Emergency Patient Tracking System
For Mass Casualty Incidents and Routine Patient Tracking

A Synthesis of Wireless Communication, Barcode and Internet Technology

Visit us at: www.homelandsecurity.Raytheon.com

Program Information:
Tom Hudson
Director, Homeland Security
Raytheon Company
1100 Wilson Boulevard Suite 2000
Arlington, VA 22209
(703)284-4346 office
(703)243-3074 fax
thomas_c_hudson@raytheon.com

Press Information:
David Shea
Director - Media Relations
Raytheon Company
1100 Wilson Boulevard Suite 2000
Arlington, VA 22209
(703)284-4245 phone
(703)525-0540 fax
djshea@raytheon.com
Improving Rural Emergency Response... America's First Line of Defense

CERMUSA RURAL HOMELAND SECURITY TECHNOLOGY EXPO

Frank J. Pasquerilla Conference Center, Johnstown, PA, October 21-22, 2004

Robotics Technologies: Advanced Automated Casualty Care

Multiple advanced robotics technologies will be on display during the Expo. Several leading organizations including Carnegie Mellon University, Applied Perception, Inc., iRobot, Inc., and Robotic Engineering Excellence, Inc. will be demonstrating and presenting robotics prototypes and products that can be used to improve homeland security in rural areas.

Mobile Wireless Emergency Communications Demonstrations

CERMUSA’s First Responder Emergency Communications-Mobile Prototype Ambulance will be displayed. Demonstrations will be delivered, highlighting the advanced wireless communications technologies and telemedicine peripherals integrated into this prototype’s unique design.

For more information go to: www.cermusa.francis.edu/expo
Who Should Attend:

Businesses manufacturing technologies used to prevent and manage emergency situations;

Emergency management professionals and officials seeking cutting edge technologies;

First responders serving rural communities;

Medical professionals interested in telehealth technologies that improve the delivery of medical services to rural areas;

Roboticists, engineers, and computer scientists involved in advanced technology projects and programs; and

Educators, government officials, and researchers seeking networking opportunities.

What You Will Learn:

Current state of weapons of mass destruction preparedness in rural areas;

Measures taken to effectively prepare for and respond to weapons of mass destruction incidents;

Telehealth technologies that improve healthcare delivery following a weapons of mass destruction incident;

Governmental and educational research projects working to improve homeland security in rural areas; and

Robotics and computer technologies that improve emergency services in rural areas.

Sponsored by:

Booz Allen Hamilton

Kimball

Drexel University

Siemens

Contact Information:
Bernadette Yeager, Phone (814) 472-3389
www.cermusa.francis.edu/expo
CONTENTS

■ New products ........................................................................................................... 9
■ Calendar .................................................................................................................. 12

PERSPECTIVE ON PEOPLE
■ People-related aspects of emergency management .............................................. 14
  Neil Simon, BS, MA

FEATURE ARTICLES
■ Current emergency medical services workforce issues in the United States.................................................. 17
  Brian J. Maguire, MSA, EMT-P, DrPH
  Bruce J. Walz, PhD
■ A précis on political theory and emergency management ................................... 27
  Richard T. Sylves, PhD
■ Case study of a chemical fire in an urban neighborhood: A wakeup call for the emergency response system ................................................... 33
  Alexandra Degher, PhD
  Anna K. Harding, PhD
■ Western State Hospital disaster response, Franklin, Virginia: September/October 1999 GO TEAM narrative report ......................... 43
  Susan Tydings Frushour
■ Breaking down barriers: Collaborative education drives collective change .................................................. 51
  Rose Barg, EdD
True Interoperability will keep this from becoming a bigger crisis.

All of the county’s fire crews have truly interoperable radios. So do the police and sheriffs in the neighboring communities. That’s how they coordinated their efforts to deploy resources, designate areas to search, assign sectors and manage water supply. True Interoperability enables instant communication between different agencies so all responders can work as a team.

Discover how standards-based Mission Critical solutions provide True Interoperability so multiple agencies can contain out of control situations, even when the outcomes seem unclear. Call 1-800-367-2346 or visit www.motorola.com/missioncritical for your free copy of *In The Event of: The Guide to Mission Critical Communications*. It’s the intelligence you need in an unpredictable world.
Subscription Rates (Rates in US dollars): Individual: US $148; Canada $172; Foreign $224
Libraries/Institution: US $193; Canada $225; Foreign $290
Single issues: US $50; Canada $60; Foreign $75

Subscription Information: Submit your complete name, address and zip code, attention: Journal of Emergency Management, Subscription Department, 470 Boston Post Road, Weston, MA 02493. Please enclose check, purchase order or credit card number and expiration date with authorization signature. Subscribers notifying the publication of an address change must submit an old mailing label and their new address, including zip code. No claims for copies lost in the mail may be allowed unless they are received within 90 days of the date of issue. Claims for issues lost as a result of insufficient notice of change of address will not be honored.

Manuscript Submittal/Author Information (See Call for manuscripts)

Quotations and Reprints: Quotations from Journal of Emergency Management may be used for purposes of review without applying for permission as long as the extract does not exceed 500 words of text, and appropriate credit is given to the Journal. Authorization to photocopy items for internal use of specific clients, is granted by Weston Medical Journals, Inc., provided the appropriate fee is paid directly to: Copyright Clearance Center (CCC), 222 Rosewood Drive, Danvers, MA 01923, USA (978) 750-8400. CCC should also be contacted prior to photocopying items for educational classroom use. Multiple reprints of material published in Journal of Emergency Management can be obtained by filling out the reprint order form in the publication or by calling 781-899-2702.

Trademarks and Copyrights: Journal of Emergency Management is a registered trademark of Weston Medical Journals, Inc. All materials are ©2004 by Weston Medical Journals, Inc. All rights reserved.

Postal Information: Standard postage paid at Boston, MA, and additional offices. Postmaster: Send address changes and form 3579 to: Journal of Emergency Management, 470 Boston Post Road, Weston, MA 02493.

Disclaimer: The publisher and editors are not responsible for any opinions expressed by the authors for articles published in Journal of Emergency Management.

Copyright 2004. Quotation is not permitted except as above. Duplicating an entire issue for sharing with others, by any means, is illegal. Photocopying of individual items for internal use is permitted for registrants with the Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923. For details, call 978-750-8400 or visit www.copyright.com. For electronic or hard copy reprints visit our website www.emergencymanagementjournal.com or www.emergencyjournal.com.
EDITORIAL BOARD

B. Wayne Blanchard, PhD, CEM
Higher Education Project Manager, Emergency Management Institute, Federal Emergency Management Agency (FEMA), Department of Homeland Security, Emmitsburg, Maryland

Steven J. Charvat, CEM
Emergency Management Director, University of Washington, Office of Emergency Management, Seattle, Washington

Craig DeAtley, PA
Associate Professor of Emergency Medicine, George Washington University School of Medicine & Health Sciences, Washington, DC

Raymond V. DeMichiei, BA, EMT-P
Operations Manager and Supervisor, City of Pittsburgh Department of Public Safety, Bureau of Communications, Pittsburgh, Pennsylvania

Thomas Drabek, PhD
Professor, Department of Sociology and Criminology, University of Denver, Denver, Colorado

Bonnie S. Fisher, PhD
Professor, Division of Criminal Justice, Department of Education, University of Cincinnati, Cincinnati, Ohio

Martin Gill, PhD
Director, Perpetuity Research and Consultancy International, and Professor of Criminology, University of Leicester, United Kingdom

Tee L. Guidotti, MD, MPH
Chair, Department of Environmental and Occupational Health; Director, Division of Occupational Medicine and Toxicology; Professor of Environment and Occupational Medicine, George Washington University School of Medicine, Washington, DC

Peter J. Hotez, MD, FAAP, PhD
Professor of Microbiology, Tropical Medicine, Global Health and International Affairs; Chair, Department of Microbiology and Tropical Medicine, George Washington University Medical Center, Washington, DC

L. M. “Lem” Jackson
Deputy Projects Manager, Domestic Preparedness Programs, Pine Bluff Arsenal, Pine Bluff, Arkansas

Eleanor Lynn Jenkins
Chief, Analysis and Field Evaluations Branch, Division of Safety Research, National Institute for Occupational Safety and Health, Morgantown, West Virginia

Paul D. Kim, MD
Regional Emergency Manager, Stratton Department of Veterans Affairs Medical Center, Albany, New York, and National Disaster Medical System Coordinator, Federal Coordinating Centers, Albany, Buffalo, and Syracuse, New York

Gunnar J. Kuepper
Chief of Operations, Emergency & Disaster Management, Inc., Los Angeles, California

Charles C. Mayo, MA
Chairman, Department of Accreditation, Massachusetts Chiefs of Police Association; Chief of Police, Weston, Massachusetts

Stephen J. McGrail
Director, MA Emergency Management Agency, Framingham, Massachusetts

Robert K. McLellan, MD, MPH
Occupational Medicine, Dartmouth Hitchcock Medical Center, Lebanon, New Hampshire

Edith F. Neumann, PhD
Dean, College of Health Sciences and College of Education, Touro University International, Cypress, California
Call for Manuscripts

Journal of Emergency management is a professional quarterly journal whose goal is to better equip all those responsible for emergency preparedness and disaster response to deal more effectively with acts of terror, weather emergencies, and catastrophic accidents. We are looking for papers to publish related to research and current issues in emergency management and disaster preparation. We will also consider guest editorials. Authors who’d like to contribute articles should feel free to contact acquisitions editor Chris Rowland (781-899-2702, x115) to discuss their ideas.

Manuscripts as well as letters to the editor can be sent by:

E-mail: jem@pnpc.co.com

Mail to:
Managing Editor
Journal of Emergency Management
470 Boston Post Road
Weston, Massachusetts 02493
FEMA Publishes New Book on Fire Mitigation

The Federal Emergency Management Agency (FEMA) recently published a book that provides practical information concerning the control of fire mitigation. *At Home in the Woods: Lessons Learned in the Wildland/Urban Interface* documents innovative fire mitigation practices currently in use in Colorado, Utah, Wyoming, Montana, North Dakota, and South Dakota. The book focuses on creative measures that individuals and communities are taking to protect themselves against wildfires. Included are personal stories, with the emphasis on challenges faced, obstacles overcome, and lessons learned. To download the PDF version of the book, go to www.fema.com/regions/viii/athome_woods.shtm.

New SDS for PosiChek3™ Audible Alarm Testing

Biosystems, a division of Bacou-Dalloz Inc. (Middletown, CT), has introduced a new microphone Sound Detection System (SDS) as an option on new PosiChek3™ computerized performance testers for air-supplied breathing apparatus. Designed to increase test precision by automating the primary audible alarm test, the SDS eliminates human error and makes the PosiChek3 easier to use. The SDS is also available as an upgrade for PosiChek3 units that are already in use, and an upgrade credit program is in place for users who currently own manual test gauges.

The SDS uses a small microphone to automatically detect when the audible alarm starts and stops during testing procedures. This ensures that even if personnel are distracted while performing the alarm test, it will still be performed correctly and yield accurate results.

Because people’s lives depend on you...

As a member of the leading professional organization for emergency managers and homeland security officials, you can depend on IAEM to deliver:

- Largest experts network offering solutions, guidance and assistance.
- Job opportunities – extensive online compilation.
- Unified voice on policies and legislation.
- Information updates—monthly newsletter, and e-mail notifications.
- Certified Emergency Manager® and Associate Emergency Manager programs.
- Scholarship program.

52nd Conference & EMEX 2004

Collaboration: The Key to Success in Emergency Management

November 7-11, 2004 • Dallas, TX

JOIN IAEM TODAY!
The SDS can be used with both bell and whistle alarms, and will not be adversely affected by ambient noise, such as PASS devices or communications. Information about the SDS is available at www.biosystems.com.

BIOSYSTEMS INTRODUCES LINE OF ECONOMICAL, REUSABLE PERSONAL GAS DETECTORS

Biosystems, a division of Bacou-Dalloz Inc. (Middletown, CT), has introduced the new ToxiPRO™ family of reusable single-sensor personal gas detectors. The ToxiPRO line of products provides an economical, compact, and rugged alternative for detecting H2S, CO, O2, and other gases. Ideal for industrial safety and fire service workers, the ToxiPRO line of detectors is classified for UL and cUL intrinsic safety certifications and for use in Hazardous Locations Class I, Division 1, Groups A-D, where applicable. Global safety certifications are currently pending.

The ToxiPRO gas detector has a replaceable battery and sensor. The lithium battery provides up to 9000 hours of operation, and all sensors have a two-year warranty. The ToxiPRO provides real-time, peak, STEL, and TWA readings as well as a 20-incident event logger and black box recorder. An optional datalogger is also available.

ToxiPRO detectors can be worn on a belt or neckstrap, in a shirt pocket, clipped to clothing, or inserted into the accessory slot of a hard hat. Information about ToxiPRO is available at www.biosystems.com.

AOSAFETY INTRODUCES QUICKFIT™ FULL FACEPIECE RESPIRATOR

AOSafety (Indianapolis, IN) announces the release of the new QuickFit™ air purifying full facepiece respirator. QuickFit offers a revolutionary new design with its exclusive twist and seal harness system. The mask seals to the wearer’s face without straps or buckles, making it easy to put on and easy to take off with one hand.

QuickFit utilizes the full line of AOSafety 8000 Series bayonet style cartridges and filters and is available in sizes small/medium and large. Additional information is available at www.aearo.com.

RAE RELEASES HIGHLY SENSITIVE, WIRELESS VOC DETECTOR

RAE Systems Inc. (Sunnyvale, CA) has announced the release of the ppbRAE Plus, a highly sensitive volatile organic compound (VOC) gas monitor. The ppbRAE Plus can detect VOCs in concentrations as low as 1 part per billion and has extended its upper detection range from 200 parts per million up to a new high scale reading of 2,000 parts per million.

The ppbRAE Plus was designed for HAZMAT and homeland security applications, including detection of toxic industrial chemicals and chemical warfare agents and assessment of people in decontamination settings. Other applications include leak detection, industrial hygiene, and indoor air quality surveys, where it can be used to identify the sources of odors and to search for mold and mildew by measuring microbial VOCs.

The ppbRAE Plus has more than 100 built-in correction factors, enabling the unit to measure over 300 different VOCs. It also has a self-cleaning lamp and sensor, minimizing the need for maintenance and calibration in hazardous field environments, and can be made wireless with the use of the RAELink product.

The unit is UL, cUL, and ATEX certified and comes with a lifetime warranty on nonconsuming components. Upgrades to existing ppbRAE units are also available. For more information and pricing information, visit the RAE Systems Web site at www.raesystems.com/Products/ppbRAE or e-mail raesales@raesystems.com.
MARK YOUR CALENDAR!
OCTOBER 26-28, 2004 - BALTIMORE, MARYLAND

Oklahoma State University (OSU)
is very pleased to announce the first ever
INTERNATIONAL ALL RISK SYMPOSIUM
BRINGING IT ALL TOGETHER

Communication between all critical emergency response disciplines

If you are responsible for leading, training, managing, and delivering your community's fire or emergency services, it is inevitable that you will gain definite valuable experiences from attending. The Symposium is a concerted effort to communicate those experiences among all critical emergency response disciplines.

A unique opportunity

The Symposium presents a unique opportunity to learn more about and network with your emergency response partners from around the world. It will encourage inter disciplinary collaboration and enhance the understanding of and solutions to common problems as well as address the need to cooperate and work together for the overall good of the public.

Who should attend?


Registration Details
Register by July 30
And Save $50
www.osu-iars.org
Priority Code: 3614
405.744.2919
National Safety Council (NSC)

92nd Annual Congress & Expo
September 10-17, 2004
Morial Convention Center
New Orleans, Louisiana

For registration information, contact:
National Safety Council
Registration and Housing Office, c/o ITS
108 Wilmot Road, Suite 400
Deerfield, IL 60015-0825
Tel: 800-621-7619
Fax: 847-940-2386
E-mail: info@nsc.org
Web site: www.nsc.org/events

International Association
of Emergency Managers (IAEM)

2004 Annual Conference
November 5-10, 2004
Adams Mark Hotel
Dallas, Texas

For registration information, contact:
IAEM Conference
c/o Sharon Kelly
201 Park Washington Ct.
Falls Church, VA 22046
Tel: 703-538-1795
Fax: 703-241-5603
E-mail: info@iaem.com
Web site: www.iaem.com

Computer Security Institute

31st Annual Computer Security
Conference and Exhibition
November 8-10, 2004
Marriott Wardman Park
Washington, DC

For registration information, contact:
Nancy Baer
CMP Media, Inc.
11 West 19th St.
New York, NY 10011
Tel: 415-947-6320
Fax: 415-947-6023
E-mail: nbaer@cmp.com
Web site: www.cmpevents.com/csi31/

Fire & Rescue

Conference and Exposition
November 12-14, 2004
Las Vegas Convention Center
Las Vegas, Nevada

FireRescue Conference & Expo
c/o Diana Press
Reed Exhibitions
383 Main Ave.
Norwalk, CT 06851
Tel: 800-363-3631
Fax: 203-840-9533
E-mail: info@firerescueexpo.com
Web site: www.firerescueexpo.com/WEBR
Emergency Response 2004
November 17-20, 2004
San Diego Convention Center
San Diego, California

For registration information, contact:
Susan Cuevas
Operations & Registration Director
Access Intelligence, LLC
1201 Seven Locks Rd.
Potomac, MD 20854
Tel: 301-354-1667
Fax: 301-340-7136
E-mail: scuevas@accessintel.com
Web site: www.emergencyrespondeshow.com

US Environmental Protection Agency
Emergency Preparedness and Prevention Conference
December 5-8, 2004
Wyndham Franklin Plaza
Philadelphia, Pennsylvania

For registration information, contact:
EPA Region III
1650 Arch St.
Philadelphia, PA 19103
E-mail: ConferenceAdministrator@2004conference.org
Web site: www.2004conference.org

UN World Conference on Disaster Reduction
January 18-22, 2005
Portopia Hotel
Kobe, Hyogo
JAPAN

For registration information, contact:
WCDR secretariat
UN/ISDR
Palais des Nations, CH-1211
Geneva 10, Switzerland
Tel: +41-22-917-2759
Fax: +41-22-917-0169
E-mail: isdr-wcdr@un.org
Web site: www.unisdr.org/wcdr
INTRODUCTION

Emergency management’s overall mission involves a dedicated responsiveness to events, whether predictable or unpredictable. We provide emergency services, disaster prevention, and we offer mitigation for calamitous and less than calamitous events. One of our main goals is to work for the preservation of our larger community. Since emergencies occur in every sphere of life, our field is wide-ranging. As emergency management professionals, we serve businesses, organizations, and individuals in our community.

