

Research suggests that mental health resiliency following disaster may be enhanced through the provision of educational materials that describe the common stress reactions and the methods and services available to respond to such reactions. Efforts should be made to release this information as soon as possible after disaster strikes. These educational materials may need to be translated into languages other than English depending upon the needs of your County and be released repeatedly over a period of time following disaster.

4.7 Collaborate with County Government in Risk Communication

In the event of a disaster, local county government must provide periodic information and updates regarding the county's disaster response and recovery plan. The content

of such information should be reviewed by disaster mental health risk communications experts in an effort to mitigate any adverse psychological reactions by the community. The County DCS or other disaster mental health expert should be consulted when preparing these disaster bulletins or updates. Mental health consultants in these roles should be provided with the appropriate Risk Communications training prior to disaster.

4.8 Implement Supportive Interventions for Disaster Mental Health Teams

Meeting the mental health needs of a community following disaster can be considerably stressful to those mental health professionals providing such aid. It is highly suggested that protocols and resources be developed and offered to meet the mental health needs of disaster mental health teams and others administering care to disaster survivors. Resources and ideas for providing mental health support to mental health professionals can be found in the Comprehensive Literature Review, Appendix A of this guide.

5. Recovery

5.1 Evaluate the Intermediate and Long-Term Mental Health Needs of the Community

Disaster mental health research suggests that while most of a disaster-impacted community will experience a range of stress reactions, these reactions are usually mild and transitory. It has also been found that a minority of individuals may develop more moderate to severe psychological reactions that over time, if untreated, may develop into such psychiatric disorders as Acute Stress Disorder, Major Depression, Post-Traumatic Stress Disorder, or Generalized Anxiety Disorder. Pre-disaster substance abuse and dependence disorders were also found to be exacerbated by disaster. With this in mind it is highly recommended that counties use systematic screening approaches to prioritize the delivery of more intensive mental health services. Outreach efforts must be implemented in the impacted community in a timely fashion so that a better understanding of the long-term mental health needs can be evaluated.

5.2 Identify Community Resources to Provide Mental Health and Substance Abuse Services

As indicated earlier in the Planning and Preparedness section, a county mental health disaster plan should include a listing of local mental health and substance abuse treatment facilities and individual providers willing to treat disaster survivors. Providers should possess the requisite education and training experience to evaluate and assess the range of intermediate and long-term psychological symptoms and psychiatric and substance abuse disorders in survivors resulting from disaster. Depending on the size and scope of the disaster, financial assistance to provide intermediate and long-term mental health treatment may be available. County mental health officials should utilize their regional and state office of mental health representatives to explore such options.

5.3 Train Mental Health Professionals in Intermediate and Long-Term Mental Health Treatment Interventions

In the event of a large scale disaster, the County Department of Mental Health must project the long-term mental health implications on the community. Training opportunities in intermediate and long-term mental health interventions will be required. Below is a list of mental health treatment modalities commonly used for those individuals suffering significant post-disaster psychological consequences. These modalities have varying levels of scientific evidence supporting their efficacy.

Intermediate/Long-Term Treatment Approaches

- Cognitive-behavioral therapy
- Phase-oriented treatment
- Brief dynamic therapy
- Psychopharmacology/pharmacotherapy

Efforts should be made to train mental health professionals in these treatment approaches prior to or shortly after disaster strikes the community.

5.4 Implement Supportive Interventions for DMH Teams and Other Disaster Personnel

As mentioned previously, providing mental health support to disaster survivors, in and of itself can be stressful. Because mental health professionals are not immune to stress reactions in the context of their work, it is highly suggested that ongoing support services are offered to mental health response team members and other disaster relief workers, especially in the long-term recovery phase of disaster. Special care should be taken to administer only those supportive interventions that are recognized as efficacious by the disaster mental health field.

6. Evaluation

6.1 Conduct Periodic Disaster Drills and Tabletop Exercises

Reviewing and evaluating the county's mental health disaster plan can ensure an effective response that meets or exceeds the mental health needs of a community. A successful plan will include an evaluation component where specific protocols and processes are reviewed, tested, and evaluated for their efficacy and result. State and County emergency management practices often include periodic drills and exercises. It is highly suggested that components of the disaster mental health plan be included in these drills and exercises. Such drills might include a periodic call down of mental health team members to evaluate availability and response times; tabletop exercises which evaluate the Department's ability to coordinate and

deploy multiple internal and external agencies providing mental health resources; and special drills which might involve establishing a community family assistance center following a mass casualty incident or Point of Dispensing clinic typically used in responding to public health emergencies.

6.2 Convene an "After Action" Committee Following the Implementation of the Mental Health Disaster Plan

In the event that the Disaster Mental Health Plan is activated, arrangements should be made as soon as possible to review the results of the activation. Special attention should be given to specific response and recovery activities associated with the plan. Opportunities to identify and revise specific planning, preparedness and mitigation efforts should also be addressed.

7. References and Resources

7.1 Planning Tools and Technical Resources

CDC Public Health Emergency Response Guide for State, Local, and Tribal Public Health Directors, 2004
Department of Health and Human Services, Centers for Disease Control and Prevention
http://www.bt.cdc.gov/planning/pdf/cdcresponseguide.pdf

Community Guidelines for Developing a Spontaneous Volunteer Plan
Illinois Terrorism Task Force Committee on Volunteers and Donations
http://www.state.il.us/iema/spontvol.PDF

Disaster Technical Assistance Center
U.S. Department of Health and Human Services, Substance Abuse and Mental Health Services Administration (SAMHSA), Center for Mental Health Services
http://www.mentalhealth.samhsa.gov/dtac/

Early Intervention for Trauma in Adults: A Framework for First Aid and Secondary Prevention
Litz, B.T. and Gray, M.J., In "Early Intervention for Trauma and Traumatic Loss." Edited by Brett T. Litz. The Guilford Press, 2004. Pp 87–111

Mental Health All-Hazards Guidance Document, 2003
U.S. Department of Health and Human Services, Substance Abuse and Mental Health Services Administration (SAMHSA), Center for Mental Health Services
http://media.shs.net/ken/pdf/SMA03-3829/All-HazGuide.pdf

Mental Health and Mass Violence: Evidence-Based Early Psychological Intervention for Victims/Survivors of Mass Violence
National Institute of Mental Health (2002)
http://www.nimh.nih.gov/publicat/massviolence.pdf

National Center for Post Traumatic Stress Disorder
http://www.ncptsd.org

National Institute of Mental Health
http://www.nimh.gov

National Memorial Institute for the Prevention of Terrorism
http://www.mipt.org

New York State Education Department, Office of the Professions, Online Verification
http://www.op.nysed.gov/opsearches.htm

New York Office of Alcoholism and Substance Abuse Services
http://www.oasas.state.ny.us/www/home.cfm

State Mental Health Authorities' Response to Terrorism, 2004
National Association of State Mental Health Directors
http://www.nasmhpd.org/general_files/publications/med_directors_pubs/Med%20Dir%20Terrorism%20Rpt%20-%20final.pdf

7.2 Risk Communication

Communicating in a Crisis: Risk Communication Guidelines for Public Officials
U.S. Department of Health and Human Services, Substance Abuse and Mental Health Services Administration (SAMHSA), 2002
http://www.riskcommunication.samhsa.gov/index.htm

7.3 Disaster-Related Agencies and Programs

American Red Cross
http://www.redcross.org

Department of Homeland Security
http://www.dhs.gov

Federal Emergency Management Agency (FEMA)
http://www.fema.gov

National Voluntary Organizations Active in Disaster (VOAD)
http://www.nvoad.org

New York State Emergency Management Office (SEMO)
http://www.nysemo.state.ny.us/

Project Liberty
New York State Office of Mental Health (OMH)
http://www.projectliberty.state.ny.us/

7.4 Special Populations

American Academy of Child & Adolescent Psychiatry
http://www.aacap.org/publications/factsfam/disaster.htm
U.S. Department of Health and Human Services, Substance Abuse and Mental Health Services Administration (SAMHSA), Center for Mental Health Services.
http://www.mentalhealth.samhsa.gov/publications/allpubs/SMA03-3828/default.asp

Disaster Mental Health: Crisis Counseling Programs for the Rural Community (1999)
U.S. Department of Health and Human Services, Substance Abuse and Mental Health Services Administration (SAMHSA), Center for Mental Health Services.

http://www.mentalhealth.org/publications/allpubs/sma99-3378/default.asp

Psychosocial Issues for Older Adults in Disasters (1999)
U.S. Department of Health and Human Services, Substance Abuse and Mental Health Services Administration (SAMHSA), Center for Mental Health Services.
http://media.shs.net/ken/pdf/SMA99-3323/99-821.pdf

Responding to the Needs of People with Serious and Persistent Mental Illness in Times of Major Disaster (1996)
U.S. Department of Health and Human Services, Substance Abuse and Mental Health Services Administration (SAMHSA), Center for Mental Health Services.
http://www.mentalhealth.org/publications/allpubs/SMA96-3077/default.asp

Tips for Talking About Traumatic Events
U.S. Department of Health and Human Services, Substance Abuse and Mental Health Services Administration (SAMHSA), Center for Mental Health Services.
http://www.mentalhealth.samhsa.gov/cmhs/TraumaticEvents/tips.asp

The National Child Traumatic Stress Network
http://www.nctsnet.org/

7.5 Intervention Resources

Early Intervention for Trauma in Adults: A Framework for First Aid and Secondary Prevention
Litz, B.T. and Gray, M.J., In "Early Intervention for Trauma and Traumatic Loss." Edited by Brett T. Litz. The Guilford Press, 2004. Pp 87–111

Grief Counseling Resource Guide
New York State Office of Mental Health
http://www.omh.state.ny.us/omhweb/grief/

Mental Health Intervention for Disaster
National Center for Post-Traumatic Stress Disorders (NCPTSD)
http://www.ncptsd.org/facts/disasters/fs_treatment_disaster.html

7.6 Training Resources

Disaster Mental Health: A Critical Response
University of Rochester Center for Disaster Medicine and Emergency Preparedness
http://www.centerfordisastermedicine.org

Field Manual for Mental Health and Human Service Workers in Major Disasters
U.S. Department of Health and Human Services, Substance Abuse and Mental Health Services Administration (SAMHSA), Center for Mental Health Services (2000)
http://www.mentalhealth.samhsa.gov/publications/allpubs/ADM90-537/Default.asp

Mental Health Response to Mass Violence and Terrorism: A Training Manual
U.S. Department of Health and Human Services, Substance Abuse and Mental Health Services Administration (SAMHSA), Center for Mental Health Services
http://www.samhsa.gov

National Disaster Mental Health Training Program
National Center for Post Traumatic Stress Disorder (NCPTSD)
http://www.ncptsd.org/about/training/ndmh_training.html

Triumph Over Tragedy: A Community Response to Managing Trauma in Times of Disaster and Terrorism
Edited by Evans, G.D., Wiens, B.A., The National Rural Behavioral Health Center, 2004.
http://www.nrbhc.org/news_detail.asp?ID=11

APPENDIX A

Comprehensive Literature Review

Introduction and Overview

What is Psychological Trauma and What Causes It?

The physical and psychological response to any demand—positive or negative—is *stress.* Positive stress includes responses to events such as getting a promotion, getting married, or graduating from college. However, the term *stress* usually describes responses to negative demands such as taking a test, getting divorced, or performing under pressure. In order to cope effectively when faced with a source of negative stress people must evaluate the situation, determine the realistic level of risk (i.e., differentiate real from imagined or irrational perceptions of risk) and decide how they are going to cope with the situation based on their own personal resources (e.g., physical strength, the ability to think clearly in a crisis, basic problem-solving abilities, premorbid psychopathology or physical disability) and the potential for support from others (e.g., emotional support, access to necessary tangible resources; Lazarus, 1966; Lazarus, 1984).

The most extreme form of negative stress is *traumatic stress*—stress resulting from a traumatic event or situation. People experience traumatic stress in response to events such as natural disasters, motor vehicle accidents, physical or sexual assault/abuse, combat, industrial accidents, terrorist attacks, torture, or as in the present discussion, airline disasters. A commonality among these traumatic situations is that they involve a threat to one's life or the lives of others. When people are not successful in coping with such situations (or perceive themselves to be unsuccessful) feelings of helplessness, rage, resentment, and increased anxiety may result (Kardiner & Spiegel, 1947).

The devastation of large-scale disasters like the terrorist attacks of the World Trade Center on September 11, 2001, may threaten or destroy the existing social structure and order such that the "normal" frames of reference and expectations are gone. This loss, particularly in combination with a lack of leadership and guidance in restoring a normal social frame of reference and safety, can contribute to the development of psychological problems of those involved in traumatic situations involving mass disasters (Noy, 2004).

As noted above, traumatic stress occurs when an event is perceived as life threatening to an individual or others and which severely challenges or compromises one's coping capacity (Noy, 2004). In these situations, one early reaction typically involves an activation of the *human survival response*—a physiological and psychological response that prepares the body and mind to fight, flee, or even freeze in attempts to cope with or "survive" the situation. In order to fight or flee, this response causes a part of the body's nervous system, called the autonomic nervous system (ANS), to prepare for these activities (e.g., fighting off an assailant or running away from a wild animal) by increasing heart and respiration rates, dilating pupils, narrowing attention, increasing vigilance, and increasing blood flow to muscles.

During an actual traumatic event, this response is considered a normal, adaptive survival response to a situation that is perceived as life threatening. If one is able to establish safety by fighting or fleeing, it will often decrease, although not eliminate, the risk for long-term negative effects of the stressful event. However, traumatic events may not accommodate these survival responses such that one must attempt to cope with a situation that is perceived as, and frequently is, life-threatening, uncontrollable, and/or inescapable—a situation that carries a higher risk for longer-term problems.

Life-threatening, inescapable situations can also result in a different physical and psychological response—freezing or becoming immobilized (e.g., people going limp and psychologically numb when being mauled by a bear). Although this response is less well understood from a physiological standpoint, it appears that the stress response may activate a different part of the ANS that immobilizes the body and decreases the experience of pain or fear. Along those lines, people can experience psychological "numbness" or what is more generally called *dissociation*—separating oneself psychologically from

an unbearable situation. Dissociation describes a fragmentation, or splitting-off, from the psychologically (or physically) painful reality of a situation in an attempt to minimize that pain.

In some ways, and over the short term, this can be considered an adaptive reaction, but over extended periods this reaction can interfere with recovery to the extent that a person is then unable to integrate the complete experience of the trauma (Noy, 2004). Dissociation can occur at many different levels of severity with the most severe involving a complete "splitting off" from oneself—what was previously referred to as a multiple personality and currently referred to diagnostically as Dissociative Identity Disorder (American Psychiatric Association, 2000).

Post-traumatic Stress and Human Reactions to Trauma

When one continues to experience a persistent traumatic stress reaction after the traumatic event has past, or post-trauma, it is called *post-traumatic stress* (American Psychiatric Association, 2000). A stress response that was adaptive and normal during a time of crisis can become maladaptive when it persists after the traumatic event has passed. Post-traumatic stress is a human survival reaction or elements of this reaction that occur when there is no actual threat present—*a survival reaction that occurs at the wrong time.* When post-traumatic stress is severe and persistent it is called *Post-Traumatic Stress Disorder* (PTSD) as described in the *Diagnostic and Statistical Manual of Mental Disorders: Text Revision (DSM-TR)*—the standard reference used for classifying and diagnosing psychiatric disorders (American Psychiatric Association, 2000).

