Research Digest

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Research Digest is a quarterly online publication (www.colorado.edu/hazards/rd) that compiles recent research into an easily accessible format to advance and communicate knowledge on hazard mitigation and disaster preparedness, response, and recovery within an all-hazard, interdisciplinary framework for the hazards and disasters community. It provides complete references and abstracts (when available) for current research in the field. The issues are compiled by Center staff and include abstracts from peer-reviewed publications.

Research Digest articles are categorized into 25 different topic areas, though not every topic may appear in each issue. Abstracts are lightly edited to match Natural Hazards Center style. Most articles are cataloged as part of the Natural Hazards Center's library holdings. Check with your local institution for article availability. The Natural Hazards Center Library (subject to copyright laws and conventions) will copy otherwise difficult to obtain material for the cost of reproduction and shipping. For inquiries and feedback, send e-mails to hazlib@colorado.edu.

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The Natural Hazards Center is funded through a National Science Foundation grant and supplemented by contributions from a consortium of federal agencies and nonprofit organizations dedicated to reducing vulnerability to disasters. Visit the Center at www.colorado.edu/hazards/.

All Hazards

Bumbak, Andrew K. 2008. Catastrophe planning and response. *Journal of Emergency Management* 6(3): 13-15.

Collander, Brett, Brad Green, Yuri Millo, Christine Shamloo, Joyce Donnellan, and Craig DeAtley. 2008. Development of an "all-hazards" hospital disaster preparedness training course utilizing multi-modality teaching. *Prehospital and Disaster Medicine* 23(1): 63-67.

The objectives of this study were to develop and evaluate an "all-hazards" hospital disaster preparedness training course that utilizes a combination of classroom lectures, skill sessions, and disaster exercises to teach the principles of hospital disaster preparedness to hospital-based employees. Participants attended a two-day, 16-hour course, entitled Hospital Disaster Life Support (HDLS). The course was designed to address seven core competencies of disaster training for healthcare workers. Specific disaster situations addressed during HDLS included: 1) biological; 2) conventional; 3) radiological; and 4) chemical mass-casualty incidents. The primary goal of HDLS was not only to teach patient care for a disaster, but more importantly, to teach hospital personnel how to manage the disaster itself. Knowledge gained from the HDLS course was assessed by pre- and post-test evaluations. Additionally, participants completed a course evaluation survey at the conclusion of the HDLS to assess their attitudes about the course. Participants included 11 physicians, 40 nurses, 23 administrators/directors, and 10 other personnel. The average score on the pre-test was 69.1 for all positions, and the post-test score was 89.5, an improvement of 20.4 points. Participants felt HDLS was educational, relevant and organized. Identifying an effective means of teaching hospital disaster preparedness to hospital-based employees is an important task. However, the optimal strategy for implementing such educa-

tion still is under debate. The HDLS course was designed to utilize multiple teaching modalities to train hospital-based employees on the principles of disaster preparedness. Participants of HDLS showed an increase in knowledge gained and reported high satisfaction from their experiences at HDLS. These results suggest that HDLS is an effective way to train hospital-based employees in the area of disaster preparedness.

Copien, C., C. Frank, and M. Becht. 2008. Natural hazards in the Bavarian Alps: A historical approach to risk assessment. ***Natural Hazards*** **45(2): 173-181.**
The Bavarian Alps region is strongly affected by various natural hazards, mainly hydrological events (floods, debris flows), geomorphic/geological events (landslides, rock falls), and avalanches. Extraordinary floods, like in 2002 or in the summer of 2005 in south Bavaria, have again posed the question of the possible extent and frequency of recurrence of catastrophic events. To put risk assessment on a broader basis, historical data about all kinds of past natural hazards were detected in the archives of local authorities and administrative offices for water management. More than 10,000 sources (written accounts, maps, and photographs) were collated in a database. The majority of this information reaches back to the middle of the 19th century. In addition, many documents referring to events dating back even as far as the Middle Ages were found. The Historische Analyse von NaturGefahren (HANG, historical analysis of natural hazards) project at the University of Eichstaett mainly focuses on a small-scale examination of the data. Initial results of the data analysis show that most catastrophic events in the Bavarian Alps only affect parts of the area, but not the whole region. Therefore it is necessary to assess the risk potential on a local scale like valleys, the catchment areas of mountain streams, or even single streams. First, the presented data is aimed to help engineers in future planning of hazard-protection measures. Second, the information can form a vital component to enhance our knowledge of hydrological and geomorphic/geological dynamics in the Alps.

Cuaresma, Jesus Crespo, Jaroslava Hilouskova, and Michael Obersteiner. 2008. Natural disasters as creative destruction? Evidence from developing countries. ***Economic Inquiry*** **46(2): 214-226.**
Recent studies found a robust positive correlation between the frequency of natural disasters and the long-run economic growth after conditioning for other determinants. This result is interpreted as evidence that disasters provide opportunities to update the capital stock and adopt new technologies, thus acting as some type of Schumpeterian creative destruction. The results of cross-country and panel data regressions indicate that the degree of catastrophic risk tends to have a negative effect on the volume of knowledge spillovers between industrialized and developing countries. Only countries with relatively high levels of development benefit from capital upgrading through trade after a natural catastrophe.