Many professional journals focus on several types of topics that help us serve our constituents. Topics include the technical aspects of emergency response, useful tools, techniques and practices, policies and procedures regulating the behavior of emergency management personnel, and issues of national, regional, and local focus. On occasion, there will be a column focusing on the people-related aspects of our field.

The bottom line for the field is that people make things happen for other people in need of emergency services. Yet, we appear to pay little conscious attention to the people-related aspect of our field. There are many journals that focus on people—for example, the psychological, psychiatric, social work, religious, and business aspects of human behavior. However, how many of us read those journals and understand what they are saying?

The concept of this column is to dedicate space to the people-related aspects of our work in understandable and practical ways. One goal of this column is to create a “teaching point” that you, the user and practitioner, can implement in your local facilities to help address issues and improve performance. People-related aspects of our work touch on many areas, for example:

- victims and their families;
- response providers, their families, and their communities;
- organizational needs for leaders, employees, sponsors, and stakeholders; and
- community issues and needs related to people-related aspects of emergency management and response.

COLUMN GOALS

This column is intended to meet reader needs, fill gaps in knowledge, help with skill development, and improve attitude and behavior. In addition, this column will strive to:

1. Create a useful awareness of the people-related aspects of emergency response (for
example, the effects on behavior of victims, responders, organizations, and communities before, during, and after an event).

2. Increase and/or affirm knowledge, skills, and practices in the people-related aspects of emergency management (self-awareness, victim management, emergency services management, the management of the emergency group’s behavior and of its organization).

3. Help response team leadership and members deal with emerging people-related aspects of emergency management through provocative and creative discussions.

4. Invite readers to share their stories, address direct questions from column followers, and share their comments and opinions.

THE PEOPLE-RELATED ASPECTS SIMPLY STATED
For the purposes of this introductory column, we will divide the people-related aspects of our work into two worlds: the individual and the collective (organizational/group). This division is somewhat artificial because there is a strong interrelationship between the individual and the collective.

OVERVIEW OF INDIVIDUAL BEHAVIOR
The most common people-related articles found in the general emergency management literature focus on victims and their families. These articles address the “what” and “how” of victim management. The “what” relates to specific questions, such as:

- What is a victim?
- What are the circumstances of the victim?
- What is the impact of the event on the victim (physiologically, emotionally, behaviorally, and spiritually), etc.?

The “how” relates to how the victim is handled with regard to policies and procedures, treatment and safety, and behavior management techniques.

Another aspect of individual behavior focuses on response providers, their families, and their communities. Attention must be paid to significant issues affecting the response provider’s physical, emotional, behavioral (postevent adjustment), and spiritual well-being. A very common topic in this area deals with stress management for the emergency response worker. Some articles in professional journals focus on family issues, such as the impact of worker schedules on family development, family stress factors for workers in the field of emergency management, and so on.

There are many fascinating people-related topics in our field, such as:

**Physical:** the impact of stress on performance, causes for worker compensations claims, the impact of shifts on family, and worker health.

**Emotional:** the effects of post-traumatic stress syndrome on individual emotional well-being, the impact of effective communications on reducing stress factors, causes for worker burnout, and domestic problems in the affected worker’s home.

**Behavioral:** worker job satisfaction, job fulfillment, reducing worker depression and anxiety, and the comparison of the effects of command and control versus self-directed empowered teams.

**Spiritual:** how religious beliefs impact worker and victim success, and the impact of post-traumatic stress on individual religious beliefs.

OVERVIEW OF COLLECTIVE BEHAVIOR (ORGANIZATIONAL AND GROUP)
Group behavior, in the context of emergency management, consists of many diverse topics. Emergency
management “businesses” are public or private enterprises that service a unique set of “customers.” These businesses can be a subset of governmental agencies or they can be businesses that sell services and products to the public and private sectors. A business of this sort focuses on segments of emergency management for selected population segments. Basically, organizations focus on factors such as the design, development, and implementation of response systems; sales of tools; techniques and strategies that assist in prevention; remediation; postevent recovery; and administration aids to improve relationships with other leaders, employees, sponsors, and stakeholders.

Leaders must be able to train their emergency management personnel to:

- create and support involvement in EM activities;
- participate in negotiations and influence others;
- develop effective communication and motivation skills;
- develop personnel policy and procedures;
- implement winning leadership, evaluation, coaching, and mentoring practices; and
- develop business skills, such as operational management, marketing and sales, and financial management.

When it comes to employee organizational behavior, we often do not examine organizational and group membership practices, such as how to be a good participant within an organization and how to create personal and professional growth environments. These skills are essential to good leadership. We do not often explore what and how group members can (and very often do) help their leaders. We do not often explore the development of relationships and their impact on the whole of the organization, both the leaders and the members together.

Emergency management units are normally composed of key individuals who have a vested interest in the organization or community. These organizational leaders (the chief of the police, commissions, and board members, for example) have an agenda and separate set of needs that hopefully fall into line with the direction of emergency management.

In order to have a successful emergency response unit, you must respond productively to emergencies and also meet the needs of the key individuals in the community, which means doing something for them and their agendas. This interrelationship requires that you involve these key individuals in strategy development, develop ways of influencing both individuals and organizations, effectively communicate with everyone involved, and develop excellent negotiation skills.

Finally, community issues and needs make up the last of the people-related aspects of emergency management. Some social-science journals include emergency management topics, such as the impact of emergencies on employee reduction, community well-being, community support for emergency management, and emergency management’s role in the community denial of terrorist threat. Psychological literature covers group behavior, while theological literature covers the spiritual needs and related behaviors of individuals. Collective behaviors are rich with questions and challenges for anyone thinking of the people-related aspects of our field.

INVITATION TO READERS

So, how will this column be focused?

This column is designed to meet your needs and will be based on open dialogue with you about your emergency management people-related concerns, suggestions about issues and topics of interest, and most importantly, the lessons you have learned.

Please contact me at NJSimon@incidentmitigation.com.

I am looking forward to the success of this, our dynamic and interactive column.

Neil Simon, BS, MA, Managing Partner, Incident Mitigation LLC, Ann Arbor, Michigan.
INTRODUCTION

Emergency medical services (EMS) providers are a vital component of our nation’s healthcare workforce. EMS personnel care for millions of critically ill and injured patients every year, and many have recognized the need to help reduce injuries and illnesses in their communities and to provide additional care at the patient’s home. EMS personnel are some of the first responders to disasters, and they may also help prepare their communities for possible disasters. Since September 11, 2001, their responsibilities in this area have been dramatically increasing; these added responsibilities have been largely underfunded, and little effort has been made to determine how these changes will affect the EMS infrastructure.

Although the nation depends on EMS as never before, the future of the workforce is at considerable risk. This paper describes the major issues currently affecting the EMS workforce in the United States.

Historically, human resources have been recognized as a major area of concern for EMS. In 1996, the National Highway Traffic Safety Administration (NHTSA) sponsored a taskforce to develop the EMS Agenda for the Future. The Agenda proposed the development of 14 EMS attributes. Human resources was one of those 14 priority areas. The Human Resources section described six objectives, which included the need for adequate training, the importance of collaborative relationships with academic institutions, and the importance of occupational health research.

METHODS

Call volume and patients treated

No published reports were found documenting the number of patients treated by EMS personnel each year in the United States. In order to estimate the national call volume, data were collected from the 2002 EMS Magazine “State and Province Survey.” Each state that listed both a population and a total EMS call volume was included. Call volume per year, per one million of population was then calculated for each location (Table 1). The state with the lowest call volume per million was North Dakota, with 48,589. Alabama was the state with the highest call volume, at 175,429 calls per one million of population. The average yearly call volume per one million of population was 109,356 (95 percent confidence interval, CI = 109,288 to 109,423). Extrapolating the data to the entire US population of 285 million in 2001, we find a total yearly call volume of 31,166,337 (95 percent confidence interval, CI = 31,146,978 to 31,185,696).

Medline searches found no reports or data documenting the number of patients treated per call or the proportion of calls that resulted in patient contact, treatment, or transport. Therefore, we developed an estimate based on data acquired using a standard web search engine (Yahoo), which we used to search for the terms EMS, statistics, and transport. Six localities were found that provided data on both responses and transports. One state in the EMS Magazine survey included data on total call volume and number of patient transports; that state, Mississippi, is included. Table 2 illustrates that 2,530,834 calls resulted in 1,613,170 transports; an average of 64 percent of calls resulted in a patient transport. The Montgomery County web page also indicated that 9 percent of their total calls were for patients who were seen by the
EMS crew but refused further medical aid. Based on these data, we estimate that 70 percent of EMS calls result in some level of treatment. Therefore, based on the available data, it is reasonable to estimate that EMS providers treat 22 million patients per year in the United States. If the state’s statistics only reflect emergency or “911” ambulance calls, then adding routine and critical care transport via ambulance and air would greatly increase the number of patients treated each year by EMS providers.

Number of providers

Estimates of the number of EMS providers in the United States have ranged from 150,000 to over 800,000.\textsuperscript{14-18} Data from the EMS Magazine survey were analyzed to estimate the number of EMS providers in

<table>
<thead>
<tr>
<th>State</th>
<th>Population</th>
<th>Call volume</th>
<th>Calls per one million population</th>
</tr>
</thead>
<tbody>
<tr>
<td>AL</td>
<td>3,990,221</td>
<td>700,000</td>
<td>175,429</td>
</tr>
<tr>
<td>CT*</td>
<td>3,300,000</td>
<td>450,000</td>
<td>136,364</td>
</tr>
<tr>
<td>DE†</td>
<td>666,200</td>
<td>77,400</td>
<td>116,181</td>
</tr>
<tr>
<td>FL</td>
<td>16,400,000</td>
<td>1,575,000</td>
<td>96,037</td>
</tr>
<tr>
<td>ID</td>
<td>1,293,953</td>
<td>75,889</td>
<td>58,649</td>
</tr>
<tr>
<td>IN</td>
<td>5,577,100</td>
<td>750,000</td>
<td>134,478</td>
</tr>
<tr>
<td>KS**</td>
<td>2,600,000</td>
<td>241,546</td>
<td>92,902</td>
</tr>
<tr>
<td>KY</td>
<td>3,900,000</td>
<td>625,000</td>
<td>160,256</td>
</tr>
<tr>
<td>ME</td>
<td>1,200,000</td>
<td>210,000</td>
<td>175,000</td>
</tr>
<tr>
<td>MA*</td>
<td>6,016,425</td>
<td>400,000</td>
<td>66,485</td>
</tr>
<tr>
<td>MN</td>
<td>4,919,479</td>
<td>390,000</td>
<td>79,277</td>
</tr>
<tr>
<td>MS</td>
<td>2,844,658</td>
<td>313,402</td>
<td>110,172</td>
</tr>
<tr>
<td>MO</td>
<td>5,233,857</td>
<td>433,000</td>
<td>82,731</td>
</tr>
<tr>
<td>NE***</td>
<td>1,700,000</td>
<td>109,172</td>
<td>64,219</td>
</tr>
<tr>
<td>NV</td>
<td>2,214,813</td>
<td>249,485</td>
<td>112,644</td>
</tr>
<tr>
<td>NH†</td>
<td>1,200,000</td>
<td>98,000</td>
<td>81,667</td>
</tr>
<tr>
<td>ND</td>
<td>638,000</td>
<td>31,000</td>
<td>48,589</td>
</tr>
<tr>
<td>OK</td>
<td>3,200,000</td>
<td>366,444</td>
<td>114,514</td>
</tr>
<tr>
<td>PA</td>
<td>12,281,054</td>
<td>1,400,000</td>
<td>113,997</td>
</tr>
<tr>
<td>RI</td>
<td>990,000</td>
<td>132,792</td>
<td>134,133</td>
</tr>
<tr>
<td>SC</td>
<td>4,012,012</td>
<td>688,956</td>
<td>171,723</td>
</tr>
<tr>
<td>SD</td>
<td>696,004</td>
<td>48,000</td>
<td>68,965</td>
</tr>
<tr>
<td>VT</td>
<td>580,000</td>
<td>52,386</td>
<td>90,321</td>
</tr>
<tr>
<td>WI</td>
<td>5,100,000</td>
<td>500,000</td>
<td>98,039</td>
</tr>
<tr>
<td>WY</td>
<td>493,000</td>
<td>39,000</td>
<td>79,108</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>91,046,776</strong></td>
<td><strong>9,956,472</strong></td>
<td><strong>109,356</strong></td>
</tr>
</tbody>
</table>

* estimated call volume; † Delaware estimated a 7 month call volume of 45,150; population estimate is from 1990; ** Kansas call volume estimate from 2000; *** Nebraska call volume from 1997; ‡ New Hampshire estimated calls at 95,000 to 100,000.
the United States. Table 3 illustrates the number of EMS personnel per category (e.g., EMT, paramedic) and the total number of EMS personnel per state. All 50 states and the District of Columbia are included. The total number of EMS personnel is found to be 891,570. Of these, 154,187 (17 percent) are paramedics. These data are limited in a number of ways. For example, it is not clear if the states counted individuals in more than one category, and it is possible that some individuals may be certified in multiple states. There is also the possibility that many people work on ambulances without EMS certification (e.g., drivers). The proportions of paid and volunteer personnel are unknown; the only report related to such proportions stated “in rural areas, approximately three-quarters of rural prehospital EMS providers are volunteers.”

In 2003, the data indicate that there were approximately 900,000 EMS personnel in the United States. Of these, approximately 180,000 were full-time workers. Much like the growing demand for emergency medicine physicians, the demand for EMS personnel is expected to increase. In fact, the Bureau of Labor Statistics predicts that “Employment is projected to grow faster than average, as paid emergency medical technician positions replace unpaid volunteers.”

**Table 2. Total calls, total patient transports and percent of calls transported, selected jurisdictions, 1991 to 2003 (n = 7)**

<table>
<thead>
<tr>
<th>Service</th>
<th>Period</th>
<th>Total calls</th>
<th>Total patient transports</th>
<th>Percent transports</th>
</tr>
</thead>
<tbody>
<tr>
<td>Montgomery County, PA (118)</td>
<td>2002</td>
<td>63,469</td>
<td>39,465</td>
<td>0.62</td>
</tr>
<tr>
<td>Iredell County, NC (119)</td>
<td>January to July 2003</td>
<td>5,667</td>
<td>4,261</td>
<td>0.75</td>
</tr>
<tr>
<td>Seattle - King County, WA (120)</td>
<td>2001</td>
<td>165,255</td>
<td>69,136</td>
<td>0.42</td>
</tr>
<tr>
<td>Hemphill County, TX (121)</td>
<td>1996 to 2000</td>
<td>1,844</td>
<td>1,311</td>
<td>0.71</td>
</tr>
<tr>
<td>Houston, TX (122)</td>
<td>1991 to 2001</td>
<td>1,833,930</td>
<td>1,132,750</td>
<td>0.62</td>
</tr>
<tr>
<td>Richmond, VA (123)</td>
<td>1999 to 2001</td>
<td>147,267</td>
<td>114,281</td>
<td>0.78</td>
</tr>
<tr>
<td>Mississippi (124)</td>
<td>2001</td>
<td>313,402</td>
<td>251,966</td>
<td>0.80</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>2,530,834</strong></td>
<td><strong>1,613,170</strong></td>
<td><strong>0.64</strong></td>
</tr>
</tbody>
</table>

**REVIEW OF THE LITERATURE**

This section reviews the current literature on EMS workforce issues. Medline searches were conducted on all available years, using the term emergency medical services, along with workforce, occupational injuries, occupational fatalities, ambulance crashes, training, research, stress, and personnel. This section focuses on the findings in eight areas: demographics, occupational hazards, work hours, training requirements, salaries, stress, fire departments in EMS, and research.