According to DSM-TR (American Psychiatric Association, 2000) diagnostic criteria, to qualify for a diagnosis of PTSD, one must have (1) experienced an event that is life threatening or perceived as life threatening, (2) witnessed an event that is perceived as life threatening to others, or (3) heard about violence to or the unexpected or violent death of others. The latter can involve such things as watching a traumatic event unfold on television (e.g., Hurricane Katrina, the events of 9/11) or hearing about the unexpected death of a loved one—referred to as vicarious or secondary traumatization (Palm, Polusny & Follette, 2004).

Further one must exhibit persistent evidence (i.e., lasting *more than one month*) of the following symptoms: (1) persistent *re-experiencing* of the traumatic event (e.g., intrusive memories or thoughts, flashbacks, nightmares), (2) *avoidance* of reminders or the trauma that can involve physical avoidance or psychological "avoidance" or numbness in the form of dissociation, and (3) *chronic hyperarousal* of the autonomic nervous system (e.g., difficulties sleeping, problems concentrating, hyper-vigilance, increased anxiety, exaggerated startle response; American Psychiatric Association, 2000). One must also exhibit severe impairments in daily functioning (e.g., impaired relationships, employment problems) in addition to the criteria just described.

Individuals for whom these same symptoms persist for *less than one month* would be classified as having Acute Stress Disorder (ASD; American Psychiatric Association, 2000). As noted previously, dissociation is one possible response to traumatic stress. There is evidence that if dissociation is present in the early or acute stages of the traumatic stress reaction, the risk is increased for developing subsequent PTSD (Birmes, Brunet, Carreras, Ducasse, Charlet, Lauque, Sztulman & Schmitt, 2003) although conflicting results have been reported (Wittman, Moergeli, & Schnyder, 2006).

Symptoms of PTSD usually appear within the first three months following exposure to a traumatic event. However, a significant number of individuals may also experience delayed-onset PTSD (Buckley, Blanchard, & Hickling, 1996) in which symptoms may not appear for months or years (American Psychiatric Association, 2000). The duration of PTSD also varies. For trauma victims with early onset PTSD, PTSD has been shown to persist from months to years following the disaster (Galea, Nandi, & Vlahov, 2005). Even with appropriate treatment, PTSD can persist as a chronic condition with periods of exacerbation and remission of symptoms (Noy, 2004).

Other Psychological Reactions to Traumatic Events

Although a range of post-traumatic stress reactions can occur for individuals who experience trauma, other psychological problems have been noted. Depression is often observed in the aftermath of trauma (Norris, Friedman, Watson, Byrne, Diaz & Kaniasty, 2002; Noy, 2004; Rubonis & Bickman, 1991) along with a spectrum of grief reactions (Bonanno & Kaltman, 2001). Further, post traumatic stress reactions and depression co-occur quite often following disaster. Another human reaction to trauma is the use of alcohol or drugs in attempts to cope with the traumatic memories and intrusive thoughts associated with the trauma (Ford, Hawke, Alessi, Ledgerwood & Petry, 2007).

One of the most enduring effects of traumatic stress involves increases in physical complaints that are not usually limited to any specific organ system and are often medically unexplained (Morren et al., 2007). Further studies suggest that a substantial number of trauma survivors experience an overall decreased quality of life, more absenteeism from work, and impaired social relationships.

Organization and Content of the Present Literature Review on Disaster Mental Health

The following presents a review of the literature on disaster and trauma. The first section is an overview of disaster and trauma that includes an overview and epidemiology of post

traumatic reactions that can occur in the wake of disasters, an overview of the factors that increase the risk for adverse reactions to disaster and trauma, a review of the psychological reactions to disaster and trauma in selected at-risk groups, and a description of the nature and correlates of vicarious or secondary traumatization. The subsequent sections review and summarize relevant literature related to prevention, screening, and intervention and planning.

The focus of the review then shifts toward mental health screening and intervention issues and includes an overview of screening tools and procedures for identifying at risk individuals in the aftermath of disasters, a review of the current evidence base for early intervention in the acute stages following disaster, an overview of the evidence base for early intervention with specific at-risk groups (e.g., emergency responders, untrained disaster volunteers), a summary of recommendations for preventing and managing vicarious traumatization, a summary of recommendations for the use of pharmacologic interventions in the acute stages of trauma, a review of methods for prevention of adverse reactions by building resilience, a summary and description of interventions aimed at reducing and treating longer-term adverse stress reactions and a overview of emerging treatments for post trauma reactions.

In the final section, the focus turns to disaster planning and preparation that includes a review of the educational and preparatory training factors important to disaster plans that address mental health issues and an overview of the organizational, social, and community factors that are important to consider in developing mental health disaster management plans.

Overview of Disaster and Trauma

Overview and Epidemiology of Post-Traumatic Reactions in the Wake of Disaster

Although numbers vary somewhat for each specific traumatic situation, in general, epidemiological statistics suggest that nearly 90–100% of those with exposure to trauma exhibit the same symptoms as those associated with PTSD during the traumatic event itself. This is not surprising because these same symptoms reflect the human survival reaction and are *not* considered pathologic when they occur during a crisis situation. About 15% of those subjected to traumatic situations will go on to develop PTSD.

It is also important to note that the percentage of people exhibiting some but not all the symptoms of PTSD is likely much greater than that for those who exhibit full blown PTSD, although there are currently no reliable estimates of this. These individuals are experiencing post-traumatic stress (PTS), not post-traumatic stress disorder (PTSD). They are often quite impaired or distressed but "fall through the cracks" because they do not have a diagnosable condition and because they continue to "function" (e.g., they go to work), although functioning may be significantly compromised relative to pre-trauma functioning. For example, someone with PTS may be able to maintain a job and/or marriage but continues to experience increased anxiety around reminders of the trauma, problems sleeping, repeated nightmares, impaired concentration, and persistent intrusive and disturbing memories and intrusive thoughts associated with the trauma.

Previous research has indicated that of the 89% of adults exposed to a traumatic incident at least one time in their lives, only 15% develop PTSD (Breslau et al., as cited in Adams & Boscarino, 2006). Of those who develop PTSD, 30–40% are direct victims of the event, 10–20% are rescue workers, and 5–10% are in the general population (Galea, Nandi, & Vlahov, 2005). Corneil, Beaton, Murphy, Johnson and Pike (1999) reported PTSD in an estimated 22.2% of American Firefighters.

Additional research conducted has generally found rates of PTSD ranging from 13–18% of firefighters, 1–4 years after a traumatic event (Fullerton, Ursano & Wang, 2004; McFarlane & Papay, 1992; North, Tivis, McMillen, Pfefferbaum, Pitznagel et al., 2002). Kessler, Sonnega and Bromet et al. (1995) reported that 60.7% of men and 51.2% of women had experienced at least one traumatic event while 19.7% of men and 11.4% of women have encountered at least three traumatic events. Kessler, Berland, Demler, Jin, Merikanga & Walters (2005) reported a lifetime prevalence rate of PTSD at 6.8% of the general population.

Katz, Pellegrino, Pandya, Ng, & DeLisi (2002) reviewed the prevalence of psychiatric morbidity and interventions following mass disasters. They note that disasters are unique in the sense that they involve trauma to many individuals at the same time and they overtax the social and political foundations of communities—a factor that contributes to the development of adverse mental health outcomes. Mollica, Cardozo, Osofsky, Raphael, Ager & Salama (2004) presented a conceptual framework for understanding the impact of disasters on the communities they affect. They point out that, in addition to its direct impact on individuals, a disaster negatively impacts a community's political, economic, sociocultural, and health care infrastructures.

Katz et al. (2002) note that previous reviews have indicated a 17% increase in the prevalence of psychopathology in the wake of mass disasters compared to controls (e.g., Rubonis & Bickman, 1991). They go on to state that, although some studies have found increased rates of psychiatric morbidity following man-made vs. natural disasters, the evidence for this is inconsistent, with some studies showing increased rates in natural disasters or no difference between the two in terms of psychiatric morbidity. These authors identify the following as the primary psychiatric disorders found in the acute phase (first two months) following disasters: acute stress disorder, PTSD, generalized anxiety disorder (consistently detected following disasters), major depression, and substance abuse disorders (although results are conflicting).

Norris et al., (2002) reviewed literature on the impact of disaster on the mental health of the people exposed. They identified six sets of outcomes that resulted from the effects of trauma. These include specific psychological problems, nonspecific distress, health problems and concerns, chronic problems in living, psychosocial resource loss, and problems specific to youth.

The specific psychological problems identified by the literature include the symptoms of PTSD, anxiety, depression and other psychiatric conditions along with the incidence of full clinical presentation of PTSD, major depressive disorder, generalized anxiety disorder and panic disorder.

The outcomes of nonspecific distress include those studies in which there were elevations of a variety of stress-related psychological and psychosomatic symptoms rather than the presence of a specific syndrome.

The third set of outcomes, health problems and concerns, include higher scores on self-report inventories of somatic complaints and medical conditions or elevated physiological indicators of stress. Also, in this area are elevated reports of alcohol, tobacco or drug use after a disaster.

A fourth set of outcomes refers to chronic problems of living. These refer to findings that victims of disaster are more likely than nonvictims to experience hassles or life events that serve as stressors in their own right. Specific examples could include troubled interpersonal relationships, new family strains and conflicts as well as occupational and financial stress.

A fifth outcome, psychosocial resource loss, refers to losses in perceived social support, losses in the feeling of social embeddedness, losses in self-efficacy, optimism and perceived control.

Factors that Increase the Risk for Adverse Reactions to Trauma

Numerous studies examined the factors that contribute to the development of PTSD in some individuals but not in others. Some factors associated with a higher risk for developing PTSD include: close proximity to the traumatic situation, prolonged exposure to the traumatic situation, situations involving extreme horror or gruesomeness, a personal history of stressful life circumstances or previous trauma, a lack of preparation for the possibility of a traumatic event, increased pre-trauma anxiety about death, feelings of extreme helplessness during the event, feeling culpable for causing some aspect of a traumatic event, and a lack of reference or ability to return to "normal life" following the traumatic event (Galea, Nandi, & Vlahov, 2005)

The latter increases risk because psychological trauma often results in extreme disorientation and a lack of feeling grounded. Hurricane Katrina would be a good example of this due to the long waiting period before someone from the "outside" responded. Katrina survivors were cocooned within the traumatic circumstances where life as they knew it had turned into chaos and horror with no reference point telling them that the rest of the world was still intact. Also, with respect to Katrina, research suggests that it was the slowed response and the subsequent prolonged exposure to unimaginable and horrific conditions—in many cases, the *human-made events* rather than those events directly caused by the hurricane itself—that contributed most significantly to the post-traumatic problems (Mills, Edmondson, & Park, 2007).

Other research also suggests that human-made disasters or traumatic events (particularly intentional human acts like violent crime or terrorist acts) are often experienced as more traumatic than those resulting from natural disasters, although the literature is conflicting on this with some studies showing no real differences between natural and man-made disasters in producing trauma (Noy, 2004). Finally, as mentioned earlier, one response to traumatic stress is dissociation or removing oneself mentally from an inescapable situation (e.g., torture, rape, being mauled by a wild animal, prolonged exposure to horrific circumstances such as serving as a body handler/identifier following a disaster involving mass casualties).

There is evidence suggesting that if dissociation is present as part of the traumatic stress reaction, the risk for developing subsequent PTSD may increase, although these results have been inconsistent across studies. The relationship between dissociation and more dramatic reactions may be due to the dissociation itself or because the situation may have been prolonged or perceived as inescapable. Further, dissociation may interfere with recovery because of the fragmentation among thoughts, emotions and behavior—factors that help one to gain a full understanding of what happened and enable them to gain better control over anxiety reactions that can appear "out of nowhere" because a person is cut off from awareness of the association between their reaction and its connection to the traumatic event (Noy, 2004).

Voges and Romney (2003) tested fifty-two individuals who were exposed to traumatic events that included physical or sexual assault, an accident, combat, the sudden death of a family member, suicide of a family member, and a life threatening illness. Forty-eight percent of the sample met criteria for PTSD. The Posttraumatic Stress Diagnostic Scale (Foa, 1995), the Coping Inventory for Stressful Situations (Endler & Parker, 1999), the State-Trait Anxiety Inventory (Spielberger, 1983), and an ad hoc questionnaire designed to gauge vulnerability and resiliency factors were administered to individuals exposed to a traumatic event who developed PTSD and those individuals exposed to a traumatic event who did not experience PTSD. The results indicate that being female significantly increased the risk for developing PTSD following exposure to a traumatic event.

Additionally, the degree to which one perceived their life to be in danger or threatened significantly increased the likeli-

hood of the development of PTSD. In this study, no relationship was shown between previous trauma, family history of mental illness, personal history of mental illness, and the existence of bodily injury and subsequent development of PTSD. Those who developed PTSD and those who did not develop PTSD reportedly experienced similar amounts of stress and anxiety during the traumatic event. However, those individuals who directly experienced a traumatic event were more likely to acquire PTSD than those who witnessed a traumatic incident. These results have important implications when detecting those at risk for the development of PTSD (females and those who perceived their life to be threatened) and planning treatment interventions.

Adams and Boscarino (2006) examined the factors associated with PTSD at one and two years following the WTC disaster in a community sample. A great deal of interest has focused on demographic characteristic (age, gender, race, and socioeconomic status) that are associated with different rates of PTSD. The results indicate that younger individuals (ages 18–29), females, those who experienced more WTC disaster-related events, those who reported low levels of social support, and those with low self-esteem had a greater risk of developing PTSD symptoms one year following the disaster. At two years following the disaster; however, those who were Latino, aged 30–64, and who had low self-esteem were more likely to develop PTSD symptoms.

Those who experienced symptoms at two years following the disaster but not at one year (delayed-onset PTSD) reported more suffering, more negative life events, and a reduction in self-esteem post-disaster. Latinos were also shown to be at an increased risk for the development of PTSD. Those who reported experiencing symptoms at one year post disaster, but not two years (remitted PTSD), reported an improvement in self esteem and less negative events.

The work of Acierno et al. (2002) indicates that older adults are typically more resilient to the psychological effects of traumatic events and natural disasters yet have an increased risk of negative post disaster physical health effects. Indeed, increased age is connected with lower rates of post disaster psychopathology, although it may reflect the fact that older adults tend to express psychological symptoms somatically. Acierno, Ruggiero, Kilpatrick, Resnick and Galea (2006) examined older and younger adults who experienced the 2004 Florida hurricanes. Symptoms of PTSD, major depressive disorder, generalized anxiety disorder, previous exposure to traumatic events, social support, and hurricane-related impact, positive outcomes, and current health status were assessed through the implementation of the National Women's Study Event History-PTSD module, the Medical Outcomes Study module, and the SCID-IV structured interview.

The results indicated that older adults were indeed more resistant than younger adults to the psychological effects after natural disasters, such as the 2004 Florida hurricanes. Low amounts of social support, previous exposure to traumatic events, and deficient health status were variables predictive of psychological symptoms for both young and old adults. Income and other financial difficulties (i.e., number of days dislocated from one's home and the number of post-insurance dollars lost) were predictive of psychopathology for older adults, but not younger adults. Indeed, risk factors that included financial factors were more significant for older adults which may reflect that economic difficulties following natural disasters are associated with older individuals' psychological health.

Wittman, Moergeli and Schnyder (2006) examined whether symptoms of peritraumatic dissociation in acute stress disorder (ASD) are predictive of the development of PTSD or psychopathology later on. The Peritraumatic Dissociative Experiences Questionnaire, Clinician-Administered PTSD Scale, Primary Care Evaluation of Mental Disorders, and Hospital Anxiety and Depression Scale, as well as an assessment for the symptom criteria for ASD, were administered to patients in a Zurich hospital following recent accidents or assaults. The results indicate that no strong relationship between peritraumatic dissociation and posttraumatic stress symptoms or general psychopathology existed. Additionally, there was a weak relationship between pre-existing psychopathology and peritraumatic dissociation.