Eshghi, Kourosh, and Richard C. Larson. 2008. Disasters: Lessons from the past 105 years. ***Disaster Prevention and Management*** **17(1): 62-82.**
This paper studies and reviews some major impacts of disasters during the past 105 years, summarizing some major lessons for the future. Furthermore, a new scaling system is presented to determine the actual damage to human life. There is no doubt that the impacts of future disasters will not be the same as previous ones, but lessons from the past can be helpful for improving knowledge about disasters and providing better response programs for local and international organizations. The new scaling system will also be a useful guide for the development and evaluation of national and international disaster planning, mitigation, and hazard reduction efforts. Important lessons have been reported based on statistical data analysis of disasters. Moreover, a new classification of disasters is presented to relate the vulnerability factors of a society to the magnitude of the natural disasters.

Marshall, Lewis W. 2008. International disaster response law: An introduction. ***American Journal of Disaster Medicine*** **3(3): 181-184.**
This paper reviews the current state of International Disaster Response Law (IDRL) and identifies barriers to development and future directions. This study is an introduction to the current status of IDRL. Globally, the data suggest we will have increasing incidents and costs in responding to disasters, but the development of IDRL has not kept pace. The further development and refining of IDRL is imperative. Additional barriers to the continued development of IDRL will have to be overcome. Global international stakeholders will need to develop mechanisms to promote the advancement of IDRL while minimizing the barriers to effective preparedness and response to global international disasters.

Mercer, Jessica, Ilan Kelman, Kate Lloyd, and Sandie Suchet-Pearson. 2008. Reflections on use of participatory research for disaster risk reduction. ***Area*** **40(2): 172-183.**

Participatory research approaches are increasingly popular with academic researchers and development organizations working to facilitate change in collaboration with local communities. This paper contributes to recent debates over the use of participatory approaches by examining the use of participatory research within disaster risk reduction. Drawing on research in Papua New Guinea in which participatory techniques were used with indigenous communities to determine strategies for dealing with environmental hazards, the value of such techniques is critiqued. Finally the significance of participatory research methodology is discussed as is its possible contribution to disaster risk reduction policy.

Nel, Philip, and Marjolein Righarts. 2008. Natural disasters and the risk of violent civil conflict. ***International Studies Quarterly*** **52(1): 159-185.**

Does the occurrence of a natural disaster such as an earthquake, volcanic eruption, tsunami, flood, hurricane, epidemic, heat wave, and/or plague increase the risk of violent civil conflict in a society? This study uses available data for 187 political units for the period 1950-2000 to systematically explore this question, which has received remarkably little attention in the voluminous literature on civil war. The authors find that natural disasters significantly increase the risk of violent civil conflict both in the short and medium term, specifically in low- and middle-income countries that have intermediate to high levels of inequality, mixed political regimes, and sluggish economic growth. Rapid-onset disasters related to geology and climate pose the highest overall risk, but different dynamics apply to minor as compared to major conflicts. The findings are robust in terms of the use of different dependent and independent variables, and a variety of model specifications. Given the likelihood that rapid climate change will increase the incidence of some types of natural disasters, more attention should be given to mitigating the social and political risks posed by these cataclysmic events.

Reid, Pat, and Dewald van Niekerk. 2008. A model for a multi-agency response management system (MARMS) for South Africa. ***Disaster Prevention and Management*** **17(2): 244-255.**

The promulgation of disaster management legislation and policy in South Africa necessitates the development of a uniform multi-agency incident and disaster response system. This paper argues that a uniform response by numerous government agencies in South Africa can only be achieved through the application of an accepted model, which is based on the requirements of the Disaster Management Act 57 of 2002 as well as the National Disaster Risk Management Framework of South Africa. The model was developed using grounded theory methodology through the use of the internet and focus group interviews with South African as well as international experts. During the process of analyzing the data by open and axial coding, key elements emerged which were then clustered into categories from which the core concepts of the model emerged. The emergent core concepts were then dimensionalized, which formed the major constructs of the model thereby ensuring that the model was grounded in the theory. Constant comparisons were drawn with the experiences in the field throughout the process in order to ensure theoretical sensitivity. During the process of axial coding certain intervening conditions emerged which could negatively or positively affect its application. The developed model was therefore subjected to scrutiny by means of a quantitative attitudinal test amongst senior professionals involved in the field of emergency and disaster management, resulting in triangulation. The findings demonstrate that in order for the proposed model to be implemented effectively it is necessary to refine each level of response in terms of authority, communication and reporting lines. This model can be used as the foundation for the development of a comprehensive response management system for South Africa and other similar countries, and that the model can further contribute to the development of a basic training module for inclusion in the curricula of response agency personnel.