**Demographics of the workforce**

Thompson published one study that specifically described the demographics of EMS personnel compared to their communities. In that study of rural EMS agencies and their communities, no significant difference was found between the EMS personnel and the community for race, sex, marital status, household size, home ownership, housing costs, and income employment. Chng et al. compared rural and urban EMS providers in Texas. They found that urban personnel were younger, more educated, were more likely to be compensated (i.e., to be paid EMS providers), and they reported a lower level of burnout. What little information is available related to gender, race, age, and marital status among EMS personnel.
<table>
<thead>
<tr>
<th>State</th>
<th>First responder</th>
<th>EMT</th>
<th>EMT-1</th>
<th>Paramedic</th>
<th>Other*</th>
<th>Total personnel</th>
</tr>
</thead>
<tbody>
<tr>
<td>AL</td>
<td>5,756</td>
<td>2,297</td>
<td>2,495</td>
<td></td>
<td></td>
<td>10,548</td>
</tr>
<tr>
<td>AK</td>
<td>3,500</td>
<td>900</td>
<td>200</td>
<td></td>
<td></td>
<td>4,600</td>
</tr>
<tr>
<td>AZ</td>
<td>8,357</td>
<td>171</td>
<td>2,801</td>
<td></td>
<td></td>
<td>11,329</td>
</tr>
<tr>
<td>AR</td>
<td>5,580</td>
<td>339</td>
<td>1,387</td>
<td></td>
<td></td>
<td>7,306</td>
</tr>
<tr>
<td>CA</td>
<td>60,000</td>
<td>119</td>
<td>12,000</td>
<td></td>
<td></td>
<td>72,119</td>
</tr>
<tr>
<td>CO</td>
<td>13,361</td>
<td>997</td>
<td>3,454</td>
<td></td>
<td></td>
<td>17,812</td>
</tr>
<tr>
<td>CT</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>17,694</td>
</tr>
<tr>
<td>DE</td>
<td>600</td>
<td>850</td>
<td>132</td>
<td></td>
<td></td>
<td>1,582</td>
</tr>
<tr>
<td>DC</td>
<td>3,500</td>
<td>11</td>
<td>500</td>
<td></td>
<td></td>
<td>4,011</td>
</tr>
<tr>
<td>FL</td>
<td>25,063</td>
<td></td>
<td>14,910</td>
<td></td>
<td></td>
<td>39,973</td>
</tr>
<tr>
<td>GA</td>
<td>50</td>
<td>150</td>
<td>6,200</td>
<td>4,000</td>
<td></td>
<td>10,400</td>
</tr>
<tr>
<td>HI</td>
<td>471</td>
<td>344</td>
<td></td>
<td></td>
<td></td>
<td>815</td>
</tr>
<tr>
<td>ID</td>
<td>438</td>
<td>2,618</td>
<td>780</td>
<td>314</td>
<td></td>
<td>4,150</td>
</tr>
<tr>
<td>IL</td>
<td>19,934</td>
<td>1,500</td>
<td>6,000</td>
<td>500</td>
<td></td>
<td>27,934</td>
</tr>
<tr>
<td>IN</td>
<td>9,029</td>
<td>13,387</td>
<td>1,483</td>
<td>2,254</td>
<td></td>
<td>26,153</td>
</tr>
<tr>
<td>IA</td>
<td>2,504</td>
<td>6,135</td>
<td>1,203</td>
<td>1,805</td>
<td>2,698</td>
<td>14,345</td>
</tr>
<tr>
<td>KS</td>
<td>1,023</td>
<td>6,173</td>
<td>2,985</td>
<td></td>
<td></td>
<td>10,181</td>
</tr>
<tr>
<td>KY</td>
<td>2,740</td>
<td>11,251</td>
<td>1,396</td>
<td></td>
<td></td>
<td>15,387</td>
</tr>
<tr>
<td>LA</td>
<td>11,152</td>
<td>4,150</td>
<td>441</td>
<td>1,694</td>
<td></td>
<td>17,437</td>
</tr>
<tr>
<td>ME</td>
<td>200</td>
<td>2,660</td>
<td>750</td>
<td>725</td>
<td></td>
<td>4,335</td>
</tr>
<tr>
<td>MD</td>
<td>11,439</td>
<td>15,172</td>
<td>710</td>
<td>2,091</td>
<td></td>
<td>29,412</td>
</tr>
<tr>
<td>MA</td>
<td>17,170</td>
<td>536</td>
<td></td>
<td>1,923</td>
<td></td>
<td>19,629</td>
</tr>
<tr>
<td>MI</td>
<td>11,709</td>
<td>12,914</td>
<td>1,773</td>
<td>6,093</td>
<td></td>
<td>32,489</td>
</tr>
<tr>
<td>MN</td>
<td>16,609</td>
<td>9,606</td>
<td>307</td>
<td>1,752</td>
<td></td>
<td>28,274</td>
</tr>
<tr>
<td>MS</td>
<td>1,739</td>
<td>243</td>
<td></td>
<td>1,295</td>
<td></td>
<td>3,277</td>
</tr>
<tr>
<td>MO</td>
<td>7,000</td>
<td></td>
<td></td>
<td>3,000</td>
<td></td>
<td>10,000</td>
</tr>
<tr>
<td>MT</td>
<td>2,345</td>
<td>3,110</td>
<td>293</td>
<td>225</td>
<td></td>
<td>5,973</td>
</tr>
<tr>
<td>NE</td>
<td>7,243</td>
<td>227</td>
<td></td>
<td>533</td>
<td></td>
<td>8,003</td>
</tr>
<tr>
<td>NV</td>
<td>1,903</td>
<td>4,911</td>
<td>2,340</td>
<td>911</td>
<td></td>
<td>10,065</td>
</tr>
<tr>
<td>NH</td>
<td>365</td>
<td>2,199</td>
<td>900</td>
<td>528</td>
<td></td>
<td>3,992</td>
</tr>
<tr>
<td>NJ</td>
<td>20,900</td>
<td></td>
<td></td>
<td>13,000</td>
<td></td>
<td>33,900</td>
</tr>
</tbody>
</table>

* Other does not include MDs, RNs, PAs, dispatchers, etc.
comes from a variety of sources. EMS personnel in
the United States tend to be mostly male, Caucasian, 35 years of age, on average, and most are married. An Iowa study found that 81 percent of personnel at EMS-only agencies had some college or a college degree compared with 51 percent at Fire/EMS agencies and 49 percent at Fire-only agencies. The study also found that 19 percent of the EMS-only personnel had a bachelor’s degree compared with 7 percent of the EMS/Fire personnel. Brown found the median experience for EMTs was 2.17 years compared with 9.12 years for paramedics.

Approximately 4.5 percent of the EMS personnel in these two studies had graduate degrees.

**Occupational hazards**

The national rate for occupational injuries calculated by the Bureau of Labor Statistics for 2000 was 6.1 injuries per 100 full time workers, per year. In that same year, it found that the industry with the highest rate of occupational injuries and illnesses was “meat packing plants”; in that industry, there are approximately 25 injuries and illnesses for every 100 workers, per year. Only two papers present data

<table>
<thead>
<tr>
<th>State</th>
<th>First responder</th>
<th>EMT</th>
<th>EMT-1</th>
<th>Paramedic</th>
<th>Other*</th>
<th>Total personnel</th>
</tr>
</thead>
<tbody>
<tr>
<td>NM</td>
<td>648</td>
<td>3,104</td>
<td>1,077</td>
<td>893</td>
<td></td>
<td>5,722</td>
</tr>
<tr>
<td>NY</td>
<td>13,136</td>
<td>37,945</td>
<td>4,806</td>
<td>4,297</td>
<td></td>
<td>60,184</td>
</tr>
<tr>
<td>NC</td>
<td>2,803</td>
<td>11,692</td>
<td>1,795</td>
<td>3,734</td>
<td>6,873</td>
<td>26,897</td>
</tr>
<tr>
<td>ND</td>
<td>1,632</td>
<td>354</td>
<td></td>
<td>320</td>
<td></td>
<td>2,306</td>
</tr>
<tr>
<td>OH</td>
<td>20,729</td>
<td>3,407</td>
<td></td>
<td>10,863</td>
<td></td>
<td>34,999</td>
</tr>
<tr>
<td>OK</td>
<td>22,526</td>
<td>6,517</td>
<td>1,327</td>
<td>1,400</td>
<td></td>
<td>31,770</td>
</tr>
<tr>
<td>OR</td>
<td>3,946</td>
<td>1,286</td>
<td></td>
<td>2,258</td>
<td></td>
<td>7,490</td>
</tr>
<tr>
<td>PA</td>
<td>5,506</td>
<td>27,125</td>
<td></td>
<td>11,769</td>
<td></td>
<td>44,400</td>
</tr>
<tr>
<td>RI</td>
<td>2,145</td>
<td>1,890</td>
<td></td>
<td>225</td>
<td></td>
<td>4,260</td>
</tr>
<tr>
<td>SC</td>
<td>2,095</td>
<td>771</td>
<td></td>
<td>2,451</td>
<td></td>
<td>5,317</td>
</tr>
<tr>
<td>SD</td>
<td>2,896</td>
<td>276</td>
<td></td>
<td>283</td>
<td></td>
<td>3,455</td>
</tr>
<tr>
<td>TN</td>
<td>3,283</td>
<td>4,904</td>
<td>3,113</td>
<td>3,285</td>
<td>223</td>
<td>14,808</td>
</tr>
<tr>
<td>TX</td>
<td>26,107</td>
<td>4,044</td>
<td></td>
<td>15,242</td>
<td>5,273</td>
<td>50,666</td>
</tr>
<tr>
<td>UT</td>
<td>7,184</td>
<td>1,741</td>
<td></td>
<td>872</td>
<td>434</td>
<td>10,231</td>
</tr>
<tr>
<td>VT</td>
<td>1,390</td>
<td>833</td>
<td></td>
<td>81</td>
<td>814</td>
<td>3,118</td>
</tr>
<tr>
<td>VA</td>
<td>2,310</td>
<td>23,044</td>
<td></td>
<td>2,921</td>
<td>4,417</td>
<td>32,692</td>
</tr>
<tr>
<td>WA</td>
<td>2,014</td>
<td>13,020</td>
<td>790</td>
<td>1,522</td>
<td></td>
<td>17,346</td>
</tr>
<tr>
<td>WV</td>
<td>644</td>
<td>4,115</td>
<td></td>
<td>1,705</td>
<td>3,360</td>
<td>9,824</td>
</tr>
<tr>
<td>WI</td>
<td>2,900</td>
<td>12,500</td>
<td>2,047</td>
<td>2,566</td>
<td></td>
<td>20,013</td>
</tr>
<tr>
<td>WY</td>
<td>2,178</td>
<td>687</td>
<td></td>
<td>82</td>
<td></td>
<td>2,947</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>127,876</strong></td>
<td><strong>509,128</strong></td>
<td><strong>58,093</strong></td>
<td><strong>154,187</strong></td>
<td><strong>24,592</strong></td>
<td><strong>891,570</strong></td>
</tr>
</tbody>
</table>

* Other does not include MDs, RNs, PAs, dispatchers, etc.
that might be used to estimate the risks for EMS. Gershon et al.\textsuperscript{28} found that there were 220 injury or illness cases among a population of 197 EMS workers in 1992, and Schwartz et al.\textsuperscript{26} found that there were approximately 45 injury and illness cases per 100 full-time EMS workers in 1990. These data indicate that the problem is potentially very serious. One paper looked at occupational fatalities among EMS personnel and found that the rate of fatality per 100,000 EMS workers was 12.7 per year.\textsuperscript{29} In comparison, the rate was 14.2 for police and 16.5 for firefighters; the national average for 1995 (a midpoint of the studies) was five.\textsuperscript{30} Ambulance collisions have been found to be a significant hazard to EMS personnel\textsuperscript{29,31-33} as well as a major source of litigation.\textsuperscript{34-37} Other occupational health hazards include: assaults,\textsuperscript{38-41} infectious disease,\textsuperscript{42,43} needlesticks,\textsuperscript{44,45} back injuries,\textsuperscript{46} and hearing loss.\textsuperscript{47}

**Work hours**

Although work hours have been found to influence EMS job satisfaction,\textsuperscript{48} a precise estimate of the number of hours worked by EMS personnel is not available. However, there are indications that employer-mandated hours may be excessive. Reports indicate that some employers, typically based in fire departments, have shifts of 24 straight hours or more.\textsuperscript{49-53} Although such shifts may be acceptable for fire personnel, who may get called out on fewer occasions during a 24-hour shift, these long shifts may be much more problematic for EMS personnel, who may be assigned to many calls during a 24-hour period. NHTSA data suggest that approximately 100,000 crashes per year, including 1,357 fatal crashes and approximately 71,000 injury crashes, involved drowsiness.\textsuperscript{54} It is reasonable to conclude that drowsiness from extended shift lengths increases the risk of ambulance crashes and occupational injuries for EMS personnel. This increased risk may also extend to citizens in the community, as well as off-duty personnel driving home after an extended shift.

In addition to the issues related to drowsiness and operational safety, there are concerns in the areas of medical competency and quality assurance. For example, medical errors have been found to be a significant problem in hospitals, which is a more controlled environment than the practice arena for EMS. The effect of work hours on physician residents has been recognized by the Accreditation Council for Graduate Medical Education and resulted in new guidelines limiting the work hours of residents.\textsuperscript{55} Other workers, such as pilots\textsuperscript{56} and commercial drivers,\textsuperscript{57} have legal limits on their work hours.

**Training requirements**

Although one study found that 55 percent of rural EMS volunteers quit because of training requirements,\textsuperscript{58} EMS personnel generally embrace training, and many are believed to be interested in pursuing additional training, such as "expanded scope EMS."\textsuperscript{59} This training allows providers to perform advanced clinical interventions, such as suturing and prescribing limited types of medications. Expanded scope personnel may, instead of taking a patient to a busy and expensive emergency department, perform some limited interventions, allowing the patient to arrange for follow-up care with a private physician or clinic at a convenient time.

**Salaries**

One study found that as of 2000, the average salary for a paramedic was approximately $38,000.\textsuperscript{60} However, the Bureau of Labor Statistics estimates the median EMT and paramedic salary in 2000 as $22,460.\textsuperscript{61} In comparison, Bureau figures for the same year report a median salary for firefighters between $29,316 and $39,477;\textsuperscript{62} $39,790\textsuperscript{63} for police; $44,840 for registered nurses;\textsuperscript{64} and $61,910 for physician assistants.\textsuperscript{65} Brown et al.\textsuperscript{25} found that EMTs had an average salary of $23,350, while the average for paramedics was $37,282. Monosky\textsuperscript{66} found that the average starting paramedic salary among respondents to a 2002 national survey was $32,420. One author concluded that only paramedics in the northwest and south central regions of the United States earn enough to afford a monthly mortgage payment for a 2,000 square foot home.\textsuperscript{67} Another survey found that many EMS workers earn salaries near the poverty level and lack health insurance.\textsuperscript{68}

**EMS and fire departments**

Although some fire departments have provided
ambulance services since at least the 1960s, an increasing number of fire departments have taken over local EMS services in recent years. The International Association of Fire Chiefs recently published the results of a study that “demonstrate that a growing percentage of fire departments are providing ambulance transport, in addition to the more traditional first response services.” Most remarkable was the finding that 94 percent of respondents were now providing some level of EMS in their communities.

Anecdotal reports from many fire departments that are providing EMS indicate that firefighters are often forced to work in EMS until openings become available on fire apparatus. The lack of research leaves open the possibility that turnover is much higher among firefighters than among personnel in EMS-only agencies (i.e., a greater proportion of firefighters may choose not to recertify as EMS providers), and that fire departments may be more likely to staff advanced life-support units with personnel not trained to the full paramedic level. If these initial findings are indicative of a larger trend, the future EMS workforce may be comprised largely of workers who have little interest in providing EMS, who have relatively little experience, and who have less training than current paramedics. Consolidation of EMS and fire departments may result in a decrease in personnel available for disasters. It could also cause a conflict in roles for such incidents, if the firefighters are needed for fire duties and are thus unavailable for patient care.

Finally, this fundamental transformation of a healthcare delivery system that treats 22 million Americans each year is being done in the absence of any published literature related to the involvement of local medical direction or the larger healthcare community. In addition, no studies have been found on the national health impact of this transformation to fire department-based service.

New frontiers

Harrawood et al. demonstrated how EMS personnel were able to help cut the pediatric drowning rate by 50 percent in one community. There is an increased interest in primary injury prevention, and 17 states report having an EMS injury prevention program. Finally, EMS personnel have an increasingly important role in monitoring the health of the community and taking on other new roles.

Research is an important component of addressing EMS problems and developing new initiatives. This may be an ideal time to develop unique research models, but the success of future EMS research depends on increased research quality. It will also require dedicated researchers, funding, better information systems, the development of research skills among EMS personnel, and a focus not only on clinical interventions but also on the evaluation of integrated EMS systems.

DISCUSSION

Emergency medical services personnel have developed a unique set of experiences and abilities related to patient care, and they have also demonstrated their abilities in community health initiatives. At the same time, low salaries and changing training and certification requirements, along with a risk of occupational hazards, threaten the future of EMS services.