Birmes et al. (2003) examined the power of peritraumatic dissociation and acute stress disorder in predicting PTSD symptoms and diagnosis three months after a traumatic event. Peritraumatic dissociation involves alterations in the experience of time, place and person during and immediately after trauma exposure. Those reporting more peritraumatic dissociation are at greater risk for the development of PTSD.

Acute stress disorder is also a predictor of PTSD. Acute Stress disorder includes a set of symptoms experienced within the first month following trauma exposure that include symptoms of dissociation, intrusion, avoidance and hyperarousal. The Peritraumatic Dissociative Experiences Questionnaire—Self-Report, Stanford Acute Stress Reaction Questionnaire, Impact of Event Scale, and the Clinical-Administered PTSD Scale were used to assess for peritraumatic dissociation, acute stress disorder, and PTSD, respectively, in victims of violent assaults. The results indicate that peritraumatic dissociation and acute stress disorder were significantly correlated with the presence of PTSD symptoms. These results may assist in the early detection of traumatized individuals at high risk for the acquisition of PTSD.

Breslau, Lucia, and Alvarad (2006) examined the extent to which intelligence, anxiety disorders, and conduct issues during childhood affected one's susceptibility for being exposed to traumatic events and whether, once exposed to traumatic events, these factors influenced the development and expres-

sion of PTSD symptoms. Indeed, previous research utilizing retrospective approaches have indicated that preexisting anxiety, depression, and conduct issues during childhood increase the possibility that an individual will be exposed to a traumatic event.

This study, utilizing a prospective approach, employed the WISC-R, Teacher Report Form, and the NIMH Diagnostic Interview Schedule for Children—Parent version 2.1 to assess for intelligence, conduct problems, and anxiety in children at age 6. At age 17, these children were interviewed to ascertain the number of traumatic events experienced and whether a diagnosis of PTSD resulted. The results indicate that children who had been rated by teachers to be above the normal range for externalizing problems (conduct issues) at 6 years of age were at an increased risk for being exposed to assaultive violence but not other types of trauma. Children with a higher IQ (above 115) were at a lower risk for exposure to all types of traumatic events. Additionally, males were shown to be exposed to traumatic events more often than women.

Early identification of individuals with PTSD would aid in the early utilization of mental health services to assuage many of the harmful effects of PTSD. Previous research has indicated that the experience of peritraumatic dissociation during or immediately following the traumatic experience is a strong predictor of the development of PTSD later on (Fullerton et al., (2000). One limitation of the existing research that documents the influence of peritraumatic dissociation on PTSD is that it has been retrospective in nature.

Birmes et al. (2003) used a prospective design to determine if petritraumatic dissociation is independently predictive of intrusions, avoidance, and PTSD symptoms at 18 months and 4 years following a fireworks disaster. The Peritraumatic Dissociative Experiences Questionnaire, Dutch version of the SCL-90, Impact of Event Scale, and the Posttraumatic Stress Disorder Self-Rating Scale were utilized. The results indicate that peritraumatic dissociation was not a significant independent predictor of intrusions, avoidance, or PTSD symptoms at 18 months or four years following the disaster.

The results also indicate that initial intrusions and avoidance were independently predictive of intrusions, avoidance reactions, and PTSD symptoms at 18 months. Psychological distress was independently significant in the prediction of PTSD symptoms at both 18 months and 4 years. Being dislocated following severe home damage put people at significant risk for the development of intrusions, avoidance, and PTSD symptom severity 4 years following the disaster.

Disaster and Trauma in Selected At-Risk Populations

Research has indicated that emergency workers are at higher risk for the development of PTSD (Corneil et al., 1999). Alvarez and Hunt (2005) compared canine search and rescue team handlers deployed to the 9/11 disaster sites to canine handlers not deployed on measures of PTSD, depression, anxiety, acute stress, peritraumatic dissociation, and clinical diagnoses six months after 9/11. Self-report measures, such as the Posttraumatic Stress Disorder Symptoms Scale Self-Report (Foa et al., 1993), the Beck Anxiety Inventory (Beck et al., 1988), the Brief Symptom Inventory (Derogatis & Coons, 1993), the Peritraumatic Dissociative Experiences Questionnaire (Marmar et al., 1997), and the Interpersonal Support Evaluation List (Cohen et al., 1985), as well as interview measures, such as the Canine Handler Interview, the Structured Clinical Interview (First et al., 1995), the Posttraumatic Stress Symptom Scale Interview (Foa et al., 1993), the Stanford Acute Stress Reaction Questionnaire (Cardena et al., 2000), and the Relationship Assessment Scale (Hendrick, 1988) were utilized.

Results indicated that deployed canine handlers acknowledged more psychological distress overall and reportedly experienced more symptoms of PTSD than canine handlers who were not deployed. Although deployed handlers' scores on general distress measures were significantly higher than handlers not deployed, these individuals' scores were lower than expected and few individuals met diagnostic criteria for a psychological disorder. These results indicate the possibility of a more resilient population, as well as buffering factors unique to this population (i.e., the use of companion animals that provides the impression of safety and protection). Important factors contributing to the resiliency of these rescue workers include training (specifically, those handlers who were certified members of FEMA were shown to be less likely to develop symptoms of PTSD), perceived marital satisfaction, and alleged social support.

Reactions during the stressful event have implications for later development of PTSD symptoms. For instance, those individuals who experience dissociation and detachment during the traumatic event were more susceptible to the development of PTSD symptoms and other disturbances later on. These results have useful implications for designing effective interventions and training programs.

Police officers are another group of first responders that have received a great deal of study regarding reactions to traumatic events. Police officers frequently encounter potentially traumatic events. The most frequently reported traumatic events experienced by police officers are violent death, injury or the non-accidental death of a child, the threat of physical injury or unpredictable situations. The subculture of police officers involves the denial of feelings and emotions and exhibiting little concern for others' feelings. Indeed, many studies have indicated that police officers may disguise or hide their feelings or perceived personal flaws in order to fit in with the prevailing "macho" police culture. This tendency interferes

with the self-disclosure, which is necessary when receiving mental health support after traumatic events.

Recent research has started to recognize the healthy and adaptive ways people cope with potentially traumatic and stressful events. Higher levels of social support have been recognized as being significantly associated with a lower prevalence of PTSD. Alternatively, lower levels of social support have been shown to be related with more PTSD symptoms, anxiety, depression, and alcohol abuse in Vietnam veterans. Indeed, research has shown that one of the most important therapeutic tools for preventing and reducing PTSD symptoms is talking about the trauma. Disclosing traumatic experiences has also been shown to result in positive health outcomes. Research has indicated that perceived emotional support has shown the most consistent positive findings (Marmar et al., 1997)

Bryant and Guthrie (2005; Bryant & Harvey, 1996) studied volunteer firefighters and found that proximity to death, severity of trauma and perceived threat were associated with the development of posttraumatic symptoms and PTSD. In a longitudinal study of firefighters, McFarlane and Papay (1992) found that 77% of participants who developed PTSD had a comorbid psychiatric diagnosis such as depression, panic disorder or phobic disorders.

Additional work with firefighters has generally found rates of PTSD ranging from 13–18% one to four years after the traumatic event (Fullerton, Ursano & Wang, 2004; McFarlane & Papay, 1992; North et al., 2002).

Heinrichs, Wagner, Schoch, Soravia, Hellhammer and Ehler (2005) noted that predictors of the development of PTSD determined from retrospective studies have poor predictive power when evaluated in prospective studies. Therefore, Heinrichs et al. (2005) used a prospective methodology in an attempt to identify salient risk factors for firefighters in the development of PTSD. This study assessed firefighters immediately after basic training and at 6, 9, 12, and 24 months after job entry.

The assessments included several self-report questionnaires to measure demographic items, personality characteristics, depression, anxiety and other measures of psychopathology and self-efficacy. In addition, salivary cortisol and urinary catecholamines were measured at each testing point. Higher levels of cortisol predict the development of PTSD (Ehlert et al., 2001), and higher urinary catecholamines have been observed in PTSD patients (Kosten et al., 1987). The results indicated that both cortisol and catecholamine levels before trauma exposure did not predict the development of posttraumatic stress symptoms over the course of two years. Results indicate that the amalgamation of preexisting high levels of hostility and low levels of self-efficacy predisposed individuals to the development of PTSD symptoms, depression, anxiety, general psychological distress, and alexithymia over a 2-year period following job entry.

Individuals who exhibited either low levels of hostility or high levels of self-efficacy or both sustained no increase in psychological symptoms, indicating that these personality traits may provide a protective factor against the development of stress-related symptoms. Social support has been shown to mediate the harmful effects of traumatic experiences and decrease the likelihood of the development of PTSD. Thus, individuals who score highly on hostility ratings may not have the resources to handle the stress resulting from stressful experiences like those with low hostility ratings.

These results have important implications in the identification of individuals who are at high risk for the development of psychopathological symptoms. Also, these results can assist in the development of training and prevention programs and the creation of screening processes for certain professions.

Johnson, Langlieb, Teret, Gross, Schwab et al. (2005) examined the physical and mental health effects of the recovery efforts on workers at the World Trade Center disaster site. During the recovery process, workers (i.e. truck drivers, laborers, mechanics, heavy equipment operators) were frequently neglected and ignored in disaster planning and response programs and trainings.

A 62-item survey was developed to assess exposures at the site and somatic and mental health symptoms of recovery workers after exposure. In addition, an open-ended question was included to have participants share other concerns. Johnson et al. (2005) reported the results of analysis of the open-ended question. They found that 24% reported a current somatic complaint or an injury related to their recovery work. Many respondents wrote about their fears of future health consequences. Ten percent of the respondents volunteered that they had or were currently experiencing mental health symptoms that included sleeping problems, depression, anxiety, PTSD, and suicidal thoughts.

Many reported using alcohol or drugs to cope and reliving their experiences in nightmares or during their daily activities. A number reported a lack of respiratory protection and training. Several respondents also reported that they were unprepared to work with human remains both logistically and psychologically. Additionally, these workers stated that they devised their own ways of coping and conveyed a great sense of pride for being able to assist in the effort. The authors argued that these responses can assist in the preparation and response efforts for future disasters. For instance, a broader array of individuals (besides firefighters, first responders, etc.) should be included in planning efforts. A disaster response plan should be clearly communicated by employers to the workers, and these workers should be provided with leadership and training. They further argued that disaster mental health services should be provided to workers to offset the likely adverse mental health issues that can occur following recovery.

These workers should also be provided with specialized training, such as specific coping strategies, stress reduction, normal reactions to stress, and how to obtain physical and mental health support services. These specialized trainings should be designed to accommodate the educational, literacy, and cultural makeup of the workers. Above all, these workers should be recognized for their efforts; recognition will help ensure that appropriate training and planning efforts are designed to include them in future disasters and will elevate job satisfaction.

One of the more debilitating symptoms that may result from exposure to trauma is the experience of frequent and persistent intrusive thoughts. These thoughts or memories may be particularly distressing if they occurred independently of any environmental cues. These thoughts may persist for years, but often their frequency decreases as time passes.

Schooler, Dougall and Baum (1999) examined the type of intrusive thoughts experienced by rescue workers following the crash of Flight 427. Using the IES, GSI, and Intrusive Thoughts Questionnaire, participants' frequency of intrusive and avoidant thoughts, distress, and environmental cues associated with thoughts regarding an event were assessed at one to two months, six months, nine months, and 12 months following the event. The results indicated individuals tended to think less frequently about the crash as time passed. Individuals also rated their thoughts to be less disturbing over time.

Additionally, the frequency of disturbing thoughts in the month following the crash was not predictive of distress later on. However, the long-term impact of intrusive thoughts tended to depend upon the degree of stress invoked by those intrusive thoughts. For example, those individuals who frequently experienced uncued thoughts regarded these thoughts to be more disturbing than those individuals who only experienced thoughts prompted by environmental cues, even though the frequency of thoughts between the uncued and cued groups did not differ.

As a result, the individuals who experienced uncued intrusive thoughts reported more distress than those who experienced cued thoughts. These individuals who experienced uncued thoughts were more prone to display signs of chronic stress and report continuing intrusive thoughts for the year following the crash. For example, early uncued thoughts and the distress resulting from intrusive thoughts in the month following the crash were correlated with higher incidences of intrusive thoughts and avoidance at six, nine, and 12 months following the crash. Although the frequency of intrusive thoughts has typically been used as a gauge for later distress and adjustment, the work of Schooler, Dougall and Baum (1999) indicates that the magnitude of distress resulting from intrusive thoughts is an important measure in determining who may experience distress later on.

One factor that seems to be related to the development of PTSD is the individual's prior trauma exposure. An individual's history of exposure to traumatic experiences may contribute to their ability to cope and the severity of stress experienced following exposure to psychological trauma. Research indicates that repeated exposure to trauma increases an individual's vulnerability for pathology and is connected with more distress. However, the literature also suggests that individuals frequently exposed to trauma are more resilient and this exposure is thus beneficial.

Dougall, Herberman, Delahanty, Inslicht and Baum (2000) examined 159 rescue and emergency workers and airport and medical personnel who recovered and sorted personal belongings, plane wreckage, and located, transported and identified human remains. The participants were involved in four testing sessions. The testing sessions occurred at four to eight weeks, and six, nine and 12 months after the crash. Measures of trauma history, intrusive thoughts, and psychological distress were obtained in each session along with measures of heart rate, blood pressure and a urine sample to measure catecholamine levels.

Dougall et al. (2000) reported that previous exposure to traumatic events that were similar to the current one was not related to lower levels of stress. However, frequent past exposure to traumatic events that were dissimilar to the crash of Flight 427 was significantly related to more distress. Indeed, more recurrent exposure to past dissimilar traumatic experiences was related with more distress and intrusive thoughts; however, this relationship was not found with physiological arousal variables, such as heart rate, blood pressure, and urinary catecholamine levels.

The impact of previous experience with stress on the subsequent development of PTSD is complicated. Mills et al. (2007) examined the effect of Hurricane Katrina on the mental health of displaced individuals. Specifically, they examined how demographic variables and experiences during the disaster predicted the development of acute stress disorder (ASD), which is a major stress response in the first month after trauma exposure. Previous work reported that the presence of ASD predicted the occurrence of PTSD up to 2 years posttrauma (Harvey & Bryant, 2002).

A Katrina-specific questionnaire, the Traumatic Events Questionnaire, and the Acute Stress Disorder Scale were utilized to assess demographic information, prior exposure to trauma, and acute stress disorder (as acute stress disorder has been shown to predict PTSD up to two years following a traumatic event). The results indicate that individuals with prior psychological problems, females, Black racial status, those who experienced an injury as a result of Katrina, and those who perceived a threat to their life were more susceptible for the development of ASD.

These factors were indicative of acute stress symptom severity. However, prior exposure to trauma was not a predictor of acute stress in this sample. Yet, Epstein, Fullerton

and Ursano (1998) examined the factors that increased one's susceptibility for developing PTSD following the Ramstein air disaster in 1988. In this situation, military health care workers were subjected to varying amounts of involvement and subsequent distress in the evacuation of victims and recovery of the crash site.