Shiwaku, Koichi, and Rajib Shaw. 2008. Proactive co-learning: A new paradigm in disaster education. *Disaster Prevention and Management* **17(2): 183-198.**

The aims of this paper are to point out the effectiveness of the education at Maiko, Japan and show the direction of effective school disaster education. A survey questionnaire was distributed in 12 schools (1,065 students) from different parts of Japan, including that of Maiko, to try to understand the linkage between disaster education and students' awareness. The results showed higher risk perception and risk reduction actions by the students in

Maiko, as compared to other schools. Maiko focuses on mitigation and preparedness, teaches about the social environment, and makes students think of the importance of implementation. This learning process is found to be effective in reducing the gap between intention and action. The study points out the crucial points of disaster education based on the teachings at Maiko and shows that the disaster education should be adapted to the local situation. The study findings are of importance for teachers or education departments designing curriculum for disaster education.

Smith, Jessica Fielding, Sandra Sue Waggoner, Arthur Rabjohn, and Avi Bachar. 2008. Protecting the functionality of airports during disaster responses: Humanitarian responses to terrorism, war, civil war, and riots. ***Journal of Emergency Management*** **6(3): 53-62.**

The response to almost any disaster has major roles for airports that carry out many or all the functions in an incident management system or act as key assets (emergency support functions). Disaster response itself stresses airports and should require protective measures that may be policy, organizational, operational, physical, or defensive. If the response is humanitarian relief during an intentional disaster such as terrorism, war, civil war, or riot, defensive protective measures become critical to airport functionality, continuity of business, and continuity of operations. This article examines 18 airports for threats to functionality and appropriate, effective defensive measures against these threats. In a disaster, an airport can substitute for almost anything else, but nothing else can substitute for an airport. This truism becomes particularly acute when the operational stresses of humanitarian relief and intentional threats coincide at an airport.

Thacker, Maria T. F., Robin Lee, Raquel I. Sabogal, and Alden Henderson. 2008. Overview of deaths associated with natural events, United States, 1979-2004. ***Disasters*** **32(2): 303-315.**

Analysis of the National Center for Health Statistics' Compressed Mortality File showed that between 1979 and 2004, natural events caused 21,491 deaths in the United States. During this 26-year period, there were 10,827 cold-related deaths and 5,279 heat-related deaths. Extreme cold or heat accounted for 75 percent of the total number of deaths attributed to natural events more than all of deaths resulting from lightning, storms and floods, and earth movements, such as earthquakes and landslides. Cold-related death rates were highest in the states of Alaska, Montana, New Mexico, and South Dakota, while heat-related deaths were highest in the states of Arizona, Missouri, and Arkansas. These deaths occurred more often among the elderly and black men. Other deaths were attributed to lightning (1,906), storms and floods (2,741), and earth movements (738). Most deaths associated with natural events are preventable and society can take action to decrease the morbidity and mortality connected with them.

Tobin, Rick. 2008. Sheltering for catastrophes: A call for change. ***Journal of Emergency Management*** **6(3): 16-17.**

Uhr, Christian, Henrik Johansson, and Lars Fredholm. 2008. Analyzing emergency response systems. ***Journal of Contingencies and Crisis Management*** **16(2): 80-90.**

This article suggests a method that can be used for analyzing an emergency response system. Both the literature and empirical findings indicate that response operations sometimes diverge from existing plans when adapting to an event and its consequences. The method, which aims at achieving a better understanding of emergency response management, adopts a systems perspective using various relationships that exist or develop between personnel belonging to those organizations that are part of the emergency response operation. Results of a study of such an emergency response system are presented and discussed in order to demonstrate how the method can be employed.

Van de Walle, Bartel, and Murray Turoff. 2008. Decision support for emergency situations. ***Journal Information Systems and E-Business Management*** **6(3): 295-316.**

Emergency situations occur unpredictably and cause individuals and organizations to shift their focus and attention immediately to deal with the situation. When disasters become large scale, all the limitations resulting from a lack of integration and collaboration among all the involved organizations begin to be exposed and further compound the negative consequences of the event. Often in large-scale disasters the people who must work together have no history of doing so; they have not developed a trust or understanding of one another's abilities, and the totality of resources they each bring to bear have never before been exercised. As a result, the challenges for individual or group decision support systems in emergency situations are diverse and im-

mense. This article presents recent advances in this area and highlight important challenges that remain.