EMS is evolving to take on a number of new roles. A logical extension of these findings is that EMS professionals can reduce the number of medical emergencies in the community, facilitate the availability of specialized care, play an important role in community health education, improve community health, and help reduce costs for healthcare in the United States. In addition to having a significant influence on healthcare, this evolution is a crucial next step in the maturation of the EMS profession.

CONCLUSION AND RECOMMENDATIONS

Since September 11, 2001, communities have become increasingly reliant on EMS personnel, especially in areas such as disaster response and monitoring of disease outbreaks. In addition, EMS professionals have been increasingly involved in a variety of community health initiatives that may have helped reduce healthcare costs and improved the health of the community. At the same time, EMS personnel are under increasing pressure from the demands of their
work and the hazards associated with the occupation. Perhaps most significant is the increased willingness by public safety and local government administrators to move EMS operations under fire departments without consideration for the long-term effects of such a change. These long-term effects may, in fact, result in fundamental changes in EMS. These changes would come at the same time as baby boomers, managed care, and Homeland Security begin to place increasing demands on EMS services.

If EMS is to continue as a profession, changes must include increased financing for EMS agencies, higher salaries, significant job redesign, and recognition both by local government and the medical profession that EMS is a true profession and a partner in public health. The job redesign must provide opportunities for rotation through less stressful and less demanding work environments. The design must also recognize the role EMS personnel can have in community health initiatives. It must provide for a reasonable career ladder, with clearer pathways based on education and experience. These changes are necessary for those who want to perform expanded scope duties and critical care roles and those who want to become researchers, educators, managers, nurses, physician extenders, or physicians. EMS research must be supported, and planning must begin to insure adequate and properly funded EMS personnel, in both urban and rural areas. Now is the time for us to develop and enact a national strategy for the future of EMS.

ACKNOWLEDGMENTS

The authors want to thank Judith A. Cooksey, MD, MPH, Richard A. Bissell, PhD, and Jeffrey T. Mitchell, PhD for their input and feedback. Some of the research described in this paper was presented at the Coalition of Academic Programs in EMS, meeting in Philadelphia, Pennsylvania on July 19, 2002.

The authors have no commercial or financial associations that might pose a conflict of interest in connection with this article. Some of the initial research for this article was supported by a HRSA grant, administered through the University of Illinois at Chicago.

Brian J. Maguire, MSA, EMT-P, DrPH, Department of Emergency Health Services University of Maryland, Baltimore County, Baltimore, Maryland.

Bruce J. Walz, PhD, Department of Emergency Health Services University of Maryland, Baltimore County, Baltimore, Maryland.

REFERENCES


ABSTRACT
This article is a short overview of political and public management theory in emergency management. The work applies the dichotomous public management theories of Jefferson and Hamilton to emergency management. The establishment of emergency management as a profession, the bureaucratic politics of the field, principal agent theory, and codification/diffusion of knowledge are discussed.

INTRODUCTION
A good way to explore how political theory contributes to the study and application of emergency management is to consider its contributions to organization studies and theories of public management. This paper is a short overview of public management-related political theory that may be of help to academics, students, and practitioners interested in the academic aspects of emergency management. The core of this discussion is based on Public Management as Art, Science, and Profession, by Laurence E. Lynn, Jr. Lynn’s book does not address emergency management directly, but its treatise is immediately relevant to emergency management because it examines critical questions about “public” management in general.

JEFFERSONIANS AND HAMILTONIANS
Let’s examine two simple normative political theories to start. Consider a subset of the political theories of two of America’s forefathers: Thomas Jefferson and Alexander Hamilton. Jefferson, major author of the Declaration of Independence and the nation’s third president, has been generally understood to insist that the job of public managers was to obtain “popular and stakeholder guidance” through political consultation or public deliberation before the fact. In other words, public managers make their decisions as the product of grassroots public consultation and the consensus of interest group recommendations. This gives a public manager’s decisions greater legitimacy for public purposes. This so-called Jeffersonian approach requires that public managers possess skills in consultation, negotiation, and communication and deftness in probing for public understanding and consent. Good Jeffersonian public managers are educated generalists (“gentlemen,” as Jefferson might have put it) who know and understand the personal relationship that exists between agents and tasks. Jeffersonian public managers are strictly accountable to the public and to their elected overseers.

For Alexander Hamilton, the first Secretary of the Treasury, a significant contributor to The Federalist Papers and a major architect of the US Constitution, public management needed to emphasize getting results. So-called Hamiltonian public managers expect others, especially strong elected executives, to judge them by whether or not their efforts produced the desired effect. They work under “after the fact” accountability, and their concerns are performance and evaluation under public law. Hamiltonians must be expert decision makers and students of organization and must possess executive talents in formulating plans and carrying out duties. Hamiltonian public managers know the substance, tools, and processes of their work. A Hamiltonian public manager is, in many ways, a technocrat who possesses special knowledge and expertise most average citizens do not have and who works under norms of objectivity and political neutrality. The rise of a professional US civil service system of government in the 1920s and its perpetuation today demands
well-educated public managers. Moreover, the complexity and vast array of public problems and governmental responsibilities demands managers who possess specialized knowledge and technical abilities.

In the course of their work, emergency managers cannot simultaneously behave as both good Jeffersonians and good Hamiltonians. The two theories point to two fundamentally different ways to approach public management. Though the two theories may be compatible in some rare circumstances, they ordinarily stand in basic counterpoint to one another. Emergency managers need to understand the difference between these theories and understand that they may often have to choose one or the other to work effectively. If they understand these theories, they will be empowered to make more informed decisions in the course of their work.

POLITICAL THEORY AND PROFESSION

What is a profession? A profession is an occupation that is esoteric, complex, and discretionary. It requires theoretical knowledge, skill, and judgment that others either do not possess or cannot easily comprehend. Theory-grounded knowledge is the basis of most professions. Professions occupy a position of legal and political privilege that protects them from competing professions. Professions sanction theory and application, something emergency managers must fully appreciate.

Once a person masters the abstractions and methodologies of a profession, he or she enjoys more autonomy in the work he or she does. To enter a profession, education and training in a professional program are needed to achieve mastery of the necessary abstract concepts. Alexander Hamilton would favor a government management workforce staffed largely by professionals.

Professions often rely on universities and colleges to educate and train skilled staff, since people at these institutions are experts at imparting abstract knowledge. Professionals in most careers must have suitable credentials to compete, and universities or colleges are able to convey these credentials. Some professions draw status from their clients. However, the range of clients for physicians, lawyers, and emergency managers, for example, is so broad that the status of these professions cannot reasonably be related to the status of the many client groups they serve.

Disputes regarding who may officially accredit emergency management education programs and who may certify people as qualified emergency managers will profoundly affect whether and how emergency management evolves as a profession. Theories and concepts are engines of knowledge creation, but in emergency management, the matters of developing and testing theories and deciding what constitutes knowledge may well be determined by the authorities and interests that win accrediting and certification powers.

Why is abstract thought important in a profession? Abstract reasoning produces measurable, generalizable knowledge that can be validated in many contexts. In other words, generalized knowledge has explanatory power across a wide variety of cases and circumstances. Abstraction and generalized knowledge help researchers transcend single case studies to see how they apply in the wider world. Abstraction enhances the value of experiential learning by enabling those with field experience to collect empirical evidence amenable to analysis by themselves and by others, most particularly those working to add predictive power to the theories they test and develop. Abstraction provides a basis for improved qualitative and quantitative examinations of social and physical phenomena, including catastrophic events. Abstract reasoning facilitates the coproduction and exchange of knowledge between people of different scientific disciplines, which is essential in emergency management work.

Is emergency management evolving as a profession? Tierney, Lindell, and Perry think it is. Waugh, Sylves, and others concur and have explored this question at length, as have Drabek et al. If those working in this field succeed in establishing their work as a profession, they have to do so by building on and enriching the theory that applies to it. Lack of theory or weak theory undercuts emergency management’s authority and contributes to its marginalization—something dangerous in an era of occupational competition from the realm of homeland security. Emergency management as a field achieves greater legitimacy when its core concepts have currency in the physical and social sciences. Conversely, physical
and social scientists are likely to contribute to the theory and conceptual growth of emergency management and disaster studies if they conclude that this is a knowledge-driven, research-supportive realm.

If emergency management becomes a serious profession, it would be reasonable to expect that the recommendations of emergency managers to top government officials would be respected and acted upon, owing both to the merit of the recommendations themselves and because the recommendations were made by those with acknowledged expertise. If political officials do not consider emergency managers as part of a specialized, knowledge-based profession, they might conclude that their own judgments are as valid as those of emergency managers. In other words, emergency managers would lack “authority of expertise.” Emergency management would be seen as a body of unsophisticated skill sets imparted to others through simple, one-directional training. Worse still, it might reasonably be assumed that anyone could perform emergency management tasks because the field is so ill-defined or based on easily learned behaviors. Emergency managers would be viewed as interchangeable functionaries carrying out relatively simple tasks with clerk-like efficiency during disaster intervals.

This conceptualization may appeal to Jeffersonians because it rests on simplification, facilitates mobilization and participation of unskilled volunteers, and maximizes political control and grassroots political responsiveness. However, for Jeffersonians, there is not much use for emergency managers between disasters. They have no role in mitigating disasters in a sophisticated way and are neither well-suited to address the causes of disaster nor likely to understand the complex, multifaceted ramifications of disasters and emergencies.

**EMERGENCY MANAGEMENT THEORY AND BUREAUCRATIC POLITICS**

Study of bureaucratic politics can also be applied to emergency management theory. According to Hugh Heclo,8 political administration is “office-using by people in a variety of circumstances at the top of the executive branch of government.” Statecraft is “using and risking political power through action,” i.e., political leadership times bureaucratic power. Bureaucratic politics are conducted quietly and skillfully behind the scenes, with possible strategic reversals, caution, and contentment with sharing credit for good results. A person needs these attributes in order to conduct good statecraft.

Some scholars of public management and bureaucratic politics impart knowledge by observing and recounting field experiences and try to produce applicable principles, referred to as “best practices,” based on those observations. Chester Barnard9 is the exemplar of the best practice approach. He sees practice as the basis for scholarship rather than scholarship as the basis for practice; the practitioner draws the picture for the observer. James Lee Witt’s book about his experiences directing FEMA provide a perfect example of this approach.10

Another set of scholars creates knowledge based on empirical validation of useful propositions derived from models. Simon et al.’s *Public Administration*11 and Graham Allison’s *Essence of Decisions*12 epitomize this social scientific approach. They see scholarship as a basis for practice, also known as the “applied heuristics” (seeking solutions by trial and error) approach. Analytical approaches and models were the early basis of policy analysis. They allow for experimentation, help public managers deal with “messy” realities, and help public managers produce adequate explanations for puzzling things. When applied to particular situations, they offer reasonable insights that improve a manager’s effectiveness.

To summarize, those using reductive approaches seek support from practitioners while those using analytical approaches seek support from academics. “Best practice” reductionist views of public management have been criticized because they are often not good guides to scholarship, teaching, or practice. However, according to Lynn,1 some case studies, especially those showing how public executives shape the institutional frameworks for policymaking and execution, have been useful contributions to theory knowledge. Executives shape the contexts that affect public policy in both the short and long run.

Within the subfields of the physical and social sciences (e.g., meteorology, seismology, sociology,
policy studies, epidemiology, emergency medicine, engineering, et al.), there is an incredible range of analytical approaches to the study of disaster. Those advancing the analytical approach to the study of disaster have benefited from advances in high-powered computing and the development of sophisticated software programs (e.g., computer-based data analysis, Geographical Information Systems, HAZUS, etc.). Emergency managers and students of emergency management must embrace analytic approaches and tools in order to advance disaster study and research.

However, the generalization sought by analytical approaches overlooks the principle of reality as a social construct rather than an objective construct that is the same for all observers. Some scholars working in the disciplines of sociology or political philosophy maintain that organizations, including government organizations, are systems of socially constructed and cognitively ordered meanings. Empiricism, which is the collection of information about the physical and social “real” world, and which is so essential to analytical approaches, loses out if social constructionists routinely discount empirical, scientific information as merely the product of individual interpretations of reality and personal belief systems.

Today, constructivist theory is widely popular in many academic realms, including disaster sociology. This author is not advocating the dismissal of social constructionist research, because it has an important place in the intellectual sphere of emergency management. However, social constructionism and its variants do not represent the only intellectual paradigm applicable to emergency management. Several alternative theories and paradigms, some facilitating links between the physical and social sciences, are of more practical use to emergency managers than is social constructionism.

**EMERGENCY MANAGEMENT AND PRINCIPAL-AGENT THEORY**

Principal-agent theory assumes that managers have no way to observe whether their agents (subordinates) carried out the instructions they issued as principals. In addition, agents may hide information from principals or may use the information in ways inconsistent with what the principal wants. Principal-agent theory gives rise to performance contracting studies and involves refining situational logic.

Principal agent theory is highly applicable to the world of emergency management. Government emergency managers work in a universe of federal, state, local, and private sector agencies. An immense amount of government emergency management involves working with private contractors and volunteer organizations. Information flowing between agents and principals influences the decisions of principals in matters of fund distribution, budgeting, planning, program administration, and management in general. Emergency managers might be well-served by applying integrated noneconomic factors and structured economic analysis to help ensure that agents addressing disaster-related needs are better guided toward achieving the goals of the principals.

“Working the seams” is part of principal-agent theory. According to Richard Elmore, public managers must know how to work the edges of administrative-legislative interaction, intergovernmental relations, agencies, and interest groups. They need technical and analytical knowledge to do this. Their world is composed of agents, seams, and a technical core. Elmore’s contributions are immediately relevant to emergency managers.

Charles Lindblom’s theory of partisan mutual adjustment seeks to explain how public managers behave in governing relations. Lindblom’s theory gives emergency managers a guide to surviving in a world of partisan political competition among political actors and reinforces the findings outlined in Heclo’s book, *Government of Strangers*. Heclo’s world is one in which political appointees interact with top civil servant administrators in a system of organic interdependence, something commonly found in emergency management in the United States.

Michael Barzelay’s *Breaking Bureaucracy* stresses customer satisfaction and advises public managers not to take their subordinate’s resistance to change personally. The Clinton “reinventing government” era gave low-level administrators more power, and these administrators needed education and training to help them maximize this opportunity.
James Lee Witt, the Clinton era FEMA assiduously embraced this movement. Customer satisfaction in government work has a ring of Jeffersonianism. Clearly, no profession can afford to ignore customer satisfaction very long without losing credibility. However, while customers may help professionals identify unmet needs, in no profession do customers actually define the nature of professional work.

**KNOWLEDGE CODIFICATION AND DIFFUSION ISSUES**

In any organization, experience and action are based on a blend of tacit, or uncodified, knowledge and structured, codified knowledge. Tacit knowledge is vague and depends on sharing expectations and values through social relationships. Codified knowledge is impersonal and learned through thinking and reasoning, not social relationships. To manage well, do emergency managers need to operate in face-to-face forums (consensual, democratic, Jeffersonian, and based on uncodified knowledge)? Or might they achieve their goals by imparting technocratic knowledge produced from data analysis, experimentation, Hamiltonian principles, and codified knowledge?

Lynn makes a worthwhile distinction about whether codified knowledge is diffused or undiffused knowledge. Diffused codified knowledge is written down and openly available so that audiences outside government can use it. If knowledge is codified but not diffused, it is contained within the bureaucracies. Someone could only master this knowledge if they worked inside the bureaucracy and learned the internal rules. If knowledge is diffused but not codified, those entering public management positions from the outside stand little chance of coordinating the work of others unless they receive help from those inside or have time to learn the uncodified information as government employees. To succeed, a public manager would have to “learn the agency,” typically from mentors.

Unfortunately, a considerable share of federal emergency management knowledge, if recorded at all, is partially codified but not sufficiently diffused beyond the agency. The Code of Federal Regulations for emergency management sets forth the core rules of federal emergency management, but it does not elucidate the essence of what emergencies and disasters are, and it does not explain how to actually do emergency management work. Some federal emergency managers have codified their expertise, but much of this information resides within the bowels of various agency offices. A possible exception is the Department of Homeland Security (formerly FEMA) Emergency Preparedness and Response Directorate which disseminates codified emergency management knowledge and trains state and local authorities and managers. However, according to former FEMA official William Cumming, “the real disaster tradition was oral, not in writing, and ad hoc rather than procedural.”

Moreover, FEMA and its progenitor agencies lacked “history divisions” (common at the Department of the Army, Department of Energy, Nuclear Regulatory Commission, NASA, etc.) or institutional memories that were more than merely the recollections of employees who have worked there. A fiefdom or cult of personality results when management knowledge is both uncodified and inaccessible. (Such may have been the case in J. Edgar Hoover’s FBI many years ago.) Management control becomes highly personalized, unreviewable, and unappealable. Some fear that the advancement of emergency management largely depends on high-profile, charismatic figures chosen to lead agencies like FEMA or state and local emergency management agencies. If emergency management know-how depends heavily on a cult of personality, there is little hope emergency management will be professionalized.