By employing scores from military medical care workers on the SCID-NP, SCL-90-R, the Impact of Event Scale, and several open-ended questions at 2, 6, 12, and 18 months following the disaster, these researchers determined that lower educational level, exposure to burn victims, a higher incidence of stressful life events following the initial traumatic event, and feeling numb immediately following exposure to the event all independently predicted the development of PTSD. Providing care for burn victims was the best predictor of the acquisition of PTSD. Furthermore, exposure to stressful life events after the disaster exacerbated the severity of PTSD symptoms.

Fullerton, Ursano, and Wang (2004) improved the methodological rigor in this area by examining exposed disaster workers who handled the response and recovery of a major airline crash compared to a group of disaster and rescue workers from a similar community not exposed to the disaster. Study participation occurred 2, 7, and 13 months post disaster. These researchers identified the existence of PTSD by utilizing the DSM PTSD-IV Scale during the thirteen month post disaster interview. Acute stress disorder was assessed in accordance with the DSM-IV criteria one week following the disaster. Depressed and non-depressed participants were identified by using a standardized cutoff for responses on the Zung Self-Rating Depression Scale, measured at 7 and 13 months following the disaster.

This research indicates that disaster workers were more likely to develop ASD and PTSD than the comparison groups. Also, the exposed disaster workers had higher rates of depression at both seven months and 13 months after the disaster than the comparison group. Those workers who were diagnosed with ASD were over seven times more likely to meet the diagnostic criteria for PTSD at 13 months post-disaster. Those workers exposed to the disaster who exhibited early dissociative symptoms were at an increased risk for displaying signs of PTSD and depression at seven months following the disaster. Additionally, workers with prior experience with traumatic events or disasters were almost seven times more likely to develop PTSD. The rates at which these workers sought services for emotional problems were nearly four times that of a control group. These results highlight the importance of early identification of dissociative symptoms, depression, and the existence of exposure to prior traumatic events in planning health care services for disaster workers.

Morren, Dirkzwager, Kessels and Yzermans (2007) examined the effects of disaster on the health of rescue workers using both pre-disaster and post-disaster health records, noting absences from work attributable to health problems. A comparison group not exposed to the disaster was also used. The disaster involved a fire in a fireworks depot in the Netherlands. The results indicate that rescue workers who responded to the disaster experienced an increase in psychological, respiratory, musculoskeletal, and nonspecific symptoms immediately following the disaster as compared to their pre-disaster levels and a control group of rescue workers who were not exposed to the disaster. These results indicate that even with training, rescue workers are not immune to the physical and psychological effects of exposure to traumatic events and disasters.

Given that trained disaster workers are at risk for the development of physical and psychological symptoms following exposure to trauma, it would seem that volunteers with minimal training would be especially susceptible to the negative effects of exposure to trauma. Hagh-Shenas, Goodarzi, Dehbozorg and Farashbandi (2005) compared the psychological status of rescue personnel who received formal training prior to disasters to those who did not receive any formal training before helping with the Bam earthquake disaster in the Kerman province of Iran. The groups compared were two groups with formal training (Red Crescent: Red Cross workers and firefighters) and a group of university student volunteers with no prior formal training in handling traumatic situations.

The participants completed three self-report scales 75 to 103 days after the earthquake. The following is a list of the measures used (1) the General Health Questionnaire that measures physical health, anxiety, social functioning and depression; (2) a measure of symptoms of post-traumatic stress in a civilian population; and (3) the Anxiety Sensitivity Index (ASI) which measures negative consequences to the experience of anxiety. The results indicate that the university student volunteers experienced more unpleasant psychological effects than the Red Crescent workers and fire fighters. It was shown that the university student volunteers scored higher on measures of PTSD, intrusive thoughts, emotionality, depressive and anxiety symptoms, and physical health symptoms. These results highlight the impact of formal training as a barrier against the development of PTSD following traumatic experiences.

It is clear that those with a direct exposure to a traumatic event experience physical and psychological problems after the exposure. Boscarino, Adams and Figley (2006) examined the impact of the September 11, 2001 terrorist attacks, the ongoing threats of further attacks on worker productivity and threats to outpatient service use 1 and 2 years after the attacks. The participants were ordinary citizens living in the New York area (not rescue workers).

Boscarino et al. (2006) argued that panic attacks and psychological distress were prevalent among New York City adult residents following the terrorist attacks. Worker productivity was also affected. Research indicates that employees who worked near the World Trade Center disaster site experienced increased physical and psychological distress.

The incidence of worksite shootings, employee violence, and accidental injuries also increased. This study interviewed individuals 1 year following the attacks and again at a two year follow-up. The number of workdays lost, the number of lower quality workdays, and the number of doctor visits within a 12-month period was assessed.

Additionally, the survey assessed the presence of PTSD (assessed by a scale that utilized DSM-IV criteria), the existence of depression (assessed by a scale that utilized a version of the SCID), the presence of three stressors (i.e., exposure to the World Trade Center disaster, negative life events, and traumatic life events), one's history of chronic diseases, mental health service utilization, social support, and self-esteem. The results indicated that there was a strong correlation between exposure to the World Trade Center disaster and lower worker productivity; this effect was seen primarily in the year following the incident. The existence of PTSD and depression was also shown to be correlated with lower worker productivity in the first year after the disaster.

Although the relationship between exposure to the attack and lower productivity existed at the 2 year follow-up, this connection was less significant and less reliable. PTSD was shown to be related to lower work quality at the two year follow-up; however, depression was not related to work quality at the two year follow-up. These results indicate that interventions and programs should be designed to negate some of the harmful effects that result from exposure to disasters and traumatic events.

Schlenger, Caddell, Evert, Jordan, Rourke, Wilson, Thalji, Dennis, Fairbank and Kulka (2002) also studied the impact of the September 11 attacks on the general population. Following the World Trade Center disaster, those individuals who lived closest to the disaster site were more at risk for the development of PTSD than those who lived farther away from the site. Through the employment of the PTSD Checklist (PCL), the SCL-90, and the Brief Symptom Inventory, this study assessed PTSD symptoms and other clinically significant mental health symptoms in adults in New York, NY, Washington, D.C., and other metropolitan areas in the United States. The results indicate that those who lived in New York City were significantly more likely to develop PTSD than individuals who resided in other metropolitan areas, including Washington, D.C.

The Nature and Correlates of Vicarious or Secondary Trauma Exposure

Lating, Sherman, Lowry, Everly and Peraquine (2004) examined vicarious traumatization by examining American Airline flight attendants who worked on the East Coast ($n = 513$) and the West Coast ($n = 353$) on measures of general well-being, psychological symptoms, life-functioning and probable PTSD. There were no significant differences between the crews regarding probable PTSD (19.1% east coast, 18.3% west coast) despite the fact that the East Coast flight attendants were twice as likely to know someone who perished as a result of the September 11 attacks than West Coast flight attendants. The authors argued that their results were evidence of a psychological contagion—a spreading of the negative impact of trauma to those who do not have direct contact with the source of the threat.

Lating, Sherman and Peraquine (2006) further examined this issue by including a third group of flight attendants who were not employed by American Airlines at the time of the September 11 attacks but were employed by American Airlines at the time of this study. Further, this third group of flight attendants was not operating out of the East Coast or West Coast at the time of this study. The results indicated that there were no significant differences among the three groups regarding the reported incidence of probable PTSD.

The rates of probable PTSD for East Coast (19.1%), West Coast based (18.3%) and the attendants hired after September 11, 2001 (15.1%) were not significantly different. The results were similar to the 13% prevalence rates of male rescue workers after the bombings in Oklahoma City (North et al., 2002), the 20% prevalence rates of residents living near the World Trade Center (Galea et al., 2005), and the 23% probable PTSD prevalence rate for Pentagon staff members (Grieger, Fullerton, & Ursano, 2004). The above prevalence rates should be viewed in the context of a 4% national prevalence rate of probable PTSD (Sclenger et al., 2002)

The deleterious impact of exposure to trauma has been identified in the children of first responders. Hoeven (2005) reported that one factor that likely contributed to children with emotional disturbance 6 months after the September 11 terrorist attack was having a family member exposed to the attack. Duarte et al. (2006) reported that children had a higher rate of probable PTSD 6 months following the attack on the World Trade Center when a family member was an emergency medical technician (18.9%) or there were two first responders in the family (17%) compared to those that had no first responders in the family (10.1%).

Propper, Stickgold, Keeley and Christman (2007) utilized 11 undergraduate students taking a class on dreaming in a study that examined the effects of media coverage of the September 11 terrorist attacks. Students had recorded their dreams prior to and after the terrorist attacks. It is of note that the students lived in the Boston area (where one of the planes involved had taken off) so they may have experienced more stress than the general population. Results indicated that students had more event-related dreams following the attacks and the frequency of the dreams and distressing content was directly associated with the number of hours they observed these events on television—a 5–6% increase in the proportion of post-attack dreams containing features related to the

attacks for every hour of television watching. Also of significant note is the fact the time spent talking to others resulted in less dreaming about specific events related to the attacks; this supports Pennebaker's finding that talking with other people ameliorates stress (Pennebaker, 2001).

Results suggest that time spent talking with other people about the attacks may have improved processing of the traumatic events. This study concurs with previous works which show that as people recover from traumas, their dreams contextualize traumatic events, shifting from dreams with specific features of the events to dreams with only thematic associations to the trauma. In summary, this research suggests that television watching of traumatic events increases traumatic stress and distressing dreams about the event. Furthermore, talking about the trauma with other people decreases stress, improves cognitive and emotional processing of the event, decreases the frequency of disaster related dreams, and changes the nature of dreams about the event. These results suggest that talking about the traumatic event enhances the recovery process.

Palm, Polusny and Follette (2004) review the evidence on vicarious traumatization in disaster and trauma to emergency workers and journalists. As noted previously, vicarious traumatization has been referred to as secondary traumatization and compassion fatigue. It describes post traumatic stress reactions experienced by those who are indirectly exposed to traumatic events. Vicarious trauma reactions include intrusive thoughts/images, avoidance, emotional numbing, hyperarousal, somatization, physical problems, alcohol use problems—all similar to those experienced by direct trauma survivors. Also noted are changes in self-identity, world-view, and spirituality, and general psychological health, disruption in beliefs about safety and personal vulnerability and feelings of powerlessness. Perceptions and meanings regarding life and the world can change.

Palm et al. (2004) indicate that family, friends, co-workers, professionals who assist direct trauma victims, media personnel, general population exposed to repeated media coverage of events, physicians and other medical personnel, emergency response personnel such as police/firefighters/paramedics, rescue workers and body handlers are at risk for vicarious traumatization. Factors that increase the risk for vicarious traumatization include listening to graphic details and consecutive interactions with trauma survivors, personal loss related to the event, higher levels of stress in general, and poor coping skills.

Palm et al. (2004) indicate that the findings for vicarious traumatization in healthcare workers are inconsistent. Some research suggests that the stressors related to disaster work increase the vulnerability for distress. Other research indicates that disaster workers, especially rescue workers are well trained and more resilient. Some studies indicate no increase in traumatization as a result of repeated exposure to trauma survivors and their stories while other studies show increased distress as a function of number of contacts with trauma survivors. Previous experience working with trauma survivors for mental health professionals decreased the risk of distress. More experienced practitioners experience less distress. Mental health worker participation in volunteer activities was associated with less distress and more positive feelings in working with disaster victims.

Screening and Intervention Methods

Screening and Identification of At-Risk Individuals in the Early Stages Following Traumatic Events

There are a number of mental health screening tools available for use with individuals who have had exposure to traumatic circumstances. These tools may be used to assess the presence of psychopathology from exposure to traumatic events over the long term (National Center for PTSD Resources, 2008). Many of these tools are brief self-report measures that can be completed in five to ten minutes and which may be useful in identifying individuals at risk. Research has shown that individuals who exhibit severe adverse mental health reactions in the acute period following exposure to trauma are at a higher risk for long-term problems in the form of PTSD, depression, health problems, and decreased quality of life (Birmes et al., 2003, Bryant, Harvey, Sackville, Dang, & Basten, 1998; Bryant, Sackville, Harvey, Dang, Moulds, & Guthrie, 1999). Therefore, early screening is an important component of disaster planning and recovery efforts.

In a comprehensive review, Brewin (2005) identified several measures that are reliable and valid for early screening and identification of individuals at risk of PTSD following mass trauma. He noted that useful screening instruments in this context should contain the minimum number of items necessary for accurate case identification, be written in understandable language, have a purpose that is transparent and acceptable to the respondent, be applicable to varying populations experiencing varying traumatic events, and have simple scoring rules that can be scored by non-specialists.

Only screening instruments that had been previously validated by comparison to a structured clinical interview for PTSD—the Structured Clinical Interview of DSMIV (SCID) PTSD Module (First, Spitzer, Gibbon, & Williams, 1995) or the Clinician Administered PTSD Scale (CAPS; Blake, Weathers, Nagy, Kaloupek, Gusman, Charney, et al., 1995)—were included in the review. Instruments had to apply to adults and be applicable to any trauma population. Screening instruments longer than 30 items were omitted because they may take too much time. Thirteen instruments were identified as the best screening instruments based on the previously noted desired characteristics as well as the inclusion criteria.

Several measures approached the performance of the SCID or the CAPS. This was often accomplished by raising the cut-off score. The Impact of Events Scale (IES; Horowitz, Wilner, & Alvarez, 1979) and the Trauma Screening Questionnaire (TSQ; Foa, Riggs, Dancu, & Rothbaum, 1993) were found to be the best screening measures overall; they had been tested in the first year following a traumatic event—another aspect of these measures that was examined in this review—making them especially useful for monitoring victims during the early months following a trauma to identify the individuals who may need further intervention.

On a different but related note, Horowitz (2007) examined the difference between distress and disorder and the importance of distinguishing the two. He describes disorder as existing within the individual which may be independent of environmental stress and which may or may not be a result of environmental stress. In this case, as environmental stress decreases, symptoms will likely persist, and if a mental disorder does exist, treatment is warranted. Distress is defined as a normal human response to stressful environmental circumstances—a situation that does not require a diagnosis of a mental disorder. In this case, as environmental stress decreases, symptoms of distress are likely to also decrease. Distress is most likely to be a consequence rather than a cause of stress. Measures of environmental stress exist that could help determine what responses are expected and normal and which responses are signs of disorder.

The importance of distinguishing the two relates to how each are treated. If distress is treated as a disorder, then appropriate environmental changes to reduce stress may not be addressed (e.g., treating symptoms pharmacologically rather than looking at and modifying the source of the stress). Overall, recognizing distress will help in emphasizing the importance of making adjustments to the environment to reduce stress. This would be especially true in the event of a disaster as many are distressed, relatively few develop disorders, and restoring the environment and support systems to normal functioning as soon as possible is likely to reduce or eliminate symptoms and distress. Focusing on the "individual with a mental disorder" as the sole source of the problems may delay addressing these larger social issues.

Conversely, Dyregrov (2004) proposes that "demedicalization" has gone too far in some cases. He argues that demedicalization had led to individuals not receiving essential professional intervention. As Horowitz (2007) suggests, demedicalization refers to labeling a condition of distress as disorder, which may diminish an individual's natural coping resources and decrease the focus on environmental issues that would reduce or eliminate distress. Dyregrov (2004) argues that this movement to demedicalize the effects of trauma produces barriers to getting necessary and often desired professional mental health services.

It would appear that careful disaster planning and organization, appropriate and timely screening, appropriate training for those involved in identification and triage of at risk individuals, and access to services independent of whether or not a person is in distress or is experiencing more entrenched mental health issues would help to find some common ground from these two important perspectives on the best way to conceptualize and subsequently manage at risk individuals in the aftermath of disaster.