Business Continuity

Smith, Jessica Fielding, Sandra Sue Waggoner, Arthur Rabjohn, and Avi Bachar. 2008. Protecting the functionality of airports during disaster responses: Humanitarian responses to terrorism, war, civil war, and riots. ***Journal of Emergency Management*** **6(3): 53-62.**

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Climate Change, Drought and El Nino

Botzen, W. J. W., and J. C. J. M. van den Bergh. 2008. Insurance against climate change and flooding in the Netherlands: Present, future, and comparison with other countries. ***Risk Analysis*** **28(2): 413-426.**

Climate change is projected to cause severe economic losses, which has the potential to affect the insurance sector and public compensation schemes considerably. This article discusses the role insurance can play in adapting to climate change impacts. The particular focus is on the Dutch insurance sector, in view of the Netherlands being extremely vulnerable to climate change impacts. The usefulness of private insurance, which is currently unavailable in the Netherlands, as an adaptation instrument to increased flood risks is examined. It is questioned whether the currently dominant role of the Dutch government in providing damage relief is justified from an economic efficiency perspective. Characteristics of flood insurance arrangements in the Netherlands, the United Kingdom, Germany, and France are compared in order to identify possible future directions for arrangements in the Netherlands. It is argued that social welfare improves when insurance companies take responsibility for part of the risks associated with climate change.

Hawkins, Catherine A., and P. Nalini Rao. 2008. CEDER3: A social development response to the tsunami recovery in Tamil Nadu, India. ***Social Development Issues*** **30(1): 29-46.**

This article summarizes some of the literature on disaster recovery and describes the impact of the 2004 tsunami in Tamil Nadu, India. It discusses the relevance of social development to the tsunami recovery efforts and uses the example of the Centre for Disaster Relief, Rehabilitation and Reconstruction to illustrate how the social development components of human capital, social capital, and employment were used to improve the lives of the survivors in Pudiakalpakkam, a fishing village that was destroyed by the tsunami.

Lever-Tracy, Constance. 2008. Global warming and sociology. ***Current Sociology*** **56(3): 445-466.**

Escalating climate change, partly induced by human activity, has made its way into public awareness, yet most sociologists, outside the specialist of environmental sociology, have had surprisingly little to say about the possible future social trajectories it may portend. Wary of accepting the truth claims of natural science, but aware of our own inability to judge the validity of their claims, we have generally preferred to look the other way, although these developments can affect the very core of our discipline's concerns. We need a cooperative multidisciplinary of social and natural scientists working together.

Mendelsohn, Robert. 2008. Is the Stern Review an economic analysis? ***Review of Environmental Economics and Policy*** **2(1): 45-60.**

This article offers four answers to this question, "Is the Stern Review an economic analysis?" First, it argues that the Stern Review does not seek to minimize the present value of the sum of abatement costs and climate damages, and instead compares the abatement cost of a single aggressive program with the climate damages of doing nothing for two centuries. Second, it states that the Stern Review fails to use consistent assumptions in these two cases. Third, it argues that the Stern Review makes strong assumptions about abatement that may significantly

underestimate near-term costs. And fourth, it claims that the Stern Review makes even stronger assumptions about climate damages that may greatly overestimate damages. The article concludes that a policy of very aggressive near-term abatement would be a mistake.

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O'Brien, Geoff. 2008. UK emergency preparedness: A holistic response? ***Disaster Prevention and Management*** **17(2): 232-243.**
This paper offers insights into emergency preparedness in the United Kingdom. It argues that to address the consequences of climate change and variability, a greater focus on pre-emergency planning that engages a wider stakeholder group must be adopted. It also discusses UK emergency management and approaches to climate change and climate variability risk. The internal focus of UK emergency management inhibits the contribution that it can make to societal resilience and public preparedness. Effective risk reduction requires that all actors, including the public, are engaged in the social learning process. From a UK emergency management perspective this requires a culture shift to an outward proactive focus. This paper offers insights into emergency preparedness in the UK.

Smucker, Thomas A., and Ben Wisner. 2008. Changing household responses to drought in Tharaka, Kenya: Vulnerability, persistence and challenge. ***Disasters*** **32(2): 167-189.**
Drought is a recurring challenge to the livelihoods of those living in Tharaka District, Kenya, situated in the semi-arid zone to the east of Mount Kenya, from the lowest slopes of the mountain to the banks of the Tana River. This part of Kenya has been marginal to the economic and political life of Kenya from the colonial period until the present day. A study of more than 30 years of change in how people in Tharaka cope with drought reveals resilience in the face of major macro-level transformations, which include privatization of landownership, population growth, political decentralization, increased conflict over natural resources, different market conditions, and environmental shifts. However, the study also shows troubling signs of increased use of drought responses that are incompatible with long-term agrarian livelihoods. Government policy needs to address the challenge of drought under these new macro conditions if sustainable human development is to be achieved.

Sterner, Thomas, and U. Martin Persson. 2008. An even Sterner Review: Introducing relative prices into the discounting debate. ***Review of Environmental Economics and Policy*** **2(1): 61-76.**
One of the key criticisms of the Stern Review has been its use of a relatively low discount rate (which could lead to overestimation of the future benefits of short-term actions). The article's authors do not object to the discounting assumptions adopted in the Stern Review and argue that the Stern Review's substantive conclusions can be justified even without using a low discount rate. In particular, the authors state that non market damages from climate change are underestimated, and that future scarcity caused by both climate change and the changing composition of the economy will lead to changes in relative prices that will increase estimated damages.