In uncodified but diffused situations, clans are the norm, and people learn by being socialized. Those selected to join the US Diplomatic Corps face this type of situation. While diplomatic histories are many, those Americans who endeavor to become diplomats must learn how to operate through the State Department’s Diplomatic Corps before they are officially entrusted to do official US diplomatic work. Certain first responder emergency management occupational specialties (fire services and law enforcement) put great emphasis on socialization and mastery of uncodified knowledge and codified knowledge not widely diffused to those outside the occupational specialty. If emergency management is basically learned through apprenticeships within emergency management agencies, few academics will be drawn to the
field. In such a case, if the field of emergency management grows at all, it will grow as a function of inhouse training, not by broad-based advancement of emergency management education and research.

CONCLUSION

When it comes to the field of emergency management, the aim should be to develop new theory or adapt old theory to produce manageable policy. “An intellectual field cannot be built on self reports by the subjects of interest.”24 The field must advance through the production of codified knowledge widely diffused to anyone who chooses to learn it. Haddow and Bullock25 have made a worthwhile start in their book Introduction to Emergency Management by conceiving emergency management as discipline, albeit with only an elemental start at theory construction and testing.

Emergency managers need to grasp the significance of political and managerial theories relevant to their work, and they need to understand their role in the policy process.26 They need to appreciate that government embodies actors and structures intended to facilitate the effective operation of democracy and political accountability. Various political theories and concepts furnish “explanations of political behavior and the exercise of power.”27 Emergency managers need to be aware of the Hamiltonian and Jeffersonian cross-pressures they face.

To grow as professionals, emergency managers need to understand a range of political, organizational, managerial, and decisional theories and the conceptual reasoning embedded in each. Knowledge is power, and theories are tools that make it possible to expand, refine, and critique public management knowledge so necessary in performing emergency management work for the American people.

ACKNOWLEDGMENT

This article is adapted from a paper presented by the author at the FEMA Emergency Management Higher Education Conference, June 8, 2004, Emmitsburg, Maryland.

Richard T. Sylves, PhD, Professor of Political Science and International Relations, University of Delaware, Newark, Delaware.

REFERENCES

2. Lynn 1996, 144-149.
ABSTRACT

In August 1992, a fire occurred at a computer circuit board manufacturing facility located in South Phoenix, Arizona, in which toxic smoke blanketed the surrounding community for a period of over eight hours. Debate continues as to whether or not government agencies took the steps needed to protect the exposed community during this emergency. Government officials were impeded in their ability to be effective due to organizational issues (lack of funding, poor communication, and unfriendly political environment) and their inability to link exposures to reported health problems. Residents believed the case was one of environmental racism. This case study explores the factors that played a role in the unsatisfactory outcome of this event, and highlights the impact that citizen involvement had in improving the local emergency response system.

INTRODUCTION

All companies that generate or use hazardous substances are required to follow federal and state regulations that outline emergency steps to be taken following an accidental discharge. In August 1992, a fire occurred at a computer circuit board manufacturing facility located in South Phoenix, Arizona, in which toxic smoke blanketed the surrounding community for a period of over eight hours. Debate has continued, even a decade later, as to whether or not the facility executives and Arizona government agencies took the steps needed to protect the exposed community. Three main points of discussion have emerged in this debate. The first is what we term organizational issues that influenced the ability of government agencies to be responsive to the needs of the South Phoenix community. Organizational issues include:

- inadequate personnel or funding necessary for enforcing environmental policies;
- confusion and poor communication between environmental agencies about their roles and responsibilities; and
- an unfriendly political environment that restricted environmental agency efforts to implement and enforce environmental policies.

A second point of discussion is whether environmental racism toward the affected residents in this neighborhood was a factor in the unsatisfactory outcome of this event. A third issue is the inadequacy of current scientific methods (e.g., chemical sampling studies and risk assessment) to link chemical exposures to predictable adverse health symptoms.

We present this fire incident as a case study to explore how these three vexing issues might have played a part in the outcome of this event and to articulate the impact that vigorous and sustained citizen involvement had in improving the local emergency response system.

METHODS

The study community is located in southwest Phoenix, Arizona, on the western edge of Census Tract (CT) 1160 and directly east of the former facility (Figure 1). We divided CT 1160 into four areas based on proximity to the facility and approximate population...
sizes. Areas 1, 2, and 3 were located north of Roeser Road, in the direct path of the smoke plume that blew in a northeasterly direction. Area 1 was located closest to the facility; Area 2 was next in proximity; and Area 3 was the furthest east of the facility. Area 4 was identified as a control group, as it was located to the south of the facility, in an area upwind of the fire.

We collected information through interviews with key players and by compiling data from secondary sources including government agency files, newspaper articles, and previous studies of this case. Articles from Arizona newspapers and files from the Arizona Department of Environmental Quality (ADEQ), the Arizona Department of Health Services (ADHS), the US Environmental Protection Agency (EPA), and the community advocacy group, Don’t Waste Arizona (DWAZ), were obtained from archived records. Face-to-face and phone interviews with active participants were conducted with employees from ADEQ, ADHS, Steve Brittle, president of DWAZ, EPA employees, and officials from the Phoenix Fire Department. We used this information to analyze events that occurred during this incident and to interpret residents’ perceptions regarding both health issues and the work done by government agencies in response to the fire.

We have also included information about symptoms of illness reported by residents that was captured in a community-based health survey conducted in 1993 by the members of DWAZ. The survey served as a tool to assist the community in determining if symptoms were more pronounced if residents lived closer to the plume at the time of the fire.

CASE STUDY: THE 1992 FACILITY FIRE

This single-story circuit manufacturing facility moved into South Phoenix in the late 1980s, employing approximately 120 people. The City of Phoenix Economic Development Agency approved the site, arguing that it would give the surrounding poor community an economic boost. In 1990, approximately 65 percent of CT 1160’s residents identified themselves as African-American, 18 percent as Hispanic, and 16 percent as White. Thirty-six percent of the 1,412 households in CT 1160 reported a total income of less than $14,000, with an average household income of $13,080. At the time, approximately 37 percent of residents lived below the poverty line.\(^1\) The neighborhood “inherited” the facility in the late 1980s, when

<table>
<thead>
<tr>
<th>Area</th>
<th>Location</th>
<th>Proportion of residents in each area (% of total residents)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>West of S. 18th Place</td>
<td>154 (22.0)</td>
</tr>
<tr>
<td>2</td>
<td>Between S. 18th Place and S. 20th Place</td>
<td>134 (19.7)</td>
</tr>
<tr>
<td>3</td>
<td>East of S. 20th Place</td>
<td>194 (28.5)</td>
</tr>
<tr>
<td>4</td>
<td>South of Roeser Road</td>
<td>202 (29.0)</td>
</tr>
<tr>
<td></td>
<td>No response</td>
<td>10 (1.4)</td>
</tr>
</tbody>
</table>

Figure 1. Area divisions of CT 1160 used for identifying participants’ proximity to the facility: South Phoenix, AZ. Area 1 was closest to the fire, and Area 4 was farthest away.
the City of Phoenix Economic Development Agency approved its relocation into this neighborhood.

In 1989, the first large fire occurred at the facility, creating a toxic smoke that blew east into CT 1160. The fire caused $2.7 million in damages, but the plant was quickly rebuilt. In 1990, ADEQ performed a hazardous waste inspection of the facility and found that it was out of compliance on several matters dealing with fire safety. A report was sent to the facility’s officials instructing them to correct these problems, but no changes were made, nor were fines levied. In 1992, the facility was cited for violating OSHA standards for having unlabeled drums and potential fire hazards (S. Brittle, oral communication, 1996). A Phoenix Fire Department spokesperson stated that the facility was never in compliance during building inspections (L. Randall, oral communication, 1999).

Over the next few years, employees at the facility put out several small fires. On August 31, 1992, however, a fire burned out of control and consumed the entire facility. The fire began around 11 AM and lasted for approximately eight hours, creating a thick black smoke that blew east into the community within Census Tract 1160. Employees emptied several extinguishers before calling the fire department at 11:25 AM. In a conversation with L. Randall (1999), “the fire was well underway by the time the fire department reached the facility” at 11:29 AM, requiring twenty fire engines, HAZMAT trucks and personnel, medical workers, and more than 125 firefighters.

Organizational responses during the 1992 fire

After battling the fire for about an hour, the fire department made a decision to let the fire burn itself out. Fire department officials gave several reasons for this response including the late dispatch, the swift consumption of the facility, the rapidly changing wind direction, and the lack of knowledge of the onsite hazardous chemicals. Although the Emergency Planning and Community Right to Know Act (EPCRA) required that facility employees give the Phoenix Fire Department records of the chemicals used onsite, the files were outdated and stored in a location that was not readily accessible.

Two hours after the fire started, a firefighter requested that air monitoring be done in the area east of the facility because “smoke was banking down low to the northeast and settling throughout the neighborhood.” This request was ignored and no air samples were taken at any time during the fire.

Around 1:30 PM, approximately 800 pupils from an elementary and middle school were evacuated to elementary schools upwind from the fire. However, when these schools were dismissed two hours later, the students were bussed back into the smoke-filled neighborhood. Earlier that day, the Phoenix Fire Department had instructed the Police Department to evacuate community residents. Subsequent studies by the Agency for Toxic Substances and Disease Registry (ATSDR), however, showed that residents were not told to evacuate until three hours after the fire began. Only 69 residents left the area, even though approximately 1,800 homes were located in the path of the smoke plume. Residents also claimed that they were not warned to turn off their swamp coolers and air conditioners, which reportedly pulled smoke-filled air into area homes during the fire. Furthermore, even though the ADHS was responsible for informing residents of how to protect themselves from the smoke, this agency was not contacted until eleven days after the fire.

Eight hours after the fire began, the area was reopened, and the fire department declared the fire to be “under control,” that is, no longer visibly emitting smoke. Approximately twelve hours after the fire had begun, the fire department declared the incident to be “closed,” even though the fire smoldered for another seven days.

Health concerns after the fire

Immediately after the fire, residents in the area surrounding the facility reported numerous health-related problems such as blurred vision, nausea and vomiting, congestion, and rashes. Residents also noted that plants and animals unexpectedly died in the days following the fire. In addition, several residents mentioned the presence of ash and soot on their properties.

Because months passed with little government action, the community joined together to form the advocacy group Concerned Residents of South
Phoenix (CRSP), to draw attention to their predicament through press conferences and demonstrations. On March 20, 1993, they held a memorial service at the state Capitol; seven cardboard coffins were lined up in the Capitol mall to represent seven residents who had died in the months following the fire. Of the seven, five had lived only one block east of the facility. This event persuaded state officials to perform a mortality study to determine if the seven deaths represented a higher than normal rate of mortality. The mortality study compared the number of deaths in CT 1160 to the average number of deaths in the surrounding four census tracts and reported “there were ten excess deaths in that census tract during the period Sept. 1, 1992 through Jan. 31, 1993.” However, the report also declared that these deaths were not statistically higher than the number of deaths in the surrounding census tracts, and that the deaths were unrelated to the fire because the death certificates did not report fire as cause, and most of the victims were “elderly and already ill.”

Still believing the deaths to be unusual, CRSP consulted a researcher at Arizona State University, who concluded that the county had used the wrong formula in analyzing the number of deaths, stating that, “overall, the entire thing was terribly done.” The epidemiologist and vital statistics officer who conducted the mortality study admitted that the initial report was erroneous and that “deaths were significantly higher” in CT 1160 after the fire, but the epidemiologist did not perform follow-up studies based on these findings.

Residents continued to complain of illnesses they believed to be related to the fire and solicited ADHS to perform a health survey, hoping to confirm their suspicions. ADHS officials stated that it would be too expensive to do a thorough health study but agreed to contract with DWAZ to develop and administer a health survey in CT 1160. DWAZ developed the health survey with the assistance of a federal health agency and administered the survey under contract with the state health department. After receiving approval in April 1993 from ADHS to proceed with the data collection, the community group administered the survey to the neighborhood and returned the completed surveys to ADHS. Although Arizona government officials paid to have the survey done, they never analyzed the data, faulting the study’s sampling and data collection procedure.

At the time that the health survey was being performed, ADEQ began a sampling study of the neighborhood. Samples of soil and cooling pad materials were taken from eleven residences in the area surrounding the former facility. Results indicated that some metal concentrations were high enough to suggest anthropogenic deposition, and that metal concentrations were higher in the affected neighborhood than in homes that were outside the path of the plume. However, while the metal concentrations were observed to be higher, the difference was not statistically significant. ADHS finished their analysis in late 1992 and concluded that all concentrations were below Health-Based Guidance Levels, meaning that they were not high enough to cause adverse health effects. Critics complained that too few houses were sampled to get statistically accurate results, that “unaffected” homes were too close to the affected homes, and that an inadequate number of chemicals were analyzed.

Later that year, ADEQ hired Zenitech, an environmental consulting company, to perform a more extensive sampling study of the area. Soil, dust, air, and air-duct material samples were taken from 10 residences near the former facility, and from three “control” homes outside the contaminated area. Results showed that levels of fluoride and a few metals were slightly higher in exposed homes when compared to control homes. For a second time, results were sent to health officials at ADEQ to perform a risk assessment, and once again, results showed that at the levels present, the sampled chemicals posed no threat to the community. The facility then hired Environmental Toxicology International (ETI) to perform their own risk assessment using the Zenitech sampling study results. ETI’s risk assessment concluded, “measured chemical residues in the local residential area that may be related to the [facility] fire are of insufficient quantities to cause concern for health of area residents.”

Because results of the risk assessment were unable to link residents’ health symptoms to exposure from the smoke plume, ADEQ did not have legal ground to force the facility to decontaminate the neighborhood. Although facility officials arranged for contaminated soil to be
removed from the site, they refused to clean local houses, alleging that there was no proof that they were responsible for residents' health problems. Feeling unsatisfied with these measures, residents filed a civil suit against facility executives, calling on health officials, toxicologists, and modeling experts for help. On March 22, 1995, the case was settled out of court for $1.5 million, with an average award of $1,700 per person, which was an amount not sufficient to cover medical bills.\textsuperscript{15}

Still feeling let down by their government agencies, DWAZ solicited outside help from an EPA-funded, university-based technical assistance outreach program to help them analyze the health survey results.\textsuperscript{16} The university group analyzed the data collected by DWAZ to characterize health symptoms and determine if there were differences in reported health symptoms based on residents' proximity to the former facility.

Commonly reported symptoms included congestion and/or coughing, trouble breathing, dizziness, nausea and/or vomiting, blurred vision, rashes, numbness and/or tingling of the extremities, and loss of smell. Results also found that significant differences existed in the frequency of symptoms reported, based on residents' proximity to the former facility (Figure 2).

The overall pattern shows that the frequency of reported symptoms was highest for Area 1, and that the symptoms progressively decreased with distance away from the facility (Areas 2 and 3) and outside of the path of the smoke plume (Area 4). Also shown is the high percentage of residents afflicted with these symptoms. For example, in both Areas 1 and 2, approximately half of the participants reported congestion and/or coughing, and trouble breathing. Approximately one-third of participants in Area 1 and one-quarter in Area 2 reported dizziness, blurry vision, limb numbness, rashes, and nausea and/or vomiting.
DISCUSSION: ISSUES OF ORGANIZATIONAL FAILURE

Required organizational responses to chemical release events

The US EPA has written procedures, stipulated under Title III of the 1986 Superfund Amendments and Reauthorization Act (SARA), requiring facilities that have a chemical release to immediately notify the city’s Local Emergency Planning Committee (LEPC) and the State Emergency Response Commission (SERC) if any hazardous substances are involved. This notification must include:

- each chemical’s name and known toxicity;
- an estimate of the quantity of each chemical released into the environment;
- the time and duration of the release;
- information about the location of the release into air, water, and/or land;
- any known or anticipated acute or chronic health risks associated with the release, and if necessary, advice regarding medical attention for exposed individuals; and
- whether an evacuation has occurred.¹⁷

The ADEQ and the ADHS are also responsible for assisting after an environmental emergency. The Remedial Projects section of the ADEQ is responsible for the identification, assessment, and remediation of sites contaminated by hazardous substances. ADHS is responsible for identifying and measuring “exposure to selected environmental contaminants and associated adverse health effects.”¹⁸ During an incident, these agencies are responsible for: 1) stopping the chemical release, if possible; 2) advising local residents of the release hazards, including the chemicals involved and their associated risks; 3) informing residents of how they can minimize their exposure; and 4) ordering resident evacuation, if necessary.

After an incident, these agencies are responsible for: 1) identifying the chemicals involved and investigating their potential hazards (i.e., each chemical’s toxicity, short- and long-term effects, bioavailability, and possible synergistic effects); 2) measuring the community’s exposure (i.e., the number of people affected and exposure concentrations); 3) performing health studies if the public’s health is affected; 4) if necessary, taking air and soil samples to measure exposure; and 5) decontaminating the area, if the release warrants such action. Because many of these steps were not carried out in this case, we suggest that the following reasons may have impacted the agencies’ abilities to carry out these responsibilities.