Early Intervention Issues and Strategies in the Acute Stages Following a Traumatic Event

Prior to the 1980s, there were no mental health interventions following disasters. As more was learned about trauma from the Vietnam veterans in the early 1980s, Psychological Debriefing, a model developed in response to the needs of the Vietnam veterans and later more fully described by Dyregrov (1997) began to be routinely applied in circumstances involving traumatized victims of adverse events. Psychological debriefing is a group intervention method that is applied within 48–72 hours following a trauma. Sessions encourage group participants to describe factual components and process emotional components of the trauma experience. Its use rests on the belief that this immediate processing of the event allows the individual to reorganize the memory of the event so that it is recalled in a less traumatic way (Van der Kolk, 1997). Critical Incident Stress Debriefing (CISD), developed by Mitchell in 1988, expanded and further articulated a process for psychological debriefing (Everly & Mitchell, 2000; Mitchell, 2004; Mitchell, 1988; Riddell & Clouse, 2004) that was later termed Critical Incident Stress Management (CISM).

Katz et al. (2002) review the literature from 1966 to 2002 related to what interventions have been used for prevention and intervention during the first two months after an event. Their review of acute psychiatric interventions indicates that the primary focus has been on attempts to minimize the long-term effects of disaster trauma on its survivors. They note that several organizations have come up with intervention teams (e.g., US Navy Special Psychiatric Intervention Teams (SPRINT), the US Army Stress Management Team (SMT)). Also noted is the fact that these interventions have been generously applied in the absence of any scientific evidence that they reduce psychiatric morbidity and further note that the same has been true for most acute interventions that "are often performed post-trauma on the basis of good intentions and theorized benefits" (Katz et al., 2002, p. 208). Until more recently, these models have been routinely utilized in emergency and disaster situations despite a lack of evidence-based outcome studies demonstrating their safety, usefulness in the acute phase following disaster, and whether they decrease the risk

for longer-term post traumatic reactions. In fact, it has been noted that debriefing is often the "default" in organizations dealing with disaster (cited in Blythe & Slawinski, 2004).

However, these methods and models are now questioned by many experts in the field and have come under much scrutiny and criticism due to questions about their effectiveness in decreasing distress and preventing negative longer-term outcomes in those individuals exposed to traumatic events (Blyth & Slawinski, 2004; Greenberg, 2001; Pennebaker, 2001). Several large-scale meta-analyses have not yielded positive findings regarding psychological debriefing and CISD/CISM (Rose, Bisson, Wessely, 2003; Rose, Bisson, Churchill & Wessely, 2005; van Emmerik, Kamphuis, Hulsbosch, & Emmelkamp, 2002).

In review of debriefing methods, researchers indicate that the application of debriefing is controversial and, although some show benefit in the short term, others report a worsening of symptoms. Some studies that do show benefits are not controlled and when controlled, show short term benefits but no long term benefits in decreasing adverse outcomes (Deahl, Gillhan, & Thomas, 1994; Hobbs, Mayou, Harrison, & Worlock, 1996; Kenardy, Webster, Lewin, Carr, Hazell, & Carter, 1996). These analyses suggest that, at best, psychological debriefing can help people feel better in the short term but that it has a negligible effect on long-term outcomes for prevention of PTSD and stress-related problems. In some cases, those who have engaged in psychological debriefings have shown increased acute distress and poorer long-term outcomes than those who received non-CISD or no formal support. This finding suggests that debriefing may actually be harmful.

In response to these criticisms, Mitchell and others emphasize that debriefing is just one component of CISD/CISM, and that it was never intended as a stand-alone method that should be applied to all people in the same manner and timing (Mitchell, 2004). Mitchell and others also note that many of the studies included in these reviews were poorly designed and as such that they do not accurately reflect the efficacy of CISM (Everly & Mitchell, 2000; Mitchell, 2004; Mitchell, 1988; Riddell & Clouse, 2004).

The debate continues, but most experts in the field have made some recommendations regarding how to best proceed. Namely, more well-designed studies assessing the short- and long-term effects of debriefing are needed to clarify the nature of the current controversy. Despite the fact that some studies have found CISM to have a positive effect and that most research on traumatic stress indicates that some form of reprocessing of the events is a necessary part of the recovery process, most feel that the application of debriefing methods should not be the "default" mode for early interventions at this point in time—especially in light of findings that it caused harm for some individuals (Blythe & Slawinski, 2004; Rose et al., 2003; Rose et al., 2005; van Emmerik et al., 2002).

Due to the fact that it may be impossible in the short term to conduct controlled studies on these early interventions, experts have come together to determine what we do know about how people cope with trauma and how that can be applied in the event of disaster (Blythe & Slawinski, 2004; Hobfoll, Watson, Bell, Bryant, Brymer, Friedman et al., 2007; International Society of Traumatic Stress Studies Resources, 2008; WHO, 2006).

Addressing Grief and Bereavement

Prevention and Management of Vicarious Traumatization

Palm et al. (2004) suggest the following in order to limit vicarious trauma reactions. They detail recommendations for interventions at the individual and organizational levels.

The following is a list of actions which may limit vicarious trauma reaction at the individual level: spending time with other people outside of the work environment/staying connected and not isolating oneself, asking for support, engaging in activities that provide a sense of purpose, attending to physical health, maintaining balance between professional, physical and emotional aspects of life, attaining social support, accepting that emotional distress in trauma survivors is a "normal" reaction to traumatic events, limiting unnecessary exposure to traumatic events by decreasing exposure through the media/newspaper, maintaining balance in the work situation, taking vacations, identifying personal limits, and talking to coworkers. Poor communication with coworkers has been shown to increase risk of adverse vicarious post-traumatic stress reactions.

The following is a list of actions which may limit vicarious trauma reaction at the organizational level: providing appropriate training for dealing with trauma and disaster, providing information about traumatic stress reactions, effective coping and possible interventions and encouraging use of natural social support systems, normalizing traumatic stress reactions, being encouraged to advocate for survivors or change policy to help survivors, ensuring manageable workloads, creating a respectful, supportive work environment, having access to support resources without fear of negative consequences, and encouraging vacations. Lack of social support in the work situation, poor communication, and poor support from supervisors has been associated with increased risk for secondary trauma, burnout, and fatigue.

The Use of Pharmacologic Interventions in the Acute Stages of Trauma

Katz et al. note that the use of medication in the treatment of acute trauma is not well studied although the studies that exist note that anxiety medication may show some minimal

effects in improving long term outcomes; tricyclic antidepressants and selective serotonin uptake inhibitors show significantly reduced rates of PTSD and ASD; antiadrenergics may have prophylactic effects (although these were laboratory studies); glucocorticoids may have a positive effect for PTSD. Overall, just a few studies exist that examine the use of medication in the acute phases after a traumatic event.

Treatment and Intervention Methods of Longer-Term Post-Trauma Reactions

The comprehensive review by Bisson and Andrews (2005) reflects the state of the current evidence-based treatments for longer-term post-traumatic reactions, namely Post Traumatic Stress Disorder. The conclusions from this review of 33 controlled studies on treatment of PTSD indicate that individual trauma-focused cognitive-behavioral therapy, eye movement desensitization and reprocessing (EMDR), stress management, and group administered trauma-focused cognitive behavioral therapy are all effective in treating PTSD.

There is some evidence that cognitive behavioral therapy and EMDR are more effective than stress management. General psychological treatments that are not specific to trauma (e.g., generic cognitive-behavioral therapy) were found to be less effective than trauma specific treatments. The review did not provide sufficient evidence to determine if psychological treatment could be harmful, but there was a greater drop-out rate in active treatment groups relative to control groups. Overall, this review most strongly supports the use of individual or group cognitive-behavioral therapy or EMDR in treating PTSD, although many questions remain unanswered with regard to treating longer-term post trauma reactions.

Treatment Strategies

Peak performance in a safety-sensitive occupation is not unique to aviation. Much of the literature that addresses workplace critical incidents refers to manuals that provide procedures, support personnel, and guidance to manage the emergency (Federal Aviation Administration, 2008). These publications greatly assist individuals who may not recall proper procedures or make an incorrect decision in the chaos of an emergency. Publications and strategies are also available to provide guidance to personnel on critical incident stress management programs with the goal of improving resiliency and decreasing the prevalence of psychological trauma and its associated complications.

While reaching out to assist passengers, their families and co-workers is a natural response in disasters, a wide variety of techniques were used. Single session debriefing (CISD) programs were used, and while they enjoyed a high rate of satisfaction among the participants, the single session did not "prevent the development of negative psychological sequelae." These sessions may be useful in reduction of immediate distress and/or identification of individuals needing referral to additional mental health support services (van Emmerick, et. al, 2002).

The International Critical Incident Stress Foundation (ICISF) supports a model developed by Dr. Jeffrey Mitchell in which a multiphase interaction with small groups and individuals would proceed through a stepwise progression with the support of trained psychologist and professional peers (CISM in Aviation). ICISF has been utilized by major groups in the aviation industry including airport personnel, air traffic controllers, airlines, and pilot groups.

While the authors claim CISM effectiveness is proven, prospective clinical trials are lacking. Without evidence to show its effectiveness over that of the natural course of trauma, which includes spontaneous recovery for some individuals, its effectiveness, while inherent, is not scientifically verified. Research involves self-reporting and the assessment of return to work data. While program satisfaction is noted, it has not been correlated with improved performance or decreased incidence of psychological complications, such as PTSD. Statements regarding prevention of stress complications were not supported with data in their publication. The process appears to be very promising, but clinical trials are needed to show statistical significance in operator performance as a result of this program.

An Integrative Organizational Approach

Jones, Roberts, and Greenberg (2003) describe a strategy that can be used within a variety of organizations that utilizes peer assessment to identify individuals at risk of developing mental illness following a traumatic event.

The management protocol as described by Jones et al. (2003) involves an organized strategy for intervention planning and a selection of personnel to be trained in risk assessment. Specific management strategies include effective site management (e.g., minimizing exposure to the traumatic event, rotating personnel, ensuring adequate rest), a planning meeting to engage organizational management who know about the event and who was exposed—including the support of line-managers to ensure successful implementation, making a decision at the planning meeting as to whether any intervention is required (organizers are trained on the situations most likely to result in higher risk of post-traumatic distress), conducting a risk-assessment interview using a "before, during and after" with either groups or individuals to identify those at risk, and conducting a one-month follow-up interview.

The strategy has a structure for large-scale events that utilizes a "filtering template" (e.g., those directly exposed, those with family/friends involved in the event, rescuers and emergency personnel, large-scale community traumatization, vulnerable individuals who react strongly to minimal stress, those who would have been involved but were not) to ensure that all personnel are considered in the plan. Overall, these authors describe some very concrete strategies to implement within an organization to address post-trauma distress and to facilitate referral as needed.

This strategy can be used for small-scale trauma involving one or a few individuals to large scale disasters involving multiple individuals and multiple organizations. It also builds upon the positive components of psychological debriefing—using an interview format to detect those experiencing significant post-traumatic stress—and addresses the criticisms of psychological debriefing in that it does not encourage excessive exploration of emotions (Rose, Bisson, & Wessely , 2003; Rose, Bisson, Churchill, & Wessely, 2005).

This strategy involves personnel management by well-trained and psychologically informed managers as well as early referral if mental health support is needed. The strategy itself involves training managers to identify those at risk through the use of a risk-assessment checklist—an assessment of risk factors that can be easily observed or assessed through an interview.

As a final note regarding intervention, *Disaster Action* is a charity whose members consist of survivors and bereaved from major disasters. This group of survivors has developed a code of ethics in order to protect the rights and interest of those affected by disaster. It is designed to influence the attitudes and behaviors of anyone who works with those affected by disasters that may include local authorities, coroners and all involved in identification processes, members of emergency services and investigation teams, and volunteer agencies.

Pre-Disaster Planning and Preparation

Learning Lessons

Tremendous emphasis is placed on the importance of after-action reports in disaster recovery. Following through with these after-action procedures is rare, but the lessons that emerge lead to the development of a disaster management protocol. Recently, several articles have identified the importance of the integration of mental health planning and response as a lesson learned from previous disasters.

Felton (2004) specifically addresses the lessons learned in regard to the mental health impact of terrorism in the wake the September 11 terrorist attacks in New York City and Washington, DC. Felton (2004) states that impact of such disasters can extend far beyond the immediate geographic area with geographic proximity to the disaster listed among the demographic factors of those at higher risk for negative mental health consequences.

It has also been determined that the current disaster mental health response model is adequate to meet the short-term mental health needs of most victims (Felton, 2004). However, this mental health response model is inadequate to meet the needs of those who develop severe and persistent mental health symptoms following a disaster.

Felton (2004) acknowledges the widely accepted belief that mass media propagates negative mental health reactions by continual exposure to horrific scenes, but empirical data to support this belief are rare. However, he asserts that mass media is a crucial communication link during disasters. Specifically, mass media is a great tool useful for informing the public about mental health response efforts and where to seek mental health support.

Gheytanchi, et al. (2007) provided a critical analysis of the response efforts which occurred during the Hurricane Katrina disaster. This analysis identified the following twelve major failures which contributed an inadequate response: (1) lack of efficient communication, (2) poor coordination plans, (3) ambiguous authority relationships, (4) unclear leadership structures, (5) recent federal government focus on counterterrorism versus all-hazards response, (6) ambiguous training standards and lack of preparation, (7) failure to evaluate lessons learned, (8) performance assessment was not integrated into the process, (9) failure to evaluate race and socio-economic status as response factors, (10) rumor and chaos, (11) lack of personal and community preparedness, and (12) uncertainty about the effects and roles of disaster mental health plans and professionals.

Examination of the disaster mental health response reveals that the best method of intervention in traumatic events is uncertain and evidence-based interventions are ambiguous. One widely applied intervention, Critical Incident Stress Debriefing (CISD), faces much criticism. As a result, alternatives to CISD are becoming more plentiful. However, the mental health community seems resistant to explore and adopt these contemporary intervention methods (Gheytanchi, 2007).

Furthermore, Gheytanchi et al. (2007) asserts that mental health professionals should engage more directly with disaster planning agencies. This would allow the role of the mental health professional to expand the treatment of trauma and include mental health planning and mitigation. Gheytanchi et al. (2007) also state that more mental health integration may also improve some of the previously listed factors which lead to an inadequate response including communication, coordination, command structures, training, assessment, rumor, and preparedness.

Individual and Community Resilience and Exposure to Traumatic Circumstances

It is interesting that so much of the research on disaster recovery has focused on risk or vulnerability factors related to the development of psychopathology such as PTSD because the majority of those exposed to traumatic circumstances do not develop long-term problems—those people who are resilient. There has been less focus in the literature on PTSD, trauma, and disaster recovery that relates to the notion of "resilience."

Bonnano, Galea, Bucciarelli and Vlahov (2006) investigated resilience following the September 11th World Trade Center attacks. These authors defined resilience as the absence of psychopathology (i.e., 0 or 1 PTSD symptoms). The sampling was taken from all adults residing in New York City and the surrounding areas, and occurred 6 months after the September 11th attacks. Overall 65% of the sample showed no evidence of PTSD. They found that the percentage of individuals showing resilience decreased as the level of exposure to the trauma increased. Individual resilience never dropped below 33%, even in the most severely exposed groups with the highest rates of PTSD.

Interestingly, as in previous work (Bonnano, Rennicke & Dekel, 2005), Bonnano et al. (2006) found that a "compound exposure" (e.g., saw the attacks occur on September 11th and were involved in rescue efforts) resulted in decreased resilience. This has some important implications regarding the selection of who will be involved in rescue efforts and in terms of training that focuses on increasing the stress resistance of those who may have repeated exposure to traumatic events.