Wang, Yongguang, Zijiang Zhou, Qiang Zhang, and Chaoying Huang. 2008. Main meteorological disasters and their impacts on the economic and societal developments in China. ***International Journal of Risk Assessment and Management*** **8(4): 384-394.**
The main meteorological disasters and their impacts on society in China are summarized. China has

meteorological disasters that take many different types, affect large area, have a high frequency, and cause severe damages. Since the 1980s, climate in China seems to become more variable and extreme meteorological events have occurred more frequently, which is most likely a consequence of the global warming. Agriculture is the sector that has been most seriously affected by meteorological disasters. Over the last ten years, there are 350 million people affected by various disasters and 200 billion RMB economic losses each year.

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Critical Infrastructure

Bana e Costa, Carlos, Carlos S. Oliveira, and Victor Vieira. 2008. Prioritization of bridges and tunnels in earthquake risk mitigation using multicriteria decision analysis: Application to Lisbon. ***Omega: The International Journal of Management Science*** **36(3): 442-450.**
This paper presents the development of a multicriteria value model enabling the prioritization of bridges and tunnels according to their structural vulnerability and strategic importance for the formulation and implementation of civil protection policies, both

for retrofitting and emergency management in the face of seismic events. An interactive structuring process was developed with a group of key players to define the evaluation criteria and the MACBETH approach was extensively used (i) to facilitate the assessment from the group of the judgmental information necessary to build value functions and (ii) to establish relative weights for the criteria. The model was subsequently explored to prioritize the bridges and tunnels of a zone in Lisbon with high seismic hazard.

Luke, Thomas C., and Jean-Paul Rodrigue. 2008. Protecting public health and global freight transportation systems during an influenza pandemic. ***American Journal of Disaster Medicine*** **3(2): 99-107.**
The H5N1 influenza threat is resulting in global preparations for the next influenza pandemic. Pandemic influenza planners are prioritizing scarce vaccine, antivirals, and public health support for different segments of society. The freight, bulk goods, and energy transportation network comprise the maritime, rail, air, and trucking industries. It relies on small numbers of specialized workers who cannot be rapidly replaced if lost due to death, illness, or voluntary absenteeism. Because transportation networks link economies, provide critical infrastructures with working material, and supply citizens with necessary commodities, disrupted transportation systems can lead to cascading failures in social and economic systems. However, some pandemic influenza plans have assigned transportation workers a low priority for public health support, vaccine, and antivirals. The science of transportation geography demonstrates that transportation networks and workers are concentrated at, or funnel through, a small number of chokepoints and corridors. Chokepoints should be used to rapidly and efficiently vaccinate and provide prophylaxis to the transportation worker cohort and to implement transmission prevention measures and thereby protect the ability to move goods. Nations, states, the transportation industry and unions, businesses, and other stakeholders must plan, resource, and exercise, and then conduct a transportation health assurance and security campaign for an influenza pandemic.

Ravisankar, N., and S. Poongothai. 2008. A study of groundwater quality in tsunami affected areas of Sirkazhi Taluk, Nagapattinam District, Tamilnadu, India. ***Science of Tsunami Hazards*** **27(1): 47-55.**
The December 26, 2004 tsunami had major impact on the quality of groundwater along the southeast coast of India, but especially in the tsunami-affected areas of the Nagapatinam district of Tamilnadu. Major pollution resulted primarily from increases in the salinity of groundwater. The post-tsunami water quality posed problems to general health and contributed significantly to agricultural and environmental degradation in the Sirkazhi taluk and Nagapattinam districts. The adverse impact was particularly significant in the areas of Pazaiyar, Madavaimedu, Thirumullaivasal, Thoduvai, Koozaiyar, Puthupattinam, Kizhamoovarkarai, Poombhukar and Vanagiri. The present study assesses the source, degree, extent and nature of groundwater contamination in the Sirkazhi coastal region. Samples of groundwater were collected from 11 wells in this area and analyzed chemically to determine the extent of contamination. The results showed significant variations in water quality parameters in the study area and helped understand the longer-term adverse impacts that tsunami inundation can have upon groundwater resources.

Smith, Jessica Fielding, Sandra Sue Waggoner, Arthur Rabjohn, and Avi Bachar. 2008. Protecting the functionality of airports during disaster responses: Humanitarian responses to terrorism, war, civil war, and riots. ***Journal of Emergency Management*** **6(3): 53-62.**
The response to almost any disaster has major roles for airports that carry out many or all the functions in an incident management system or act as key assets (emergency support functions). Disaster response itself stresses airports and should require protective measures that may be policy, organizational, operational, physical, or defensive. If the response is humanitarian relief during an intentional disaster such as terrorism, war, civil war, or riot, defensive protective measures become critical to airport functionality, continuity of business, and continuity of operations. This article examines 18 airports for threats to functionality and appropriate, effective defensive measures against these threats. In a disaster, an airport can substitute for almost anything else, but nothing else can substitute for an airport. This truism becomes particularly acute when the operational stresses of humanitarian relief and intentional threats coincide at an airport.