Inadequate funding needed to enforce environmental policies

Lack of funding might have influenced the outcome of this case. In 1986, the Arizona Environmental Quality Act established the Water Quality Assurance Revolving Fund to help clean up contaminated sites and prosecute polluters. Between 1987 and 1990, the Fund received $5 million a year, but this amount decreased significantly in the following years and disappeared by 1996.¹⁸ In June 1993, a spokesperson for the ADEQ stated that “the department’s budget is already stretched to the limit,” and that ADEQ could not fund additional contaminated sites.¹⁹ The budget was so depleted that the Zenitech sampling study was “limited by time and financial considerations” and resulted in few samples being taken.¹² Finally, in a letter to the EPA, a spokesperson for ADHS stated that they had spent more than $250,000 on the fire investigation and that “these expenses are continuing to tap into the limited public health dollars of both ADEQ and ADHS.”²⁰ It was argued that the community “was quite successful in an out-of-court settlement,” and that ADHS needed to prioritize their money to get “the biggest bang for the buck.”²⁰

National funding for ADEQ also decreased, falling from 28 percent in 1978 to below 18 percent in 1990.²¹ States became responsible for making up the funding loss, leaving Arizona at a disadvantage with a Legislature that continuously limited the amount of funding allocated for environmental organizations; the Arizona Legislature decreased state taxes over the years, which was the largest source of environmental funding. A lack of funding might also have contributed to the contract being given to DWAZ for the purpose of
developing and administering the community health survey, which was considerably less expensive than if the study had been administered by the ADHS.

**Role misunderstanding and poor communication by government agencies**

Problems related to the sampling studies point to lack of communication in roles and responsibilities for the various agencies. ADEQ was responsible for identifying, assessing, and remediating chemicals released during the fire. ADHS was responsible for identifying and measuring chemical effects on a community and assessing potential adverse health effects. Arizona law states that ADEQ is the lead agency during environmental incidents, but that ADHS is responsible for attending to health issues that arise. The erratic evacuation procedures point to a lack of clarity in roles and responsibilities, in that both the Police and Fire Departments assumed the evacuation was taking place, but there was no oversight in actually carrying out the evacuation procedures.

**An unfriendly political environment**

An unfriendly political environment may also have impacted the outcome of this incident. An investigation by Hall and Kerr22 found that in Arizona, neither environmental nor community health issues have ranked high on the list of government priorities, and the state places low in these areas when compared to other states. Results of this investigation gave Arizona a “worst” ranking for environmental spending and effective environmental policies. The study concluded that Arizona’s political climate has promoted economic development at the expense of environmental quality. In 1992, ADEQ unsuccessfully attempted to increase its power to enforce environmental remediation, and in 1996, the Legislature placed a moratorium on any new enforcement actions by ADEQ.18

**Issues of environmental racism**

Residents continue to experience serious health problems years after the fire and view their situation as both a failure by government agencies to properly respond to a community health crisis, and as a case of environmental racism. Their assertion of environmental racism is aligned with the definition noted by Liu23 that environmental racism refers to “any policy, practice, or directive that differentially affects or disadvantages (whether intended or unintended) individuals, groups, or communities based on race or color.” The community’s perspective that the case was environmental racism was the result of a long history of having citizen complaints regarding the facility’s environmental compliance being ignored by state and federal agencies. For example, although the facility failed to comply with environmental regulations soon after it was built and smaller fires occasionally erupted in the facility, the facility was never closed or forced to make improvements. The South Phoenix area has long been used for siting chemical and manufacturing facilities; a 1996 study done by the ADHS found approximately 59 toxic facilities located in the South Phoenix area.24 After this facility burned down, a second facility was built two blocks away from the former plant.

Consequently, the neighborhood’s frustration with the governmental agency response to the fire, following a series of environmental mishaps, is understandable. The neighborhood asserts that government agencies were lackadaisical in their initial response to the fire by not taking air samples, by failing to evacuate the neighborhood, and for not completing the analysis of the 1993 health study. They firmly believe they would have been treated differently if they had been a Caucasian rather than an African-American community.

In May 1994, ADEQ tried to address environmental racism/injustices by initiating the Environmental Justice Project. The South Phoenix community was used as the subject for developing this project, and the goals were twofold: 1) “...to identify ways to protect the public health so that no community is adversely impacted by undue exposure to hazardous contaminants/ pollution;” and 2) to standardize the inclusion of environmental justice considerations into the development and implementation of its regulatory programs.25 Though this project was a step in the right direction, it was viewed by the community as being merely rhetoric rather than being an attempt to acknowledge citizens’ concerns and to rectify environmental inequities.
Challenges linking chemical exposure to human health problems

The inadequacy of current methods of risk assessment to link chemical exposures to health outcomes may also have influenced the outcome of the South Phoenix case. The decision in this case was based on a risk assessment that was calculated for each chemical for which measurements were taken, and from these measurements, community exposure concentrations were estimated. The exposure concentration of each chemical was compared to the health-based comparison value associated with the particular chemical.26

A health-based comparison value is a gauge used to measure the potential health risk associated with exposure to a particular contaminant in a particular medium (e.g., yard soil or indoor settled dust). These values are set by regulatory and health agencies and are based strictly on the toxicological risks associated with the contaminant.26,27 “If a contaminant in a particular medium is above the established health-based comparison value, then long-term, repeated exposure may pose a risk. EPA expects chemical concentrations at or below these values to be protective of human health for the long-term, repeated exposures. If sampling shows levels of contamination above these values, it does not necessarily indicate that human health would be threatened, but EPA would then recommend further evaluation.”26

In this instance, a standard risk assessment may not have been adequate to infer that health effects were a result of the fire. Air samples were not taken during the fire, and exposure concentrations were unknown. Thus, there were no real-time exposure data that could be compared to guidance levels, negating the practicality of performing a risk assessment. Additionally, risk assessments can only be calculated for sampled chemicals. Hence, even if an extremely toxic chemical was released in the fire, the chemical would not appear in the risk assessment if it was not measured in the sampling studies. Further, risk assessments are only valid for chemicals in which health-based comparison values have been calculated. Many of the chemicals released in the fire did not have health-based comparison values, and as a result, the adverse health effects were unknown.

Finally, a chemical may be calculated to have an exposure concentration below its health-based comparison value, but, in fact, may be toxic at a lower concentration if in the presence of synergistic chemicals.23

The above examples point to the operational and methodological problems inherent in risk assessment. To this date, residents in the South Phoenix community maintain that the health of their community deteriorated after the fire. Though there were insufficient data to show a statistical association between the levels of chemical residues found in the neighborhood and reported health effects, the 1993 DWAZ health study did show that residents living closer to the former facility reported suffering from symptoms more frequently than those living farther away (Figure 2).

Several government officials acknowledged throughout the incident that residents’ health problems were most likely a result of exposure to smoke from the fire. An ATSDR employee wrote, “respiratory health effects reported by residents living in the neighborhood surrounding the [facility] are consistent with those produced by direct exposure to high concentrations of irritant gases during fire conditions.”25 In a similar letter issued in April 1997, ATSDR summarized the incident by stating that both ATSDR and ADHS “have recognized that exposures did occur, and that residents who were exposed to smoke from the [facility] fire may have suffered health effects as the result of the fire.”28 However, as an ATSDR employee stated, “since no air monitoring was conducted at the time of the fire, ATSDR cannot conclude that the health effects reported by the area residents are directly related to the fire.”25 In the end, government agencies chose not to act to rectify the problems, basing their decision on the outcome of the sampling and calculated risk levels. They concluded that the contaminants from the fire did not pose a health threat to residents.

Recent research highlights the vexing issues that surface in such cases, with attempts to link symptom reporting to environmental exposures. Researchers recommend using qualitative approaches, including semistructured interviews and observational techniques to complement quantitative data and for including community participants in research.29,30
fact, it is now well-recognized that citizens from the affected population should be actively recruited to participate in the design and implementation of research to better document the links between exposure and disease.\textsuperscript{29,31} In instances in which the science is incomplete with respect to environmental health and justice issues, the Institute of Medicine\textsuperscript{29} urged policymakers to exercise caution on behalf of the affected communities, particularly those that have the least access to medical, political, and economic resources.

In the case of South Phoenix, members of the neighborhood were likely the best available source of information regarding exposures, including multiple exposures or routes of exposure. Resident stories identified patterns of illness that appeared in the health study but were never documented in the healthcare delivery system, nor considered in the risk assessment deliberations. Health symptom data collected by the community residents were ignored, despite the fact that the survey was designed with the help of the government agency. To this day, residents blame the state government for not forcing the facility executives to clean up their houses immediately after the fire. Most residents are poor and cannot afford to move out of their homes, and the stigma of the fire has considerably decreased area property values.\textsuperscript{32}

\textbf{Case study elicited a wakeup call}

Although South Phoenix residents’ health issues were never resolved, their problems did provide a wakeup call to the Arizona government and Phoenix Fire Department. Members of the South Phoenix community were so persistent in their outcries that ADEQ applied for and received a grant from the EPA to improve their response to environmental emergencies. As a result, ADHS now has four people on call 24 hours a day, who respond to environmental emergencies. ADEQ remains the authority at emergency sites, but ADEQ notifies ADHS when health issues arise. As a result of this case, ADHS also developed a standard health survey for analyzing residents’ health effects after a chemical release incident.

ADEQ’s Division of Emergency Management also received a grant to improve the response to chemical fires. As a result of this “Boulder Project,” the Phoenix Fire Department has improved its system for communicating with hazardous facilities. Information on the hazardous substances used at a facility is stored on a single computer database where it is continuously updated and can be instantly accessed using a laptop and modem by firefighters. This provides firefighters advanced knowledge of the chemical hazards involved so they can decide how best to respond to the release and protect themselves and at-risk communities.

\textbf{Conclusions}

We found obvious discord between the articulated interests of residents involved in this environmental release incident and those of the government agencies responsible for their protection. It is now obvious that the government agencies were remiss in the handling of this situation by failing to gather appropriate data in a timely fashion and failing to protect the community from the incident, both prior to and after its occurrence. The article is not meant to discount the very effective responses to environmental emergencies that state and federal agencies often deliver, despite limited resources and personnel. Furthermore, it will never be possible for health authorities to be completely prepared for environmental disasters. However, the case study demonstrates how important it is for emergency response and public health professionals to respond immediately to community concerns in events such as these and to provide leadership in the aftermath, including being attentive to and respectful of community health concerns. This requires collecting and analyzing appropriate health and environmental data in a timely manner. Prompt analysis of environmental and survey data might have allowed for identifying medical and/or public health interventions targeted at those living closest to the fire, with the intention of lessening long-term chronic symptoms. At the very least, analysis of the survey might have demonstrated to the community that their efforts to contribute to the data collection process were not in vain, and that their own experiences with the incident were heard and valued by the government agencies.

There is no current method or collection of methods for properly assessing the actual risk to a community of
any particular environmental action. This demands that community members be involved in evaluating environmental risk in their communities, using more comprehensive tools that also consider unusual and excessive exposure patterns and other factors that contribute to elevated susceptibility to adverse health effects. This is particularly true in the case of South Phoenix, where the community shares a disproportionate burden of environmental risk and has not benefited equally from past environmental regulation.

Finally, the case study provides an example of how important it is for community-based organizations to work in coalition with government agencies, industries, and policymakers to affect changes in regulations to strengthen the capacity of local authorities to protect community environmental health. While the community was unable to convince the government officials of the link between plume exposure to health concerns in the community, the improvements that did occur to the environmental emergency system results at least in part, from the vigorous and sustained political and legal efforts made by the community residents.

Alexandra Degher, PhD, Department of Civil, Construction, and Environmental Engineering Oregon State University, Corvallis, Oregon.

Anna K. Harding, PhD, Associate Professor, Department of Public Health, Oregon State University, Corvallis, Oregon.

REFERENCES
ABSTRACT
This article describes the efforts of the Western State Hospital (WSH) GO TEAM staff to develop a mental health, disaster response program based on their own Critical Incident Stress Management (CISM) team. Four social workers from WSH were deployed to eastern Virginia following significant flooding caused by Hurricane Floyd. Their experiences and the lessons they learned are detailed in this article.

INTRODUCTION
In 1995, The Virginia Department of Mental Health, Mental Retardation, and Substance Abuse Services (DMHMRSAS) asked Western State Hospital (WSH) to develop a mental health, disaster response program called the GO TEAM. Our Critical Incident Stress Management (CISM) team had caught the attention of headquarters because WSH, which is located in the Shenandoah Valley, had a formally trained CISM team. A few other state facilities had initiated employee support teams, but none were specifically trained under the International Critical Incident Stress Foundation (ICISF) protocol (the Mitchell CISM model).

Although catastrophic disasters have occasionally occurred in Virginia, the GO TEAM concept may not have been developed if the 1993 bombing of the World Trade Center and the 1995 Oklahoma City Murrah Federal Building bombing had not occurred. These events awakened a new sense of worry and a fear of terrorism in the United States. Until that time, we had been insulated from what many other nations in the world had experienced—terrorism on our shores.

HISTORY
During the 1990s, Virginia experienced periodic, severe flooding. The Commonwealth’s DMHMRSAS predisaster planning priorities were partially influenced by Hurricanes Hugo (1989) and Andrew (1992). During these disasters, public, community-based, mental health services were off-line in some areas for many weeks. Mental health centers in Virginia are called Community Services Boards (CSBs), and the Rappahannock-Rapidan, Valley, Harrisonburg/Rockingham, and Rockbridge CSBs had all experienced catastrophic flood damage within their boundaries, particularly in rural clinic areas. After the massive floods of 1995, John DePerro, an engineer with the DMHMRSAS central office, expressed his concerns about postdisaster operations. His descriptions of the devastation that could occur in the tidewater area in the event of a category 3, 4, or 5 hurricane hitting Virginia’s shores directly are legendary. Although population density has appreciably increased, the roads and interstates to be used as escape routes have not been improved.

Historically, large-scale hurricanes that hit the Virginia mid-Atlantic coast directly wax and wane in intensity in 20 to 25 year cycles. In the current cycle, we can expect larger and more deadly hurricanes to affect the coast of Virginia. The last large-scale storm cycle occurred before the huge increase in population and residential/commercial building in the tidewater area. In a category 3, 4, or 5 hurricane, John DePerro predicted eight feet of water in downtown Norfolk and Virginia beach, with thousands dead and injured. He also predicted masses of people stranded on the Interstates, some dying in their cars, as the primary Interstate out of the tidewater area is occasionally under water from flooding. Escape route infrastructure has not kept pace with disaster route needs.
DMHMRAS was originally designed to respond to natural disaster events, specifically hurricane wind and water damage, (primarily in the tidewater areas), an occasional tornado, forest fires, and flash flooding. We have since learned that the Shenandoah Valley is on a major fault line and that the area experienced a 5.8 earthquake in 1897, increasing the importance of earthquake disaster planning.

DMHMRAS had very little money to assist the hospital in developing a team. WSH received $2,000 in seed monies to outfit 16 members with enough basic gear. Following a large disaster, there is often no available housing for the victims or disaster responders. The WSH team had enough camping gear, medical supplies, and food provisions to be self-sufficient for up to seven days. Teams of four would be deployed, with the rotation of other teams of four, depending on the severity of the event. Initially, we expected we would assist the CSBs immediately following a disaster, before most formal response agencies were in place. The primary focus would be to fill in for the CSBs when a disaster of catastrophic proportions had occurred in which the CSB staff themselves were disaster victims.

**Hurricane Hugo**

Joseph Bevilaquia was the Virginia Commissioner of Mental Health when Hurricane Hugo caused catastrophic damage in South Carolina, with massive flooding in the coastal areas and severe wind damage inland. He is credited with developing the state-sponsored, public, mental health GO TEAM design.

During Hurricane Hugo, the storm surge pushed as far as 15 miles inland. Whole communities were without supportive infrastructure, and mental health employees were victims themselves, many losing their homes, vehicles, and the mental health clinics in which they worked. Transportation was at a complete standstill; many roads were washed out, either covered in sand, or impassable due to debris. In some communities, individuals with serious mental illness, substance abuse or addiction problems, and mental retardation had to fend for themselves, as there was no one to meet their therapy, case management, crisis intervention, or pharmaceutical needs.

After Hurricane Hugo, Dr. Bevilaquia became South Carolina’s Commissioner of Mental Health; he realized that public mental health hospitals that were not directly affected by the storm had clinical and support staff resources. The public psychiatric hospital staff could be moved to community locations within the disaster area to provide crisis counseling to storm victims and could operate the community-based, out-patient programs when clinic clients and personnel were affected.

The Virginia Department of Stress Intervention provided the following account of the CSB’s attempts to deal with the crisis:

Of the seven offices operated by the Charleston, South Carolina CSB, five were destroyed and declared unusable by the local building code official. In a desperate attempt to become operational, the CSB leased office space, which was costly and required a multiyear lease. Many of the vehicles owned by the CSB were damaged beyond use. The CSB director was trapped in his house by fallen trees. He was rescued by a central office worker who went to the director’s home looking for him. Half of the staff did not report to work until seven days after the storm, and the CSB leadership did not know if these individuals were alive or dead. One employee who did report to work revealed that her home and all her belongings had been destroyed and that she and her nine-year-old daughter were living out of her car. The daughter was staying in the car in the parking lot while the mother was at work. The State Department of Mental Health sent trucks and workers who helped the CSB move the furnishings, files, and office equipment to safe storage out of the disabled buildings.