Bonanno, Galea, Bucciarelli, and Vlahov (2007) investigated variables that might predict psychological resilience following mass disaster using a sample of adults with varying levels of exposure to the attacks of September 11th. This study defined resilience in the same manner as earlier studies with resilient individuals showing only 0 or 1 symptoms of PTSD. They also included measures of depression and substance abuse in examining resilient outcomes. The variables of interest included the following: demographic characteristics (gender, ethnicity, education, age), measures of social and material resources (material, interpersonal, energy, and work resources), and levels of life stress prior to and after the traumatic event. Previous studies have shown many of these variables to correlate with an increased risk for PTSD.

First, Bonanno et al. (2007) found that resilient individuals had lower levels of depression and substance abuse than those with mild to moderate trauma or PTSD. Female gender was a robust predictor of decreased resilience, which is consistent with findings that female gender is a risk factor for PTSD. Older age predicted resilience with those over age 65 years showing significantly better resilience than young adults. Interestingly, this study found that higher education levels were associated with decreased resilience. Decreases in income, decreases in perceived social support, and the presence of chronic disease predicted decreased resilience. Finally, people who had not experienced traumatic events prior to September 11th, who had no recent life stressors, and who had no additional trauma following September 11th were more likely to exhibit resilience.

Hoge, Austin and Pollack (2007) reviewed the literature on resilience and how it is associated with the development of PTSD. Hoge et al. (2007) reviewed the focus of earlier studies of resilience in children and identified easy temperament, a warm relationship with an adult, social support, internal locus of control (self-efficacy), and positive self-esteem as predictors of longer-term psychological resilience. The review of early research on resilience in adults identifies a focus on the notion of "hardiness"—considered a constant and stable personal resource (Kobasa, 1979).

Many aspects of the notion of hardiness are consistent with other factors that had been identified earlier such as self-efficacy, an internal locus of control and a willingness to take some risks or take on challenging activities. These authors note that, in addition to those factors noted above, positive distancing (accepting the next best thing to what one wants), hope, optimism, religious behavior, a sense of control, social support, active involvement in and maintenance of relationships and psychological preparedness and structured training experiences have been identified as predictors of resilience. Finally, successful past experiences with stressors has also been identified as potentially protective, possibly increasing self-efficacy.

Other researchers have also identified procedural problems in studying resilience. For example, Hoge et al. (2007) identify the difficulties defining and characterizing the concept of resilience. Is it the "converse" of a risk factor? These authors suggest that certain factors seem to be more likely to be related to both risk and resilience such as social support, while others would not such as the presence or absence of developmental delays or gender. Others suggest that resilience involves factors that "confer protection," which may only show themselves when one is placed in a stressful situation (Rutter, 1987).

Hoge et al. (2007) suggest that it may be advantageous to define resilience as modifiable factors that are inherent within the individual—noting that this could include environmental factors in the sense that the focus is on how an individual interacts with the environment—utilizing or not utilizing resources. These authors also suggest the fact that resilience is studied almost exclusively in retrospective experimental designs—measuring the characteristics of individuals who do not develop PTSD. For example, they note that "avoidant coping style" is identified as a factor that decreases resilience. Yet, avoidance is a primary sign of PTSD and thus retrospective studies cannot

differentiate this factor as an inherent characteristic of an individual from the effect of traumatic stress itself.

A recent critical review of the research literature on resilience identifies several methodological problems with some of the previous work in this area—much of which relates to what is meant by resilience, how it has been studied from a conceptual standpoint, what conclusions have been made and the implications of this previous work (Layne, Warren, Watson & Shalev, 2007).

Research differentiates the terms "protective factor" (a measurable attribute that decreases the susceptibility for being negatively affected by adverse circumstances or stressful events), "stress resistance" (the capacity to maintain adaptive functioning during and after adverse circumstances), and "resilience" (the capacity to apply adaptive strategies early on following an adverse event, such that one is able to bounce back following a period of temporary decrease in adaptive functioning). These authors specifically focus on differentiating stress resistance from resilience. Secondly, and perhaps more importantly, they assert that both are "domain specific." Specifically in response to significant stress or trauma, a person may be resilient and competent in one domain of functioning (e.g., work) and show a deterioration of functioning in another domain (e.g., close interpersonal relationships). They further emphasize that resilience is not simply the absence of overt psychopathology, but rather that a person's adaptive functioning following a trauma or stressful event is similar to their previous level of adaptive functioning.

These authors also indicate that although resilience refers to the notion of bouncing back after exposure to trauma, they stress that people can expect to be changed in some ways by exposure to traumatic circumstances and that the notion of returning to previous functioning is "unrealistic"—suggesting other ways of thinking about resilience such as "acceptance of loss" or a "positive adaptation to enduring or ongoing change" (p. 515).

What does previous work in the area of resilience inform as far as application to real-world disaster recovery and interventions that emphasize resilience? In their extensive review, Layne et al. (2007) suggest that resilience-focused interventions can "compliment" trauma-focused (i.e., reduction of psychopathology/problem-focused) interventions. These authors indicate that resilience-focused interventions could include identification of those at a higher risk for developing particular adverse outcomes due to specific combinations of risk, vulnerability, and protective variables. Interventions could target reduction in risk and vulnerability factors and enhance protective factors.

Another recommendation by these authors includes dividing events according to a timeline: pre-, peri- and post event time periods. In this way, one could incorporate systematic preventive measures during the pre-event period in order to reinforce and build stress resistance—whether that be related to attempts to prevent the stressor from occurring (e.g., aviation accident investigation and safety planning), building up a reserve of tangible resources to be used in the event of a disaster, or building resistance to stress in those most likely to have exposure to trauma (e.g., table-top training exercises, learning how to analyze problems to determine an appropriate course of action). During or shortly after the trauma, the peri-trauma period, systematic measures could be taken to enhance resilience (e.g., building self-efficacy, improving ability to solve problems, improving the ability to evaluate risks in particular situations); during the post-trauma period, interventions could target aspects of longer-term recovery in those who do not "bounce back."

State of the Art Model in Disaster Management

A number of researchers and professionals, national organizations, and international organizations have articulated some recommendations and guidelines for managing trauma in the aftermath of disasters (Blythe and Slawinski, 2004; Alexander, 2005; Bisson, Brayne, Ochberg, & Everly 2007; Bisson & Cohen 2006; International Society of Traumatic Stress Studies resources, 2006; WHO IASC guidelines on mental health and psychosocial support in emergency settings, 2006). Hobfoll et al. (2007) represent some recent work done by a group of international experts from a variety of disciplines relevant to disaster mental health. This group was formed to address the needs of individuals traumatized by disasters in lieu of the lack of controlled studies in this area in order to articulate some "evidence informed" recommendations. The project resulted in the identification of five essential elements that are important for mental health interventions performed in the aftermath of disasters. The following is a list of these important elements (1) a sense of safety, (2) calming, (3) a sense of self- and community efficacy, (4) connectedness, and (5) hope are all important (see Chapter 2, "Five Essential Intervention Principles").

APPENDIX B

Research Methodology

Introduction

The data collection process utilized a mixed methodology approach, which is a combination of semi-structured personal interviews and several self-report questionnaires. The qualitative interview developed was resultant of a review of the literature on the impact of exposure to trauma, a review of the diagnostic criteria for Post Traumatic Stress Disorder (PTSD), and factors that influence the determination that an absence of resiliency in an individual's reaction to trauma occurred. The interview includes demographic data, assessment of strengths, and accident history of individual's previous training of disaster response, previous experience with aviation disasters, symptoms of psychological trauma, natural coping skills, and personal recommendations for coping with aviation accidents based upon their experience. The quantitative self-report questionnaires are highly used measures in psychology. They assess psychological and physical reactions to trauma exposure. Subsequent sections provide a detailed description of these questionnaires.

The purpose of this section of the study was twofold:

1. To discover how airport/airline employees perceive their response/reaction to disasters or traumatic incidences, and
2. To determine what assisted or hindered airport/airline employees recovery from the disaster/traumatic incident.

The interviews did not include the experiences from the county, city, or airport police officers, fire-fighters and EMT (emergency medical technician) personnel who are usually considered first responders to an incident, since research has already been conducted with these groups. The groups that were interviewed are personnel that work at the airport. Their normal course of work is not disaster response; however, these employees often find themselves having a role in disaster response activities when a disaster occurs.

The research questions included the following:

1. How did you perceive yourself responding to or coping with the traumatic incident?
2. What preparation did you have that assisted in dealing with the emotional response you experienced?
3. What would you perceive as helpful to persons experiencing this type of trauma in your industry?
4. Were there processes or events that assisted you in coping with the trauma of the experience?
5. Were there processes or events that increased the trauma of the experience and hindered coping?

A semi-structured interview guide was developed to obtain information that provided answers to the research questions.

Another set of measurements obtained were demographics that included age, gender, education level, marital status, occupation history and other pertinent demographic measures. Many of the aforementioned measures have been found to mediate the deleterious impact of exposure to a traumatic event.

Sample

The aircraft accident database from the National Transportation Safety Board (NTSB) was scanned to see what airlines/airports had been involved in incidents since 2001. The research team felt that timeliness of the accident could be an important factor, as feelings may begin to fade, and the most recent accidents should be researched first. There were several aircraft crashes studied. The American Association of Airport Executives database for hurricane relief was also utilized to determine which airports had been hardest hit by natural disasters in the past several years. Contact was then made with the appropriate airport official.

The accident sites were narrowed by the number of people that were involved or affected by the trauma. In the end, there were a few sites that the research team was unable to visit, as the incidents were off airport, and there was no airport response. A number of airports did agree to participate. In order to conduct interviews and set up meetings, a letter was sent to the airport director seeking permission for voluntary on-site interviews with affected employees. Due to the cost, complicated organizational structures, and time elapsed since the accident, the research team decided against attempting to contact witnesses who may not have been prepared to unexpectedly be queried about their involvement in a prior catastrophic event. While it was possible to order the entire investigation file(s) from the NTSB and comb through the witness statements to find all of the employees that were involved in the event, the team elected to focus on volunteer interviewees who were more easily attainable versus a "cold-call" to an employee or former employee, forcing that individual to revisit the traumatic incident.

The participants interviewed had experience with one of the selected aircraft accidents, or were an airport employee involved in the chosen natural disaster. A total of 24 participants were interviewed that had exposure to man-made and natural disasters. Participants represented a wide variety of employee positions commonly found in the airline/airport industry (such as labor crew chief, customer service supervisor, analyst, acting director of emergency response, training instructor, airport police and airport safety officers, and airport administration). Most have worked in different positions within the aviation industry over the course of their careers. While the ultimate sample utilized was one of convenience, the team attempted to obtain as representative a sample as possible. The diversity within the sample also supported maximum variation in experiences and shared stories which allowed for multiple themes to emerge from various perspectives.

The participants ranged in age from 29 to 67 years old (mean = 49.43). Eighteen of the participants were males and six were females. The educational level of participants included five people with a high school diploma, four with a two-year degree, nine with a Bachelor's degree, four with a master's degree and one with a doctoral degree.

The participants were individuals involved in and/or exposed to a variety of aviation-related traumatic events as well as individuals outside of the airline/airport industry who were involved in the response to traumatic events in both airline and airport disasters. Individuals were identified through the NTSB public reports, and their voluntary participation was solicited through advertisements at their local airport. Several of the participants had experience with or been involved in multiple aircraft incidents and catastrophes.

Each participant was interviewed individually to determine such things as the extent of their exposure to the disaster, their experiences while responding to the disaster, whether they had been previously trained or prepared for disaster response (and the specific nature of that training), and what they did to cope with the psychological impact of responding to the disaster. Each qualitative interview was recorded and later transcribed in order to attain the greatest accuracy.

Participants were asked to speak about their experience with, personal connection to, and role in an identified disaster. They were asked to explain all effects, emotional and physical. Interviewers included summative statements asking for validation if the perceptions/experiences did or did not fit their experience. Participants freely agreed and disagreed on these summative points. The majority of the participants presented a friendly open posture during the interviews with organized answers to the questions asked. Emotions were expressed (crying or teary eyed) by many participants. However, there was no need to terminate an interview due to a high level of emotional response (no loss of control of feelings). Comparative analysis continued throughout the study. Themes were identified and categorized during and beyond the completion of the last interview.

It should be noted that the research team had great difficulty in soliciting some groups of employees and other peripheral professional organizations to participate in this study. At times, there appeared some trepidation by some potential subjects who preferred to not take part in these endeavors. While the team chose not to pursue a rationale or assign a reason for such avoidance behaviors, it is important to note such impediments to the study existed and could be a focus of future inquiry.

APPENDIX C

Data Analysis

Data Analysis and Findings

Emotional Response

All participants expressed that they had an emotional response to the incidents that the research team chose to focus on during the interviews. Frequently the participants who had experienced other incidents would bring in their first traumatic exposure as a comparison or contrast to the chosen incident. Participants also freely brought in other traumatic incidents besides these two as part of the interviews.

There were variations in the degree of response that the participants experienced. Participants, less involved at the site of the incident but responsible for peripheral tasks, were able to express feeling "sadness" that the incident had happened and people had died. They were connected to the situation through media coverage and shared stories from co-workers in the work environment. This group did not indicate other symptoms of post-traumatic stress, or post-traumatic stress disorder.

There were variations of symptoms experienced among the participant groups of responders and accident investigators. A continuum from post-traumatic stress response (i.e., problems sleeping, experiencing a physical illness) to symptoms of a significant disorder (i.e., change in personality, altered functioning and behaviors, intrusive thoughts, labile emotions) was reported and described by participants. Several sought relief through medication and therapy, while others identified support systems of family, friends and co-workers as significant to their coping. The risk factors identified in the following section influenced the reactions and coping strategies of participants.

Antecedents

During the analysis several factors emerged as antecedents that affect the participant's degree of emotional response to the experience. The following characteristics could be viewed as risk factors:

- **First time exposure to trauma.** Participants that had multiple traumatic experiences reverted back to their first experience and spoke of what it meant to them and how they dealt with it. Then they could communicate how the chosen incident required similar or different responses from them. The succeeding incidents of trauma were reported as having less of a traumatic impact or at least the participant felt more in control of their response and the situation. Participants that experienced the chosen incident as their first trauma spoke at length of its impact and how they attempted to deal with their emotional and physical responses. Some reported becoming physically ill after their first day of working within the role established for the incident response. First time exposure to trauma is a risk factor for an adverse reaction since they had no previously established coping strategies, lacked predictability of response in the situation, and had no understanding of the post-traumatic process.
- **Perceived magnitude and gravity (gruesomeness) of the incident.** Participants spoke of their lack of preparedness for the "real" situation. All their practice and tabletop discussions could not get them ready to see the actual event. Seeing the gruesome scene made it real and more difficult to remove the memory of it. Feelings of sadness were positively related to proximity to the site and hearing about the incident from coworkers. Having survivors at the site created questions that were rehashed such as "why couldn't we save more?" Guilt seemed more prevalent in this latter situation.
- **Type of exposure and tasks to do at the site and after**. The persons completing tasks that they didn't usually do and those involved in more gruesome activities spoke of their shock/surprise of how they felt unprepared for the realness of the situation. The stress of this combination heightened their overall response to the trauma.
- **Length of exposure or involvement in the incident (marathon vs. sprint).** Longer exposure to the cleanup or details surrounding the incident increased the potential of experiencing post-traumatic stress reaction (PTSR) or

many of its symptoms. If the person had not resolved previous trauma, the new incident increased their need to seek therapeutic resources.
- **Focus person maintains about the task being done.** Persons that did their job without time for idle thinking (thought dwelling) and maintained an objectified perception about their work ("did the job you were expected to do") coped better with the situation. Participants stated that this response was similar to a firefighter's mentality. Those who personalized the situation (present when family members were present or saw personal artifacts of the victims) had more difficulty moving beyond the memories of the incident. Subjectivity was accompanied with internalization and more emotional responses.
- **Amount of external stressors present during incident.** The number of other agencies and organizations (investigative and regulator people) involved that are outside of the planned protocols add stress to the setting. Not knowing what their protocols and needs are adds another layer of stress to a traumatic event for the local people. The media adds chaos and strains the local resources profoundly.