Disaster and Emergency Management

Avery, George H., Mark Lawley, Sandra Garrett, Barrett Caldwell, Marshall P. Durr, Dulcy Abraham, Feng

Lin, Po-Ching C. DeLaurentis, Maria L. Peralta, Renata A. Kopach-Conrad, Lalaine M. Ignacio, Rebecca Sandino, and Deanna J. Staples. 2008. Planning for pandemic influenza: Lessons from the experiences of thirteen Indiana counties. ***Journal of Homeland Security and Emergency Management*** **5(1): 1-26.**

Significant concerns exist over the ability of the healthcare and public health systems to meet the surge demands that would result from an event such as an influenza pandemic. Current guidance for public health planners is largely based on expert opinion and may lack connection to the problems of street-level public health practice. To identify the problems of local planners and prepare a state-level planning template for increasing health care surge capacity that accounted for these issues, a study was conducted of local pandemic planning efforts in 13 counties, finding that cognitive biases, coordination problems, institutional structures in the healthcare system, and resource shortfalls are significant barriers to preparing and implementing a surge capacity plan. In addition, local planners identify patient demand management through triage and education efforts as a viable means of ensuring adequate capacity, in contrast to guidance proposing an increased supply of care as a primary tool.

Ballow, Shana, Solomon Behar, Ilene Claudius, Kathleen Stevenson, Robert Neches, and Jeffrey S. Upperman. 2008. Hospital-based disaster preparedness for pediatric patients: How to design a realistic set of drill victims. ***American Journal of Disaster Medicine*** **3(3): 171-180.**

The purpose of this report is to describe an innovative idea for hospital pediatric victim disaster planning. This is a descriptive manuscript outlining an innovative approach to exercise planning. In this report, the authors describe a model set of patients for pediatric disaster simulation. The results were an epidemiologically based set of mock victims. The authors believe that by enhancing pediatric disaster simulation exercises, hospital personnel and decision makers will be better prepared for an actual disaster event involving pediatric victims.

Barnes, Michael D., Carl L. Hanson, Len M. B. Novilla, Aaron T. Meacham, Emily McIntyre, and Brittany C. Erickson. 2008. Analysis of media agenda setting during and after Hurricane Katrina: Implications for emergency preparedness, disaster response, and disaster policy. ***American Journal of Public Health*** **98(4): 604-610.**

Media agenda setting refers to the deliberate coverage of topics or events with the goal of influencing public opinion and public policy. The authors conducted a quantitative content analysis of four prominent newspapers to examine how the media gathered and distributed news to shape public policy priorities during Hurricane Katrina. The media framed most Hurricane Katrina stories by emphasizing government response and less often addressing individuals' and communities' level of preparedness or responsibility. Hence, more articles covered response and recovery than mitigation and preparation. The newspapers studied focused significantly more on government response than on key public health roles in disaster management. The article discusses specific implications for public health professionals, policymakers, and mass media so that, in the future, coordination can be enhanced among these entities before, during, and after disasters occur.

Burgess, Paula A. 2008. Disaster lessons learned: Apis mellifera and the art and science of communication. ***Journal of Emergency Management*** **6(3): 18-20.**

Lessons learned from disaster responses often include failure of communication. The author of this editorial is an emergency physician and public health scientist with expertise in disaster response; the author is also an amateur beekeeper. The author whimsically compares and contrasts what honey bees know about communication to what disaster response professionals know. Perhaps, disaster response professionals can learn more about communication from the experts: honey bees.

Carresi, Alejandro Lopez. 2008. The 2004 Madrid train bombings: An analysis of pre-hospital management. ***Disasters*** **32(1): 41-65.**

The terrorist train bombings in Madrid, Spain, on March 11, 2004 triggered a swift and massive medical response. This paper analyses the pre-hospital response to the attacks to gain insight into current trends in disaster management among Madrid's Emergency Medical Services (EMSs). To this end, the existing emergency planning framework is described, the basic structures of the different EMSs are presented, and the attacks are briefly depicted before consideration is given to pre-hospital management. Finally, an explanation of the main underlying misconceptions in emergency planning and management in Madrid is provided to aid understanding of the origins of some of the problems detected during the response. These are attributable mainly to inappropriate planning rather than to mistakes in field-level decisionmaking. By contrast, many of the successes are attributable to individual ini-

tiatives by frontline medics who compensated for the lack of clear command by senior managers by making adaptive and flexible decisions.