**The Saga Begins**

Pat Higgins, LCSW, Christy Cacciapaglia, AA,
Allison Bell, BS/RNS, and I (Susan Frushour, BA), who are all social workers, represented the GO TEAM from WSH in eastern Virginia following significant flooding caused by Hurricane Floyd. We left for Franklin City on September 24, 1999. Our assignment called for us to be linked with the Western Tidewater CSB, whose catchment area was Southampton County, including the cities of Suffolk and Franklin. With the hospital’s petty cash in our pockets and a truck full of disaster gear and supplies, we were on our way.

- Make sure that the team has an adequate understanding of the agency they are to link with and that they have advance knowledge of the demographics, geographic boundaries, and extent of the effects of the disaster on both the agency and the catchment.

- In advance, make sure that all equipment issued meets the needs of the users.

We were told we could not get there, but we went anyway. Finding a route to Franklin that was not washed out or closed due to high water was difficult. In Virginia, 130 secondary roads and portions of four interstate highways were closed. After many phone calls to the State Police and Virginia Department of Transportation (VDOT), we were able to develop travel route plans. A normal three-hour commute took us eight hours after circumnavigating closed roads and bridges.

We arrived after dark to find a town that appeared to be under siege. Approaching the downtown business district, every corner was cordoned off by State Police or the National Guard. Fire trucks, ambulances, and other emergency vehicles representing HAZMAT, FEMA, EPA, VDOT, city police, Sheriff’s office, Salvation Army, and Red Cross lined the streets on the periphery of the area; 28 agencies were represented.

Although we were exhausted by the end of the day, we were eager to get a sense of the area, and the National Guard allowed us to go beyond the barricades into the perimeter surrounding the disaster area. The water in Franklin’s downtown, a district containing 180 homes and 156 businesses, was finally receding after submerging the town for 15 days. The next day, officials planned to complete an assessment as to when the town would be safe for re-entry for civilians and business owners.

The danger of contamination from raw sewage and chemicals, which poured into the floodwaters from a fuel company and the Union Camp paper mill, caused the greatest concern. Large fuel silos, which had become detached from their moorings, were floating in the area, along with 360 55-gallon drums of unknown chemicals. A tractor-trailer of gasoline had turned over on its side. Butane and propane fuel containers for gas grills and home heating were buzzing around in the water as their nozzles came loose. The potential for fire was enormous. Many homes on the periphery had been evacuated for over two weeks as a precaution, in case a fuel tank blew up or the fuel-laden waters caught on fire. The restricted area consisted of 180 homes and 156 businesses damaged by the floodwaters and hundreds of others that had been without electricity for over two weeks. Of all these, only one business owner had flood insurance.

The harsh odor of petrochemicals filled the air, causing our eyes to tear. We worried that prolonged exposure could cause our eyes and noses to become severely irritated. Many homes directly across the street from the damaged areas were also vacant, as they had been without running water and electricity for two weeks. After our trip to the restricted zone, the State Police provided escort for us to the Incident Command Center (ICC) and Emergency Operations Center (EOC) where we registered our availability. I was impressed with the Incident Command model implemented by the Fire Chief. At the Hunterdale Fire Department/EOC, we learned that we should not have been allowed into the cordoned-off area. HAZMAT passes would be given later to those allowed to enter the area. Home and business owners, disaster response workers, and other state and local officials could enter only after the EPA and Virginia’s Department of Environmental Quality granted admission.

- Make sure the area is approved before entering.
Finding lodging for the week was no easy task. Flood victims and the response agencies already in the area occupied many rooms. The entire telephone system was down, and rooms that had been reserved before the flood could not be confirmed or cancelled. We finally found the last known available room, but there was no assurance we would have it the next day.

- Anticipate that communication systems may not be operable. Bring reliable, lightweight cell phones and walkie-talkie systems.

- Bring a letter of reference to facilitate direct billing for room accommodations.

- Assign a logistics officer to arrange for transportation and housing and to learn about the community demographics. Find out about comfort services available to the disaster response workers; i.e., food operations, restaurants providing meals to disaster responders, medical services, etc.

- Contact other state agencies with experience in disaster response. The Virginia Department of Health has a protocol for setting up lodging and food systems and had established an account with Walmart for responder incidentals. They also coordinate medical assistance for disaster workers. Check with the local department of health emergency coordination teams to make them aware of your presence and location.

Due to our late arrival, we did not get to the clinic in Suffolk on the first day. I called the CSB clinic director to ask if he could meet with us the next day in Franklin. Since we did not get our formal assignments until the third day, we took advantage of that time to acquaint ourselves with the community, the town’s geography, and the location of relocated city services. Many of the city’s key infrastructure agencies and offices were flood victims themselves. The city building, city council, mayor’s office, chamber of commerce, police, fire, rescue squad, telephone company, courts, jail, probation offices, health department, social services, post office, and funeral homes had been relocated to dry land. We were struck by the lack of coordination between the flood response agencies, which was complicated by the lack of an operable telephone system. Many flood victims had lost their housing and their vehicles. Consequently, victims had difficulty finding relocated agencies and services without available transportation and communication.

- Ask the central office or facility to consider arranging for the federal government’s exclusive emergency telephone system (three bandwidths reserved), for agencies on the federal, state, and local level, to facilitate communications during disaster/emergency situations.

We introduced ourselves to the Franklin office of the CSB, not realizing until later that day that the clinic personnel were disaster victims themselves. Our blue vests allowed us to get in and out of the disaster area and lent credibility to our presence, and they allowed civilians to approach us with their concerns and needs. During our first morning in Franklin, a flood victim and her supervisor approached us at breakfast and told us that two employees had lost everything in the flood. The company’s regional manager would not adjust their schedules to allow them to get to agencies to seek disaster relief services. Our first self-assignment was to the Salvation Army to obtain food baskets for both, and clothes and hygiene supplies for one employee who swam out of his home with only the clothes he was wearing. After we brought them the supplies, we arranged for services for a man who was displaced from his apartment. His care provider approached Allison and Christy with a request for intervention while we were at the Salvation Army. This elderly, frail, flood victim, who was on oxygen, was relocated to a room without heat. Allison arranged for a Red Cross nurse to help him move to a more appropriate heated setting and arranged for follow-up care. We then assisted a diabetic veteran with a severe and persistent major mental illness, who was without...
insulin, his special diet foods, and psychiatric medications. For two weeks, he had been without consistent shelter and his medications. In addition to being traumatized as a victim, he was also evicted from shelters as he became more agitated, hostile, and menacing, due to his mental illness. Allison, Christy, and Pat arranged for a special dietary food voucher, and we linked him with a few relief agencies to help him get back on track.

In the middle of the afternoon, a representative from the CSB/Mental Health Center met us. I was placed in the EOC/ICC at the Hunterdale Fire Department, due to my background in critical incident stress management. The others were sent to distant counseling rooms at the community college and an industrial park.

During the eight-day response effort, I kept a journal of our experiences and lists of all the things that we knew would assist us the next time the team was deployed. We spent a few hours every evening processing the events of the day. On the third day, I was assigned to the ICC, where I met with city officials and the first responder community, learning the roles played on the federal, state, and local level. In disaster situations, many communities have a designated ICC. The young, proficient, very exhausted ICC chief had a number of problems with very tired and weary personnel. The first responder community and local government employees had been working 18-hour days since the floodwaters had risen two weeks before. Some were flood victims themselves, with tempers flaring and emotions running high. Arguments were beginning to develop as people had less physical energy and emotional reserves available.

He asked for suggestions on how to manage interagency conflicts and turf issues among the many agencies represented at the ICC. Throughout the week, he would seek me out and ask for coaching and guidance in managing difficult personnel situations. Establishing relationships with the Franklin City and Southampton County first responder community proved invaluable, as we would need their help, assistance, and transportation in the days to come. In this setting, I primarily provided emotional first-aid in small groups or one-on-one consultation. I met with angry business owners, handed out HAZMAT authorizations, provided information and referral, and linked people with relocated agencies. Unfortunately, Pat, Allison, and Christy had unproductive experiences, as they were stuck in far-away places, where no one came for counseling assistance on their first day of formal assignment.

- One of the first tenets of disaster work is to go where the people are; victims do not take the time to seek out mental health services.

At 4 PM on Saturday, FEMA personnel came to the ICC and said that they would be in Franklin through Thanksgiving, due to the level of destruction. Buildings and their contents were saturated with flammable petrochemicals as they soaked in the water for 15 days, and many buildings were structurally unsound. Some homes were too unsafe to be entered, and owners were notified that they could not enter, not even to retrieve a few treasured family possessions. After two weeks under water, floors and ceilings had caved in, and some homes were visibly sitting on an angle, tilted to the side. The next day the team returned to the remote counseling site, which was locked for the weekend and unavailable. I called the clinic representative and said that we wanted to renegotiate the team’s assignments, which we continued to request throughout the entire stay. Inactivity would quickly demoralize and cause stress for the team members. At that point, we realized the community mental health system was not sure what to do with us. We had a serious credibility problem, with the potential to derail our response effort; we had to earn the clinic’s respect.

- Determine before arrival if the locality requested assistance or if they feel assistance is being imposed on them by headquarters. The deployment might not change, but the knowledge will provide a better understanding of the “unwritten agenda.”

**RESIDENTS AND BUSINESS OWNERS RETURN**

The EOC/ICC paged us early Sunday morning, requesting that we start providing one-on-one counseling services for disaster victims. After three weeks, the home
and business owners were finally allowed into the flood zone under police escort, in groups of five cars at a time. At the re-entry point (the decontamination site), many of the disaster victims were clearly devastated after their return to their homes and businesses. Repeatedly, we heard, in sobbing voices, “I never knew that it would be this bad.” Businesses and homeowners gave the police a list of 10 items they wanted to salvage. Sanitation and public safety were major concerns. The EPA and the Commonwealth’s Environmental Quality and Health Departments worried about the risks of exposure from contaminated buildings and belongings. West Nile virus and encephalitis were thought to be a real possibility from mosquito bites. Flood victims could only re-enter the community after having their vehicles, items, and boots decontaminated.

The ICISF representatives found us riding through town just as we were paged by the EOC. ICISF followed us to the ICC, honking the car horn, requesting our involvement. We later felt that the credibility we earned with the ICISF representatives and our presence the day before at the EOC made a considerable impact on the CSB and on our ability to fit into the clinic’s flood response system.

I continued my assignment early Sunday at the EOC/ICC, which was in a large, empty fire station. Areas were portioned off to various ICC entities; National Guard, Forestry Service, Coast Guard, etc., and the city government had representatives from its various divisions. Two large, makeshift rooms were set up to provide privacy to the logistics and command divisions. National Guard personnel were stationed outside of each of these areas to ensure safety and order. A local first responder official asked me to meet with a city employee. Another public official asked if I would intervene with managing someone who was clearly overtaxed with emotional and physical exhaustion and was not making sound decisions. This manager’s behavior was causing problems for others who were threatening to mutiny if this employee was not counseled about the destructive behavior, the need for rest, and how the behavior was causing major problems for others. Two other first responders, who were making unreasonable demands, which was out of character and reflective of their stress levels, also needed to be managed.

A very angry, loud, and tearful business owner came to the center demanding immediate attention when there was no staff member available to answer a specific question. The owner was irate. He was questioning policy decisions loudly and assertively and was becoming potentially aggressive. I intervened and talked about having been a flood victim myself, as a home and business owner, and was able to connect through mutual experience. The volatile situation calmed down, and the business owner waved and talked to me periodically when we ran into each other for the rest of the week. Interestingly, the business owner’s spouse, one year later, contacted me, asking for assistance in dealing with issues related to the anniversary of the flood.

The other team members went to the re-entry point where they established our base operations for the rest of the trip. Later that day, I joined them, and a police officer took us on a riding tour of the downtown area to help us get a sense of what the business owners were seeing. We stationed ourselves across the street from the Salvation Army food truck, which tuned out to be a smart move. Both citizens and first responders came to the corner to rejuvenate themselves. As we earned the trust and respect of the first responder community and other state and federal agencies, civilians in acute distress were physically brought to our corner or referred to us. We followed up some of these referrals in person, and some we referred to another formal agency in Franklin.

Allison and Christy went out on a referral for stray animal retrieval. They assisted the woman who rescued animal flood victims (20 stray cats and 14 dogs) with cat and dog food supplies, and on one occasion, helped the Dog Warden catch the dogs that had gotten loose from a woman’s fenced-in yard. Allison and Christy delivered cat food and accepted a donation for additional animal supplies from one of the ICISF staff, a former police officer with a great affinity for animals. Occasionally, members of first responder management came to our area to express their exhausted angst. After we allowed him to vent his ire in private, one official said that the process of talking with us helped him manage his anger and kept him from “punching a prominent employee in the face.” Our availability to
the agency and civilian population, in a confidential and supportive environment, seemed to be one of the most productive services we could provide.

On Monday, we went to the Franklin Mental Health Center to reintroduce ourselves, and I apologized for not being attentive to their needs as disaster victims. Their clinic was one of the worst damaged businesses. We later realized that the abrupt reception we thought we had received from the clinic staff and from a few other human service agency personnel was a reflection of disaster related stress. A few days later, we arranged to provide a debriefing for a group of people.

First impressions in disaster situations can be inaccurate. Be patient and remember that people are responding to a traumatic and abnormal situation.

We learned a lot about team composition and cohesion throughout our trip and commented to each other on this frequently. We all assumed unique roles. Pat was the chief clinician and driver; I was the team captain, scribe, and CISM manager; Allison was the registered nurse/social worker; and Christy was the social work case manager. Complementary team member personalities were important for living in close quarters while working long hours with little privacy. Members need to be independent, assertive, and know intuitively when to “step back.” They also need to know when to prompt another member to take a break, without being overbearing, intrusive, or smothering. Team members must recognize their physical and emotional limits.

Team members must be mature enough to know their limits and willing to accept guidance from other team members when they are taxed emotionally or physically.

An entry from our log reflects working conditions and stress levels and how these affected us in our day-to-day work.

Allison and Christy found a man sobbing in his front yard. He was in his early 50s and disabled. He could not lift more than 10 pounds. His wife was terminally ill with cancer. He had just returned to his apartment for the first time. He had no insurance, and they had lost everything they owned. His landlord notified him that day that he must salvage his few possessions, and he had no one to help him. He had recently bought his first new car and it was destroyed. The team found two young Mormon men, who were glad to have a “family to adopt.” They also called a community volunteer at the ICC and requested that she find a church group to help the family with their recovery and relocation efforts. They provided mental health and situational counseling, assessment, referrals, and arranged for services.

At the request of the Southampton Sheriff, Pat, Allison, and a deputy visited a low-income community of approximately 30 homes, most of which were uninhabitable. None were insured and all contents were destroyed. They went from house to house, offering support, providing information and referral, assessing emotional needs, helping to prioritize tasks, and handing out assistance packets on how to start over. Frequently, we found that a shoulder to cry on was as helpful as any other service. We went to the YMCA to find a list of people willing to do laundry for flood victims and provided the residents with the information. The small, single-family dwellings in this community were submerged to their ceilings in water. Every home was condemned. The Sheriff requested that we provide a presence, as the homeowners were led back to their community for the first time. The residents found total destruction of their homes and then received the bleak news that they could never return. We found a young couple standing in front of their home, which had been condemned, appearing devastated and dazed. They wanted to salvage their family Bible and the wife’s jewelry, but neither of them were dressed appropriately to enter the home. We volunteered, and after breaking out a few windows, we found their few mementoes.

On the 28th, Pat and Christy, again at the request of Sheriff Frances, went under escort to
Dockside, a small, middle-class community on the North Carolina border. The Great Dismal Swamp and the Nottoway and Blackwater rivers surround it. It had a restaurant, four trailer homes, and 16 single-dwelling homes all located on canals. All the homes and the restaurant, except for three recently built homes on stilts, were under water. A park bench was balanced on top of a second floor window air conditioner unit on one of the homes raised on stilts.

On the 29th, we returned to the Franklin Mental Health Center to escort the staff to their clinic for the first time. By then, it had been flooded for three weeks. We first prepared them for what they would find. I had seen the clinic for the first time three days before. The neighborhood was completely deserted.

It was one of the worst flooded buildings, being fairly close to the river. The ceiling had caved in, bright pink insulation was hanging down, and front windows were broken out. Watermarks were 10 feet high. The Shenandoah Valley floods of 1985 had affected my home. I was suddenly immersed and unexpectedly overwhelmed by such sad feelings, as if my home had been destroyed only yesterday.

Do not send members into the community alone. If a member is hurt, or in a dangerous situation there should be someone to respond to the emergent condition.

With a caravan of vehicles, we drove into their city. It was the first time that any of the clinic's personnel had been into the downtown area. We could hear quiet sobbing as we drove down the hill, getting closer and closer to their site. Creative, quick use of a flashlight as a hammer helped us gain entrance, as the doors were swollen shut, warped, and stuck shut. We climbed through a window and Pat kicked open uncooperative office doors. The stench of decay, sewage, and river muck was awful, as portions of offices still had standing water in them. By this time, we were impervious to the petrochemical smells. Wet and slimy ceiling insulation was hanging down on our heads, and we walked and climbed over a number of large, slimy, obstacles. We wore masks on our faces, knee-high boots, long pants, and thick, industrial-strength rubber gloves to prevent contamination. Armed with flashlights, we peered into offices to assist the Western Tidewater staff in salvaging, their few personal items. We would occasionally hear a cry of joy, as one staff member after another found something important. While at the clinic, we received a Page from the facility. The Tarboro dam had broken, and a social work friend was worried for our safety.