In summary, the following table lists key factors that help or hinder a person's ability to cope with a traumatic event. The number of risk factors the person experiences is positively related to development of post-traumatic stress response or disorder.

Environmental Influences

The factors discussed above exist within an environment of multiple variables that influence the stress response experienced by the workers. Supervisors and employees have varying degrees of control over planning a proactively responsive environment. The following environmental variables relate to the tasks to be done that influence outcome and can support or interfere with coping processes of individuals:

- Preexisting collaboration agreements that reduce confusion and support a smooth transition from emergency response to recovery.
- Preexisting process/protocols with all people having knowledge of and involvement in traumatic accidents/disasters (awareness of and practice with what a real situation could be like with explicit details).
- Degree of support/trust present in relationships among and between workers, departments and agencies.
- Flexibility in being able to show up for the emergency job or transfer off the job without repercussions.
- Inference of no guilt for work done or inability to do all the work (e.g., person becomes ill in response to first day of over working).
- Defined outcomes with an end in sight, including the intent to move into normalizing work as soon as possible.
- Pre-knowledge of the role, length of time, and degree of involvement in the task to be completed by all workers ("marathon" vs. a "sprint").
- Resources available (or have quick access to them) that support having control of the situation (tools, experts, money etc.).
- Number of hours a person has to put in without a break; level of exhaustion experienced in disaster work.
- An understood meaning and purpose to the work being done (personally or corporately which is recognized/verbalized).
- Presence of familiar support systems, including formal (counseling services) and informal (family, spouse/significant other, peers/coworkers) that meet the needs of the person throughout crisis to recovery.
- Number of "insiders" that are familiar with their situation and post traumatic stress response (a lot of explaining not necessary) to provide support.
- Acknowledgment that this work is difficult and an expression of gratitude by significant leaders towards workers.

Summary of Significant Findings

From the themes (points and factors) that emerged during the semi-structured interviews, a composite description has been created that explicates the ideal responsive environment that would assist airline and airport workers in coping with natural and man-made disasters.

Hinders coping (heightens risk of PTSR)	Helps coping
• First traumatic event with limited knowledge of post traumatic response • Perceived magnitude/gruesomeness of the event • Personalization of the work and feelings of guilt (more could have been done) • Long term involvement in the incident • Required task is new with unknown/hidden aspects • Multiple unexpected demands from outside agencies/sources (additional stress)	• Has experienced multiple traumatic events with some resolution • Perceived magnitude/gruesomeness of the event • Objectifies the tasks to be done or gives meaning to the work • Short term focused task within the incident • Comfortable with task and no surprises • Limited outside intrusion and knowledge of their expectations

Pre-trauma Environment and Activities

Assumptions exist that there would be a presence of key environmental factors/behaviors that positively support the work of the employees. These relate to dynamics in the environment including open communication, trust between and among workers and departments, and a demonstration of respect for each other. The system would also have preexisting collaboration agreements and protocols in place to follow during a disaster. Team members would be cross-trained within their areas of comfort.

The system would integrate mental health support into the response and recovery planning team. The mental health support person(s) would have familiarity with the workers in all the settings, spend time in the work environments, and would assess/observe the current and ongoing levels of function among and between workers. These observations would include, but not be limited to, identification of daily stressors in the environment and coping strategies used by workers. The mental health support personnel would promote personal resiliency, provide information about symptoms of stress response, and explain healthy coping strategies via brochures, presentations and/or published materials for workers and their families.

Mental health support personnel would also assess the cultural response to counseling and health seeking behaviors; they would work to reduce or eliminate the myths that interfere with health seeking behaviors. Therefore, they would build therapy into the culture of the work environment. This method recognizes mental health support as growth producing rather than a need for individuals who "are out of control," "not doing [their] job" and "need to get back in shape." Also, the therapy process and what can be expected from therapy would be discussed.

The mental health support personnel or other contracted services would also train peers to act as mentors. These peers would be volunteers that have had some exposure to the types of trauma that could be expected in the setting. If it is not possible to recruit from the setting, a pre-identified "sister" organization with trained mentors would assist in the time of a disaster. The mentors would provide support needed, observation of changes and recognition of depletion of coping strategies of individuals in the work environment during disaster response and recovery.

During Disasters

Established protocols are followed to minimize exposure to trauma since extensive exposure puts individuals at greater risk for exhaustion and potential of physical illness. Workers should be aware of their roles, know all associated aspects (nothing hidden or unknown) and have practiced these roles. They are informed about what the real situation could entail before entering the site. At the end of each day during the critical period, they participate in a group meeting (more than a debriefing) that supports their ability to recall the work of the day, how it was accomplished and what needs to be completed. The environment would encourage members to speak freely of their feelings, graphically describe what they are dealing with (senses overload), and discuss how they are coping with the whole incident. Normalization of the experiences and reinforcement of previous learning related to PTSR would be part of the group members' response.

Mental health support personnel (or mentors or trained peers) would do family outreach. They would connect with family members that observe the worker at home to assess how that environment is being affected by the trauma/disaster. Workers that use spouses as significant support resources may also shield ("protect") them from many of the "gruesome" details especially if the spouse had no real understanding of what could be happening. The degree of sharing or protection employed affects the degree of internalization used. Internalization also affects the development of PTSR symptoms. Moreover, the degree of sharing with a spouse could also create a secondary traumatic response in their spouse or family members. Therefore, outreach would include assessing the worker and other family members.

As workers complete their roles and others continue, this supportive process is continually available to all who wish to participate. Workers are referred to other resources (by peers, mentors, and professionals) as observation identifies those in need of more intense assistance. Costs are managed by the agency and do not burden the employees for the duration of their need.

Recovery

The mental health support personnel would be present throughout the trauma, helping workers to see their strengths in moving through the incident and recommending other ways of coping and reframing of the incident (re-capping resiliency information). Administration within the environment would recognize the need of workers to talk more with one another to process their current feelings and experiences; thus, a reduction in productivity may be necessary to deal with these stress let downs. "Let downs" may also require employees to have unscheduled days off to recuperate from the experience.

Normal work hours and responsibilities would return as quickly as possible to support predictability and feelings of being in control of work expectations. Acknowledgment of worker's contributions and expressions of gratitude would be issued to all involved.

Quantitative Analysis

A number of self-report measures were administered to each participant. These measures were meant to assess psychological and physical reactions to trauma exposure. These measures had been used in previous work. A detailed description of each measure is presented below.

Trauma Symptom Inventory

The Trauma Symptom Inventory (TSI) is a 100-item self-report measure used in the evaluation of acute and chronic posttraumatic symptomatology, including the effects of rape, spousal abuse, physical assault, combat experiences, major accidents, natural disasters, and the lasting sequelae of childhood abuse and other early traumatic events. Each symptom item is rated according to its frequency of occurrence over the prior six months using a four point scale ranging from 0 ("never") to 3 ("often"). This measure has three validity scales and ten clinical scales, all of which yield sex- and age-normal T scores. The various scales of the TSI assess a wide range of psychological impacts. These include intra- and interpersonal difficulties often associated with chronic psychological trauma in addition to symptoms typically associated with PTSD and ASD.

The following is a list of TSI validity scales:

- **Response Level (RL)** measures a tendency toward defensiveness, a general under-endorsement response set, or a need to appear unusually symptom-free.
- **Atypical Response (ATR)** measures psychosis or extreme distress, a general over-endorsement response set, or an attempt to appear especially disturbed or dysfunctional.
- **Inconsistent Response (INC)** measures inconsistent responses to TSI items, potentially due to random item endorsement, attention or concentration problems, or reading/language difficulties.

The following is a list of the clinical scales:

- **Anxious Arousal (AA)** measures symptoms of anxiety, including those associated with posttraumatic hyperarousal.
- **Depression (D)** measures depressive symptomatology, both in terms of mood state and depressive cognitive distortions.
- **Anger/Irritability (AI)** measures angry or irritable affect, as well as associated angry cognitions and behavior.
- **Intrusive Experiences (IE)** measures intrusive symptoms associated with posttraumatic stress, such as flashbacks, nightmares, and intrusive thoughts.
- **Defensive Avoidance (DA)** measures posttraumatic avoidance, both cognitive and behavioral.
- **Dissociation (DIS)** measures dissociative symptomatology, such as depersonalization, out-of-body experiences, and psychic numbing.
- **Sexual Concerns (SC)** measures sexual distress, such as sexual dissatisfaction, sexual dysfunction, and unwanted sexual thoughts or feelings.
- **Dysfunctional Sexual Behavior (DSB)** measures sexual behavior that is in some way dysfunctional, either because of its indiscriminate quality, its potential for self-harm, or its inappropriate use to accomplish non-sexual goals.
- **Impaired Self-reference (ISR)** measures problems in the "self" domain, such as identity confusion, self-other disturbance, and a relative lack of self-support.
- **Tension Reduction Behavior (TRB)** measures the respondent's tendency to turn to external methods of reducing internal tension or distress, such as self-mutilation, angry outbursts, and suicide threats.

The Symptom Checklist-90-Revised (SCL-90-R)

This is a 90 item self-report symptom inventory test. It has been developed to reflect the psychological symptom patterns of psychiatric or medical patients. Each of the 90 items is a problem or complaint that patients sometimes have. The respondent is to rate each item according to "how much discomfort that problem has caused during the past week, including today" on a 5-point scale of distress, ranging from "not at all" to "extremely." The SCL-90-R is scored and interpreted in terms of 9 primary symptom dimensions and 3 Global Indices of Distress. These symptom dimensions and indices of distress are listed below with a brief description of each dimension. The scores for each dimension are T-Scores that have a mean of 50 and a standard deviation of 10. The scores were compared to a non-patient gender appropriate sample. The definition of each scale is listed:

- **Somatization Scale** reflects distress arising from perception of bodily dysfunction.
- **Obsessive-Compulsive Scale** reflects symptoms that are highly identified with the standard clinical syndrome with this name.
- **Interpersonal Sensitivity Scale** focuses on feelings of personal inadequacy and inferiority, particularly in comparison with others.
- **Depression Scale** reflects endorsement of a broad range of symptoms compatible with depression, such as dysphonic mood, feelings of hopelessness, and somatic complaints compatible with depression.
- **Anxiety Scale** includes symptoms of nervousness, tension, apprehension, and somatic complaints associated with anxiety.

- **Hostility Scale** includes thoughts, feelings, or actions that are characteristic of the negative affect state of anger.
- **Phobic Anxiety Scale** measures a persistent fear response to a specific person, place or object or situation which is characterized as being irrational and disproportionate to the actual stimulus which leads to avoidance or escape behavior.
- **Paranoid Ideation Scale** measures paranoid behavior as a disordered mode of thinking.
- **Psychoticism Scale** measures the extent to which the individual is isolated, withdrawn, and experiences difficulties in clear thinking.
- **Global Severity Index (GSI)** is designed to measure overall psychological distress.
- **Positive Symptom Distress Index (PSDI)** is designed to measure the intensity of symptoms.
- **Positive Symptom Total (PST)** reports number of self-reported symptoms

The Impact of Events Scale-Revised

This is a 22-item self-report scale. Respondents are to report the distress caused by a variety of symptoms of PTSD. The symptoms cover the range of traumatic stress reactions and include intrusion, avoidance and persistent hyperarousal. The respondents were asked to rate the distress caused by each symptom during the past week on a scale ranging from not at all (0) to extremely (4). In light of the unique nature of our data collection in which participants were responding to their experience of a disaster which may have occurred several years ago, two versions of the scale were created. One version asked the participant to indicate how currently distressing each item was (IES-R Current). The second version asked them to recall how distressing each situation was for them in the first few months following the disaster (IES-R Past).

The Connor-Davidson Resilience Scale (CD-RISC)

This is a 25-item scale that measures the ability to cope with adversity. Participants rated items on a scale from 0 (not at all true) to 4 (true nearly all the time). The scale is rated as to how the subject has felt over the past month. The total score ranges from 0–100 with the higher scores reflecting greater resilience.

The SF-36v.2 Health Survey

The SF-36v.2 is a 36-item health survey that yields scores on eight scales of functional health and well-being. A mental health and physical health summary index is also included in this survey. This measure assesses general health status, rather than one that targets a specific age, disease or treatment group. The eight domains of health-related quality of life include Physical Functioning, Role-Physical (role limitations due to physical health), Bodily Pain, General Health, Vitality, Social Functioning, Role-Emotional (role limitations due to mental/emotional health) and Mental Health. The scores on these eight health domains are collapsed into a Physical Component Summary (PCS) measure and a Mental Component Summary (MCS) measure.

Results

The Trauma Symptom Inventory was scored for each participant according to the standardized instructions. T-scores were generated for all three validity scales and all 10 clinical scales. The means and standard deviations for all of the scales are presented in Table 1. An examination of the means indicates that group performance was near the average in the general population for each scale. However, in order to identify individuals who may have been scoring in the extreme range, we identified participants who scored more than one T-score standard deviation (60 or greater) above the mean. The participants with scores in this range are listed below along with the scales on which those elevated scores occurred.

The most frequent elevations were observed on the Anxious Arousal (AA), the Dissociation (DIS), the Dysfunctional

Table 1. Trauma Symptom Inventory (TSI).

	Mean	SD
Validity Scales		
1. Atypical Response (ATR)	47.68	4.23
2. Response Level (RL)	45.26	5.27
3. Inconsistent Response (INC)	45.47	5.00
Clinical Scales		
4. Anxious Arousal (AA)	51.11	10.25
5. Depression (D)	47.16	5.00
6. Anger/Irritability (AI)	48.32	6.80
7. Intrusive Experiences (IE)	48.32	6.68
8. Defensive Avoidance (DA)	49.00	7.02
9. Dissociation (DIS)	52.89	7.99
10. Sexual Concerns (SC)	49.21	7.42
11. Dysfunctional Sexual Behavior (DSB)	49.58	8.88
12. Impaired Self-reference (ISR)	48.16	6.99
13. Tension Reduction Behavior (TRB)	48.00	7.23

Participant 107 DSB, ISR, TRB
Participant 102 AA, AI, DA, DIS, DSB, ISR
Participant 501 AA, IE, DA, DIS
Participant 101 AA, DIS
Participant 306 DIS
Participant 201 SC
Participant 101 DSB

Sexual Behavior (DSB), and the Impaired Self-Reference (ISR) scales. Each of these scales yielded elevated scores with three participants, except the DSB which yielded elevated scores with two participants. The AA scale indicates a high number of symptoms of anxiety, including those associated with posttraumatic hyperarousal. The DIS scale indicates dissociative symptomology, such as depersonalization and psychic numbing. The DSB scale reflects sexual behavior that is in some way dysfunctional, either because of its indiscriminate quality, potential for self-harm or inappropriate use to accomplish non-sexual goals. The ISR indicates a lack of coping resources.