Chokshi, Nikuni K., Solomon Behar, Alan L. Nagar, Fred Dorey, and Jeffrey S. Upperman. 2008. Disaster management among pediatric surgeons: Preparedness, training and involvement. ***American Journal of Disaster Medicine*** **3(1): 5-14.**

Contemporary events in the United States (e.g. September 2001, school shootings), Europe (e.g. Madrid train bombings), and the Middle East have raised awareness of mass casualty events and the need for a capable disaster response. Recent natural disasters have highlighted the poor preparation and infrastructure in place to respond to mass casualty events. In response, public health policy makers and emergency planners developed plans and prepared emergency response systems. Emergency response providers include first responders, a subset of emergency professionals, including firemen, law enforcement, paramedics, who respond to the incident scene and first receivers, a set of healthcare workers who receive the disaster victims at hospital facilities. The role of pediatric surgeons in mass casualty emergency response plans remains undefined. The authors hypothesize that pediatric surgeons' training and experience will predict their willingness and ability to be activated first receivers. The objective of our study was to determine the baseline experience, preparedness, willingness, and availability of pediatric surgeons to participate as activated first receivers. After institutional review board approval, the authors conducted an anonymous online survey of members of the American Pediatric Surgical Association in 2007. The authors explored four domains in this survey: (1) demographics, (2) disaster experience and perceived preparedness, (3) attitudes regarding responsibility and willingness to participate in a disaster response, and (4) availability to participate in a disaster response. The authors performed univariate and bivariate analyses to determine significance. Finally, the authors conducted a logistic regression to determine whether experience or preparedness factors affected the respondent's availability or willingness to respond to a disaster as a first receiver. Results: The authors sent 725 invitations and received 265 (36.6 percent) completed surveys. Overall, the authors found that 77 percent of the respondents felt "definitely" responsible for helping out during a disaster but only 24 percent of respondents felt "definitely" prepared to respond to a disaster. Most felt they needed additional training, with 74 percent stating that they definitely or probably needed to do more training. Among experiential factors, the authors found that attendance at a national conference was associated with the highest sense of preparedness. The authors determined that subjects with actual disaster experience were about four times more likely to feel prepared than those with no disaster experience ($p < 0.001$). The authors also demonstrated that individuals with a defined leadership position in a disaster response plan are twice as likely to feel prepared ($p = 0.002$) and nearly five times more willing to respond to a disaster than those without a leadership role. The authors found other factors that predicted willingness including the following: a contractual agreement to respond (OR 2.3); combat experience (OR 2.1); and prior disaster experience (OR 2.0). Finally, the authors found that no experiential variables or training types were associated with an increased availability to respond to a disaster. A minority of pediatric surgeons feel prepared, and most feel they require more training. Current training methods may be ineffectual in building a prepared and willing pool of first receivers. Disaster planners must plan for healthcare worker related issues, such as transportation and communication. Further work and emphasis is needed to bolster participation in disaster preparedness training.

Collander, Brett, Brad Green, Yuri Millo, Christine Shamloo, Joyce Donnellan, and Craig DeAtley. 2008. Development of an "all-hazards" hospital disaster preparedness training course utilizing multi-modality teaching. ***Prehospital and Disaster Medicine*** **23(1): 63-67.**

The objectives of this study were to develop and evaluate an "all-hazards" hospital disaster preparedness training course that utilizes a combination of classroom lectures, skill sessions, and disaster exercises to teach the principles of hospital disaster preparedness to hospital-based employees. Participants attended a two-day, 16-hour course, entitled Hospital Disaster Life Support (HDLS). The course was designed to address seven core competencies of disaster training for healthcare workers. Specific disaster situations addressed during HDLS included: 1) biological; 2) conventional; 3) radiological; and 4) chemical mass-casualty incidents. The primary goal of HDLS was not only to teach patient care for a disaster, but more importantly, to teach hospital personnel how to manage the disaster itself. Knowledge gained from the HDLS course was assessed by pre- and post-test evaluations. Additionally, participants completed a course evaluation survey at the conclusion of the HDLS to assess their attitudes about the course. Participants included 11 physicians, 40 nurses, 23 administrators/directors, and 10 other personnel. The average score on the pre-test was 69.1

for all positions, and the post-test score was 89.5, an improvement of 20.4 points. Participants felt HDLS was educational, relevant and organized. Identifying an effective means of teaching hospital disaster preparedness to hospital-based employees is an important task. However, the optimal strategy for implementing such education still is under debate. The HDLS course was designed to utilize multiple teaching modalities to train hospital-based employees on the principles of disaster preparedness. Participants of HDLS showed an increase in knowledge gained and reported high satisfaction from their experiences at HDLS. These results suggest that HDLS is an effective way to train hospital-based employees in the area of disaster preparedness.