- Do not enter structurally compromised buildings until first approved by the local jurisdiction’s building inspector. When you do enter, wear hard hats.

On the eighth day, we headed back to the hospital with mixed feelings, as we returned home. The transition from disaster to the real world was difficult. It was ironic that by the time we knew our way around the city and had finally found our niche in the recovery process, it was time to leave. We left with some sadness, because we would not be there to assist as the remaining homeowners were returning to their houses for the first time. We read a nice article in the local paper the morning we left, mentioning our “noticeable” presence in the flood area. The city's downtown area, which we believe will recover eventually, will change. The complexion of the city and a part of its history will be changed forever. Many of the homes will be torn down. Zoning will take place to prohibit rebuilding. Many people will remain displaced without the financial means to restart. Nationally, in business districts that have experienced catastrophic damage, of the businesses that reopen, 50 to 70 percent fail.

It was an exhausting endeavor, but oddly enough, one of the most enjoyable lifetime experiences I have had, and I feel the rest of the team echoes this. As a result of this experience, I feel closer to the team and know that we have a bond that will last a lifetime.

Susan Tydings Frushour, Emergency Manager/LHRC Liaison, CISM & Disaster Response Coordination, Western State Hospital, Staunton, Virginia.

REFERENCE
1. Interview with Virginia Department of Stress Intervention, Lennis G. Echterling, PhD, VDSI Project Supervisor, James Madison University, Psychology Department Johnston Hall, Harrisonburg, Virginia. 22807, March 13, 2002.
In the aftermath of the attacks on the World Trade Center in New York City on September 11, 2001, governments and first response agencies in Ontario became acutely aware of their vulnerability. While individual organizations had achieved various levels of readiness to respond to major or complex emergencies, there was a clear need for greater cooperation at all levels of government and among first-response agencies.

This article describes how the Office of the Fire Marshal (OFM) maximized the opportunity that resulted from this event to develop a collaborative and systematic approach to multiagency training and education. The systems of collaboration continue to contribute to increased multiagency readiness at the municipal, regional, and provincial levels throughout Ontario. This was evidenced in response to the SARS outbreak and the major power outage that were experienced in the province of Ontario in 2003.

Emergency Preparedness Project

In the immediate shadow of the attacks on the World Trade Center, the OFM initiated an emergency preparedness project. The comprehensive project goal was “to ensure that a competent, multidisciplinary team is available on a province-wide basis to respond to large-scale and/or complex natural or human-caused emergencies in a planned, coordinated, and timely manner.”

The achievement of this goal requires continuous evaluation, monitoring, and improvement of response readiness in relation to emerging threats, pressures, and practices. It was recognized immediately that training would become a major focus within the project.

Preparing to Respond: A Two-Part Approach

The emergency preparedness project comprised a two-part approach. The first part of this approach was to develop a comprehensive provincial response strategy that partnered with existing agency networks within the province. The provincial response strategy was developed in response to a survey of existing response capabilities. The survey results, along with discussions with key stakeholders, assisted in the development of appropriate goals and strategies. The second part of the approach was to develop a framework of multiagency decision makers who would collaborate and provide assistance to training and education programs within the province.

The following sections outline the comprehensive provincial response strategy and the interagency training and educational system.

Part One: The Comprehensive Provincial Response Strategy

Level One: Municipal and Community Response

In Ontario’s system of emergency management, the municipal government must act first to attend to the public’s emergency needs. Agencies such as fire, police, and emergency medical services are usually the first to arrive at the scene and respond to an incident in keeping with their agency-specific Standard Operating Guidelines (SOGs) and in accordance with their legislative frameworks.

When an incident involves a response to hazardous materials, the expectation is that all municipal and community response agencies throughout the province have the capacity to respond to a level one response. Level one response teams within Ontario are expected to respond according to the awareness
level defined by the National Fire Protection Association Standard 472 (NFPA 472): Standard for Professional Competence of Responders to Hazardous Materials Incidents (2002, Edition). This means that all responders should be able to recognize the presence of hazardous materials and take appropriate safety precautions, secure the scene of the incident, and call the appropriate authorities for assistance.

**Levels two and three response teams**

When advanced support is required to respond to emergencies, assistance may be available through agreements within mutual aid systems or from contracted service providers. When incidents involve hazardous materials and the community has declared a municipal emergency, level two and/or level three response teams who have partnered with OFM may be activated by the Provincial Operations Centre (POC), which is operated by Emergency Management Ontario (EMO). These teams support the local community in the response.

Level two response teams, who are trained to the operations level as defined by NFPA 472, come from fire departments that have partnered with OFM and are strategically located throughout the province. The responsibilities of Level two teams include incident analyses, identification of hazards, containment, and decontamination.

The level three teams, who are trained to the technician level in accordance with NFPA 472, are prepared to locate and rescue victims in the hot zone, establish procedures to control the hazardous release, ensure that appropriate levels of decontamination are implemented, and safely terminate the incident.

**Activating provincial and federal resources**

The POC receives requests for assistance from regional fire coordinators who coordinate mutual aid systems for local communities throughout the province. Fire coordinators identify the details of the incident and request resources to mitigate the emergency. Upon approval, the appropriate level of response team is activated. As warranted by the situation, the Ontario Provincial Police (OPP), Provincial Emergency Response Team (PERT) and the OFM Emergency Response Team (ERT) may provide response support. This can include the provision of mobile command posts, protective clothing, or radio and satellite communications systems, along with individuals who are prepared to offer advice and assistance. The provincial response teams work in cooperation with appropriate multiagency responders as required by the nature of the incident.

Depending on the nature of the emergency, provincial ministers may be delegated to take the lead in handling certain emergencies. (For example, a toxic spill would fall under the Ministry of the Environment, while major nuclear or radioactive emergency response would be the responsibility of the OFM and coordinated through EMO.)

Access to federal assistance is also coordinated through EMO. This includes notification or intervention in incidents that involve federal jurisdictions, such as war, or where federal lands are concerned. The federal government, through the Royal Canadian Mounted Police (RCMP), has primary responsibility in the event of suspected terrorist incidents.

**PART TWO: MULTIAGENCY COLLABORATION ON TRAINING AND EDUCATION**

When this project was first established, the OFM wanted to ensure that all training and educational initiatives targeted the appropriate groups of responders and agencies, that the course content was appropriate for each target group, and that the courses developed were coordinated with those being offered by other agencies. For these reasons, it was determined that a systematic and comprehensive approach would be developed through the appointment of a multiagency committee so that the appropriate input, feedback, and recommendations would be received to support the development of an emergency preparedness academic unit.

**Emergency preparedness/response core planning committee**

To initiate a systematic and comprehensive approach to training and education, the multiagency emergency preparedness/response core planning committee was established. The committee’s mandate was to provide advice and recommendations on the
development and coordination of all training projects that resulted from the OFM-led government initiative for multidisciplinary team response to large-scale or complex emergencies. This committee now has representatives from more than 15 agencies that include fire, police, emergency medical services (EMS), EMO, emergency health services (EHS), public health services, and hospitals. The committee meets regularly to share information and discuss issues that relate to multiagency training and education and to ensure that there is a coordinated approach to multiagency training initiatives in Ontario.

**Multiagency course planning work teams**

In addition to providing advice and recommendations on training projects, a key responsibility of committee members is to assist the OFM by providing appropriate agency-specific work team members to assist in the development of course materials.

Multiagency work teams are established to collaborate on planning, development, and delivery of training programs to ensure that their separate and collective needs are met. By using multiagency work teams appointed by the core planning committee, the OFM is assured that all agencies address the appropriate course content, that the courses meet the educational needs of the targeted groups, and that the courses are coordinated throughout jurisdictions and agencies.

**EMERGENCY MANAGEMENT CENTRE OF EXCELLENCE**

The courses that have been developed to date are part of what will become the Emergency Management Centre of Excellence. Physically, the Centre will operate from the grounds of the Ontario Fire College (OFC) located in Gravenhurst, Ontario. The OFC is expanding its capabilities beyond the fire service to ensure that program delivery capability, registrations, certificates, and other student administration and record systems are established in keeping with the needs of this multiagency initiative. The multiagency education and training initiatives currently available are delivered through the OFC and will become a key part of the Emergency Management Centre of Excellence. The courses were designed by multiagency work teams who were appointed by the core planning committee.

The following sections provide an overview of courses that have been developed through this process to date. We believe that the collaborative way in which these courses have been developed contributes to the overall project goal.

**COURSES THAT SUPPORT LEVEL ONE TEAMS THROUGHOUT THE PROVINCE**

The **Terrorism/Hazardous Materials Awareness for First Responders in Ontario** self-study course is available to all first responders on the OFM Internet site at www.ofm.gov.on.ca. This course, which is based on the NFPA 472, Standard for Professional Competence of Responders to Hazardous Materials Incidents (2002, Edition), has been distributed to first response agencies in Ontario and continues to be downloaded by many multiagency first responders in the province and other jurisdictions. Our goal is to reach as many first responders as possible. In keeping with the provincial response strategy, we encourage all first responders from fire, police, and ambulance/emergency health to develop their skills so that they meet the requirements of awareness level training. We continue to offer OFC certificates of completion to those who have completed the course.

**Interagency first responder course**

The interagency first responder course was developed for front-line responders including fire, police, emergency/public health, EMO, and hospitals. This interactive workshop provides participants with a common understanding of their shared and separate responsibilities when responding to significant emergencies.

A cross section of speakers that represent the varying agencies highlight the legislative frameworks and protocols which govern the work of first responders. This is followed by considerable sharing of experiences, success stories, and challenges, while participants work through a series of case studies to plan and practice a unified approach to incident management.

Although this course has been piloted, it is still in the developmental stages, and plans are currently underway to finalize the course content and to plan for its implementation for other multiagency first responders within Ontario.
Multiagency senior officer/manager course

This year, our multiagency senior officer/manager course is being rolled out for regional delivery in key communities within the province. Although the first communities to be targeted for this opportunity are those who have partnered with the OFM as level two (operational level) or level three (technician level) teams that contribute to Ontario’s emergency response strategy, the long-term intent is to make this course available throughout the province. The target audience includes senior decision makers, officers, and managers who work together in local communities to plan for and respond to complex emergencies.

The purpose of this workshop is to provide an opportunity to senior officers and managers from regional emergency management and response agencies to work through case studies of significant or complex emergencies. Participants practice the implementation of a unified incident management system, in keeping with the emerging provincial and local protocols. The shared and separate roles of the multidisciplinary agencies are highlighted, while focusing on cooperation that contributes to a seamless transition from one agency’s responsibilities to the next. Participants practice responses to simulated complex emergencies and are encouraged to take the acquired knowledge, skills, and resource materials back to their local departments.

From the Halliburton area, a senior manager in the long-term care access center wrote:

I was able to take the information that I gained and use it to revise our internal emergency response plan and make contact with our EMO community officers in our three counties. This enabled us to contribute to our municipal Chemical, Biological, Radiological/Nuclear (CBRN) emergency response plan.

A sergeant from the OPP who participated in the course stated:

The use of the multiagency senior officer/manager course was beneficial in seeing the vast perspectives in dealing with an emergency from all agencies. At times we become too entrapped in our own programs to see the impact emergencies have on other agencies. More specifically, police, fire, and ambulance forget about the support agencies that deal with and continue to care for those who are impacted long after the initial emergency is over.

A participant from the Health Sciences Centre in Hamilton indicated:

This course provided valuable insight and education about agencies my organization doesn’t deal with on a daily basis. In the event of an emergency or disaster situation, the information and networking opportunities with experts in the field will be invaluable to my organization and myself.

COURSES THAT SUPPORT LEVEL TWO TEAMS

Hazardous materials operations course

A hazardous materials operations course was developed to support the response of level two teams. This course, which has been accredited by the International Fire Service Accreditation Congress (IFSAC) to meet the operations level of the NFPA 472, was initially offered on location by the OFC to level two teams. Subsequent courses have been delivered by local instructors who are qualified as associate instructors with the OFC. Using in-depth classroom activities that focus on both skill and knowledge, this course targets responders who will support the local level one teams. Teams trained to this level will be prepared to analyze hazardous materials incidents, determine the nature of the hazards, plan a safe response, and practice decontamination procedures.

COURSES THAT SUPPORT LEVEL THREE TEAMS

Hazardous materials technician course

One of the requirements of level three teams is that members are trained to the technician level in accordance with NFPA 472. Consequently, a hazardous materials technician course has been developed to support these teams. This two-week course provides
participants with an opportunity to analyze situational factors that involve hazardous materials. Learners go through several rigorous simulated hazardous scene responses where they assess and identify hazards, develop and implement action plans, and practice responding safely as team members. Learners also focus on rescue, recovery, and scene restoration, while using specialized protective equipment.

Provincial CBRN response teams training and exercise

Over the past three years, we have held at least one major exercise annually, where the provincial CBRN response teams from Windsor, Ottawa, and Toronto, supported by the OPP PERT team, meet to work on enhancing their individual technician teams’ capabilities by responding to a simulated complex CBRN emergency. The workshops associated with these training sessions have focused on identification of hazards, intervention, rescue and recovery, decontamination, mass decontamination, and radiation safety. A major one-day multiagency exercise tests the response and decision-making actions within a unified incident management system. Participants and observers from EMS/Ambulance, EMO, and the Ministry of Health and Long-Term Care (MOHLTC) support the team members in the exercise.

SUMMARY

In summary, the OFM has been able to contribute to multidisciplinary training and education to support preparedness and response within Ontario. However, we could not have done so without the considerable support and collaborative efforts of the multiagency network that joined us in the early stages of this project to plan and discuss issues, to make recommendations on training needs, and to provide us with many planning team members with content expertise. The planning team members put in long, hard hours to ensure that courses were meeting the identified needs. We believe that the collaborative approach that was initiated early in this project, and the cooperative work that followed, contributed to breaking down barriers among agencies and increasing multiagency preparedness at the municipal, regional, and provincial levels throughout Ontario.

REPRINT ORDER FORM

Note: While one photocopy is permissible, multiple reproduction of materials published in *Journal of Emergency Management* is prohibited without written permission of the publisher. For educational classroom use, quantity 200 or less, contact Copyright Clearance Center (222 Rosewood Dr., Danvers, MA 01923, 978-750-8400) directly. For all other uses, please order reprints using this form.

Author __________________________ Issue __________________________
Title of article ______________________________________________________________________
Page Nos. _________________________ Quantity ________________________________

Minimum order, 100 — minimum price based on 4 pages. For orders over 500, please write or call for quotation. Postage and/or freight included. For commercial reprints and articles over 20 pages, call for rates. 4-color reprints additional $1250 4-color charge. All reprint prices in effect for 1-year from publication date. Past 1-year, call for rates. Delivery time 4-6 weeks. All reprints run on Docutech. For reprints printed Offset on coated stock, call for custom quote.

<table>
<thead>
<tr>
<th>Pages</th>
<th>1-4</th>
<th>5-8</th>
<th>9-12</th>
<th>13-16</th>
<th>17-20</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 Copies</td>
<td>105.00</td>
<td>215.00</td>
<td>310.00</td>
<td>415.00</td>
<td>545.00</td>
</tr>
<tr>
<td>200 Copies</td>
<td>200.00</td>
<td>400.00</td>
<td>600.00</td>
<td>800.00</td>
<td>1000.00</td>
</tr>
<tr>
<td>300 Copies</td>
<td>285.00</td>
<td>570.00</td>
<td>855.00</td>
<td>1140.00</td>
<td>1425.00</td>
</tr>
<tr>
<td>400 Copies</td>
<td>360.00</td>
<td>720.00</td>
<td>1080.00</td>
<td>1440.00</td>
<td>1800.00</td>
</tr>
<tr>
<td>500 Copies</td>
<td>425.00</td>
<td>850.00</td>
<td>1275.00</td>
<td>1700.00</td>
<td>2125.00</td>
</tr>
</tbody>
</table>

**Billing Info:**

- All orders must be prepaid by check, credit card or purchase order
- Check enclosed (remit in US dollars)
- Make checks payable to: *Journal of Emergency Management*
- Charge my [ ] Visa [ ] MasterCard [ ] AMEX [ ] Discover
- Account # __________________________
- Expiration date __________________________
- Signature __________________________
- Cardholder address __________________________
- Tel ( ) ___________ Fax ( ) ___________
- E-mail __________________________
- Billing order/purchase number __________________________

**Ordering Info:**

Ordered by __________________________
Institution __________________________
Address __________________________
City __________________ State ______ Zip __________
E-mail __________________________

**Ship To:**

Name __________________________
Institution __________________________
Address __________________________
City __________________ State ______ Zip __________
E-mail __________________________

*Journal of Emergency Management*

470 Boston Post Road, Weston, MA 02493 • 781-899-2702 • Fax: 781-899-4900

www.emergencymanagementjournal.com
Wireless Gas Detection
Monitor Multiple Sites with a Single Solution

AreaRAE
Rapidly deployable, wireless, multi-channel, compact multi-gas, radiation, IAQ monitors
Be safe!

www.raesystems.com
Hazardous Environment Detection