The Symptom Checklist 90 revised (SC-90-R) was scored for each participant according to the standardized instructions. T-scores were generated for all nine clinical scales and the three composite scales. The raw scores were compared to a non-patient gender appropriate normative sample when computing T-scores. The means and standard deviations for all of the scales are presented in Table 2. An examination of the means indicates that group performance was near the average in the general population for most of the scales and all three of the composite measures. The exceptions to this observation are the Somatization scale, the Obsessive Compulsive scale and the Depression scale. All three were at least 5 T-Score points higher than the mean of 50. In order to identify individuals who may have been scoring in the extreme range on the remaining scales, we identified participants who scored more than one T-score standard deviation (60 or greater) above the mean. The participants with scores in this range and the scales on which those elevated scores occurred are listed. An examination of the scores indicated that several participants were reporting a high degree of psychological distress on many of the scales.

The analysis of the Symptom Checklist 90 revised revealed that 12 of the 24 participants had an elevation on at least one of the subscales with two individuals having nine elevations and one having six. The most frequent number of elevations observed was on the Somatization scale (six participants), the Obsessive-Compulsive scale (five participants), the Depression scale (four participants) and the Interpersonal Sensitivity Scale (three participants). Elevations on the Somatization scale indicate the individual is reporting a high degree of distress from the perception of physical symptoms. Elevations on the Obsessive-Compulsive scale indicate difficulties with impaired concentration, distractibility and inattention. Elevations on the Interpersonal Sensitivity scale reflect a high degree of feelings of personal inadequacy and inferiority, particularly in comparison with others. Finally, elevations on the Depression scale indicate endorsement of a broad range of symptoms compatible with depression, such as dysphoric mood, feelings of hopelessness, and somatic complaints compatible with depression. Clearly our participants were reporting a high degree of psychological distress.

Therefore, the scores for each scale are the sum of the items endorsed for each scale. The means and standard deviations for all of the scales are presented in Table 3. An examination of the means indicates that overall the participants reported that the traumatic event was less stressful currently than when it immediately happened. In order to identify individuals who may have been scoring in the extreme range on the remaining scales, we identified participants who scored more than one standard deviation above the mean. The participants with scores in this range are listed below. An examination of the scores indicated that several participants were reporting a high degree of current stress and past stress over the traumatic event.

Table 2. Symptom Checklist (SC-90-R).

	Mean	STD	Extreme Scores
1. Somatization:	56.2	6.53	60,64,65,68
2. Obsessive-Compulsive:	57.05	8.47	61,62,63,69,74
3. Interpersonal Sensitivity:	52.15	8.41	61,62,66,68
4. Depression:	55.1	7.66	60,63,70,74
5. Anxiety:	47.2	10.38	67,73
6. Hostility:	48.45	8.64	60,61,73
7. Phobic Anxiety:	48.5	5.63	66
8. Paranoid Ideation:	50.55	8.78	62,67
9. Psychoticism:	52.6	7.65	60,63
10. Global Severity Index (GSI):	53.1	9.57	64,67,74
11. Positive Symptom Distress Index (PSDI):	51.6	7.17	60,61,64,65
12. Positive Symptom Total (PST):	53.7	7.76	60,64,68,70

Participant 100 Som
Participant 101 Som, Psy, PSDI
Participant 102 Som, Psy, IS, OC, HOS, PST

Table 3. The Impact of Events Scale (current and past).

	Mean	SD
1. Impact of Events Scale-Revised Current	10.16	9.38
Participants who scored > 1sd above mean (19.54)		
Participant 306 34 Participant 307 22 Participant 400 25		
2. Impact of Events Scale-Revised Past	19.74	14.36
Participants who scored > 1sd above mean (34.09)		
Participant 205 51 Participant 306 46 Participant 400 35		

Three participants had elevations on the Impact of Events Scale-Revised (past) and the Impact of Events Scale-Revised (current), with two of the three participants having elevations on both versions of the scale. The scales addressed how currently distressing each item was for each participant (IES-R Current) and how distressing each situation was for them in the first few months following the airline/natural disaster (IES-R Past). For three of our participants, the perception of their subjective distress was high at the time of the trauma and remained high several years after their exposure to the trauma.

The means and standard deviations for all of the scales are presented in Table 4. An examination of the means indicate that overall our participants rated themselves as very resilient.

Results from the Connor-Davidson Resilience Scale (CD-RISC) indicate a relatively high degree of self-reported resilience among our participants. Interestingly, the two participants with relatively low scores on the Connor-Davidson Resilience Scale (CD-RISC) reported the least amount of psychological distress.

A series of Pearson Correlations were computed between each participant's Connor-Davidson Resilience Scale (CD-RISC) and all of the subscales of the various self-report measures used. Surprisingly, all correlations were positive and above 70.

The SF-36v2 Health Survey (SF-36v2) was scored according to the standardized instructions and Physical Component Summary (PCS) measure, and a Mental Component Summary (MCS) measure was produced for each participant. These scores are T-scores with a mean of 50 and a standard deviation of 10. The higher number on either scale indicates better functioning. The means and standard deviations for all of the scales are presented in Table 5.

Results from the SF-36v2 Health Survey indicated there were four participants who reported a high number of physical symptoms and two participants who reported a high number of mental health problems.

Integration of Qualitative and Quantitative Methodologies

One important theme that emerged from the quantitative and qualitative analysis is that some of the participants continue to report an above average number of symptoms of psy-

Table 4. Connor-Davidson Resilience Scale.

	Mean	SD
Connor-Davidson Resilience Scale (CD-RISC)	78.74	8.01
Participants who scored < 1sd below mean (70.73) Note (66.68 is 1.5 SD below mean)		
Participant 100 66 Participant 204 68		

Table 5. The SF-36v2 Health Survey.

	Mean	SD
Physical Component Summary (PCS) measure	48.84	4.97
Participants who scored < 1sd below mean (43.87)		
Participant 100 38		
Participant 101 40		
Participant 307 42		
Participant 103 43		
Mental Component Summary (MCS) measure	43.95	4.98
Participants who scored < 1sd below mean (38.97)		
Participant 306 33		
Participant 204 35		

chological distress, several years after their exposure to trauma. On the SCL-90, five participants produced scores in the above average range on three or more of the 12 indices examined. Six of the participants produced elevations on the Somatization scale, reporting a high number of physical symptoms. Five of the participants produced elevations on the obsessive-compulsive scale which reflects a high degree of inattention, distractibility and repeated thoughts. Four of the participants produced elevations on the depression scale. Clearly, five of the participants were reporting an above average number of symptoms of psychological problems some time after the trauma exposure had occurred. It was clear that a subset of our participants continued to report difficulties with psychological functioning some time after experiencing the trauma.

The Impact of Events Scale-Revised also revealed that two of the participants reported a high degree of distress caused by a variety of symptoms of PTSD in the first few months following the trauma and currently. The symptoms covered the range of traumatic stress reactions including intrusion, avoidance and persistent hyperarousal.

Despite having a number of participants report a high degree of continuing psychological distress, participants reported a high degree of resilience with a mean score of 78.74. Further, the resilience scores were positively correlated with the self-report measures of psychological trauma. It appears that several of our participants continued to view themselves as resilient while reporting a high degree of psychological trauma.

Online Airport Survey

In order to determine the extent of post-disaster mental health crisis programs existing at airports in the United States, a survey was conducted among airport management personnel. A membership roster of the American Association of Airport Executives (AAAE) was utilized to generate contact information. In general, representatives on the roster list were the highest ranking management officials associated with a particular airport. Each member on the AAAE roster was sent an email which contained an Internet link to an online survey instrument. This survey used the software on www.surveymonkey.com. To ensure anonymity, the survey did not require any participant to identify themselves or their airports. The survey was administered to 175 airports nationwide.

Some demographic information was collected for the purposes of measuring whether any group differences occurred. The demographic information is listed in Table 6.

The airport locations were divided among Alaskan, Central, Eastern, Great Lakes, New England, Northwest Mountain, Southern, Southwest, and Western Pacific. Type of Airport (based upon FAA criterion) included general aviation, non hub, small hub, medium hub, and large hub. The yearly enplanements included the following choices: no enplanements, less than 100,000 enplanements, 100,001 to 250,000 enplanements, 250,001 to 500,000 enplanements, and over 500,000 enplanements. The survey had 64 respondents which covered all regions except Alaskan and all types of airports and enplanement categories. In addition, exposure to both natural, airline and general aviation disasters within the preceding ten years was recorded.

Table 6. Demographic identifiers among sample.

Airport Location
Type of Airport (based upon FAA Criterion)
Yearly Enplanements

The first question that respondents answered was the following: "In regard to your Airport Emergency Plan (AEP), does your airport currently have any formal or informal program(s) designed to deal exclusively with the mental health trauma that employees may face after responding to an aircraft accident or natural disaster?" Thirty-six respondents indicated they do currently have a program in place to deal with employee mental health traumas post-accident, while 28 indicated that they do not have such programs. It should be noted that no definition of a "formal or informal program" was used within the survey, and the interpretation was left up to the respondent. It is possible there are wide variances between the structures and types of programs amongst those answering in the affirmative.

The second question asked was the following: "Would you be in favor of a program/template that would help your organization initiate a program to assist employees coping with traumatic events (deal with what they have witnessed) in the course of responding to a disaster?" Forty respondents indicated they would be in favor, with six not in favor and 18 uncertain. There was no significant difference between those organizations who had post-disaster mental health trauma programs in place and those who did not with regard to being in favor of implementing such a program, χ^2 (2, $N = 64$) = .666, $p > .05$.

Within the preceding 10 years, airports who had experienced an airline disaster ($n = 4$), a general aviation disaster ($n = 24$), or a natural disaster ($n = 17$) reported no group differences in their preference for wanting post-disaster mental health programs, χ^2 (2, $N = 64$) = 4.693, $p = .096$; χ^2 (2, $N = 64$) = 1.233, $p > .05$; and, χ^2 (2, $N = 64$) = .205, $p > .05$, respectively. Airport location, classification and number of annual enplanements also demonstrated no group differences with regard to favoring or not favoring the creation of a program, χ^2 (14, $N = 64$) = 16.261, $p > .05$; χ^2 (8, $N = 64$) = 5.908, $p > .05$; and, χ^2 (8, $N = 64$) = 4.388, $p > .05$.

Interestingly, 36 of 64 respondents reported they already have a mental health recovery program in place at their airport. This does not seem to be congruent with this study's findings in the field. The incongruity could possibly be explained with a wide variance of definitions as they pertain to a mental health recovery program. For instance, it is possible that an airport may simply have a clause in their emergency plan to have employees contact the Red Cross or the Employee Assistance Program (EAP) should they encounter mental health trauma. While this may be a productive measure, it may not be comprehensive enough to completely assist employees with their own resiliency and would not be considered a "classic" mental health recovery program.

The majority of respondents feel a mental health recovery program is a worthwhile addition to their plan (62.5%). This perception held true irrespective of whether the airport already had a plan in place or not and whether they had experienced an aviation or natural disaster within the past 10 years. Only 9.4% did not favor the idea of such a program, with 28.1% unsure.

From the data, it appears most airports would be open to some type of guidance on how to implement a mental health recovery program and integrate it within their emergency plan. Regarding the favorability of implementing a program, extensive regulation or cumbersome application could be the reason for the higher number of "unsure" respondents. However, a formal definition of such a plan would have to be thoroughly developed and applied in order to alleviate burdensome obstacles in implementation. This definition could also increase the robustness of currently implemented plans, whether they are simplistic or involved. In any event, further study into the issue of mental health recovery programs could generate more focused data given that the more detailed definition of a recovery program is operationally defined.

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ACRONYMS

AAAE	American Association of Airport Executives
A/C	Advisory Circular
AEP	Airport Emergency Program
ALPA	Airline Pilots Association
ANS	Autonomic Nervous System
ASD	Acute Stress Disorder
ARFF	Aircraft Rescue and Fire Fighting
ATA	Air Transport Association
BCM	Business Continuity Management
CD-RISC	Connor-Davidson Resiliency Scale
CIRP	Critical Incident Response Program
CIRM	Critical Incident Response Management
CISD	Critical Incident Stress Debriefing
CISM	Critical Incident Stress Management
DCS	Director of Community Services
DHS	Department of Homeland Security
DMH	Disaster Mental Health
DOJ	Department of Justice
DSM-IV	Diagnostic and Statistical Manual
DSM-TR	Diagnostic and Statistical Manual of Mental Disorders: Text Revision
EAP	Employees Assistance Program
EMDR	Eye Movement Desensitization and Reprocessing
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulations
FAR Part 121 Air Carrier	An airline certified by the Federal Aviation Administration to transport passengers on aircraft containing more than nine seats, engaged in common carriage, and either scheduled or supplemental
FAR Part 135 Air Carrier	An operator certified by the Federal Aviation Administration to transport passengers or cargo, either scheduled or unscheduled, on aircraft having a passenger seating capacity of less than or equal to nine seats
FAR Part 139 Airport	An airport that receives scheduled or unscheduled air carrier service with an aircraft with more than nine seats on board
FBI	Federal Bureau of Investigation
FEMA	Federal Emergency Management Agency
FBO	Fixed Base Operator

GA	General Aviation
GIS	Geographic Information System
GSI	Global Severity Index
ICISF	International Critical Incident Stress Foundation
ICS	Incident Command System
IES-R	Impact of Events Scale (current and past)
MHCP	Mental Health Care Professional
MHRP	Mental Health Recovery Plan
MOU	Memorandum of Understanding
NIMS	National Incident Management System
NOAA	National Oceanic and Atmospheric Administration
NRP	National Response Plan
NTSB	National Transportation Safety Board
OVA	Office for Victims Assistance
OVC	Office for Victims of Crime
PD	Psychological Debriefing
PFA	Psychological First Aid
PTS	Post Traumatic Stress
PTSD	Post Traumatic Stress Disorder
SAMHSA	Substance Abuse and Mental Health Services Administration
SCL-90-R	Symptom Checklist 90-revised
SEADOG	Southeast Airports Disaster Operations Group
SF-36	Medical Outcome Short Form Health Survey
SMT	Stress Management Team
SPRINT	Special Psychiatric Intervention Teams
TQ	Traumatic Life Events Questionnaire
TSI	Trauma Symptom Inventory
TSA	Transportation Security Administration
WESTDOG	Western Airports Disaster Operations Group

Abbreviations and acronyms used without definitions in TRB publications:

AAAE	American Association of Airport Executives
AASHO	American Association of State Highway Officials
AASHTO	American Association of State Highway and Transportation Officials
ACI–NA	Airports Council International–North America
ACRP	Airport Cooperative Research Program
ADA	Americans with Disabilities Act
APTA	American Public Transportation Association
ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
ATA	Air Transport Association
ATA	American Trucking Associations
CTAA	Community Transportation Association of America
CTBSSP	Commercial Truck and Bus Safety Synthesis Program
DHS	Department of Homeland Security
DOE	Department of Energy
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
FHWA	Federal Highway Administration
FMCSA	Federal Motor Carrier Safety Administration
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
IEEE	Institute of Electrical and Electronics Engineers
ISTEA	Intermodal Surface Transportation Efficiency Act of 1991
ITE	Institute of Transportation Engineers
NASA	National Aeronautics and Space Administration
NASAO	National Association of State Aviation Officials
NCFRP	National Cooperative Freight Research Program
NCHRP	National Cooperative Highway Research Program
NHTSA	National Highway Traffic Safety Administration
NTSB	National Transportation Safety Board
SAE	Society of Automotive Engineers
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (2005)
TCRP	Transit Cooperative Research Program
TEA-21	Transportation Equity Act for the 21st Century (1998)
TRB	Transportation Research Board
TSA	Transportation Security Administration
U.S.DOT	United States Department of Transportation