Dayton, Christopher, Jamil Ibrahim, Michael Augenbraun, Steven Brooks, Kiaran Mody, Donald Holford, Patricia Roblin, and Bonnie Arquilla. 2008. Integrated plan to augment surge capacity. ***Prehospital and Disaster Medicine*** **23(2): 113-119.**
Surge capacity is defined as a healthcare system's ability to rapidly expand beyond normal services to meet the increased demand for appropriate space, qualified personnel, medical care, and public health in the event of bioterrorism, disaster, or other large-scale public health emergencies. There are many individuals and agencies, including policy makers, planners, administrators, and staff at the federal, state, and local level, involved in the process of planning for and executing policy in respect to a surge in the medical requirements of a population. They are responsible to ensure there is sufficient surge capacity within their own jurisdiction. The federal government has required New York State to create a system of hospital bed surge capacity that provides for 500 adult and pediatric patients per one million population, which has been estimated to be an increase of 15-20 percent in bed availability. In response, the New York City Department of Health and Mental Hygiene (NYC DOH) has requested that area hospitals take an inventory of available beds and set a goal to provide for a 20 percent surge capacity to be available during a mass-casualty event of other conditions calling for increased inpatient bed availability. In 2003, under the auspices of the NYC DOH, the New York Institute of all Hazard Preparedness (NYIHP) was formed from four unaffiliated, healthcare facilities in Central Brooklyn to address this and other goals. The NYIHP hospitals have developed a surge capacity plan to provide necessary space and utilities. As these plans have been applied, a bed surge capacity of approximately 25 percent was identified and created for Central Brooklyn to provide for the increased demand on the medical care system that may accompany a disaster. Though the process of developing an integrated plan that would engage a public health incident, the facilities of NYIHP demonstrate that a model of cooperation may be applied to an inherently fractioned medical system.

Kapucu, Naim. 2008. Collaborative emergency management: Better community organizing, better public preparedness and response. ***Disasters*** **32(2): 239-262.**
Community coordination requires communication and planning of precautions to take when faced with a severe threat of disaster. The unique case of the four Florida hurricanes of 2004 Charley, Frances, Ivan, and Jeanne is used here to assess community responses to repeated threats of hurricanes. The paper examines how effectiveness in coordinating community disaster response efforts affects future public preparedness. The findings suggest that pre-season planning; open communication between emergency managers and elected officials, and the use of technology all had a significant impact on community responses. The repeated threat scenario indicates that emergency managers must work vigilantly to keep residents informed of the seriousness of a situation. The study describes how emergency managers in Florida countered public complacency during four hurricanes in six weeks. The strategies identified as useful by public managers in the context of hurricanes are applicable to other natural and man-made disasters.

Krekeler, Mark, and C. Scott Allen. 2008. Remote sensing spectra of cesium chloride provide a potential emergency management tool for response to a radiological dispersal device detonation. ***Journal of Emergency Management*** **6(2): 60-64.**
Delineating affected areas from radiological dispersal device (RDD) events is a major challenge in emergency response. Remote sensing is one promising technique for detecting and discriminating dangerous from benign materials over large areas and from a safe distance. Remote sensing spectra of one major threat, cesium chloride (CsCl) powders, identifies previously unrecognized emissivity features at 2.96 m (>30 percent), 6.01 m (>20 percent), a broad feature at 7.10-7.49 m (6-8 percent), and a triplet at 8.46 (6 percent), 8.89 (11-15 percent), and 9.33 m (5-7 percent). While the features at 2.96, 6.01, and 7.10-7.49 m are masked by atmospheric gases such as water vapor, the triplet at 8.46, 8.89, and 9.33 m provides a unique spectral fingerprint that can be safely exploited from platforms at standoff distances.

Goodman, Helen, and John Gawen. 2008. Glimpses of "community" through the lens of a small fire event. *The Australian Journal of Emergency Management* 23(1): 30-36.

In eliciting feedback from household members affected by ember attack in an urban interface fire, researchers found evidence of latent and actual strengths at the individual, household and community levels. How the emergency services acknowledge and work with these strengths across Australia's varied community landscape provides both ongoing challenges and opportunities for increasing community safety.

Greenberg, Brad. 2008. The development of the current urban search and rescue program (ESF-9): A policy perspective. *Journal of Emergency Management* 6(2): 55-59.

This article explores the origins of the current urban search and rescue (US&R) program, its philosophical foundations, and examines the history of the catastrophic events that punctuated the stepwise development of national policy and legislation enabling the federal government to conduct such a program. Since its inception, the program goal was to structure existing local assets into an integrated task force capable of national and international response. Past events natural, political, and terrorist deeply affected the development of the US&R Response system. It has matured over time, but remains dynamic.

Gstraunthaler, Thomas. 2008. Planning for judgement day: Restrictions of government planning for avian influenza. *Disaster Prevention and Management* 17(2): 199-211.

The purpose of this paper is to examine the organization and execution of the planning process of the Department for Environment, Food and Rural Affairs (DEFRA). The focus is placed on the different stakeholders involved and their role in the decision-making process. The research involves content analysis of the available paperwork and interviews with leading personnel of DEFRA. The organization of the planning process ensures strong involvement of the industry. As the financial resources of DEFRA are limited, parts of the costs of the process are passed on to the industry, which allow it to play a stronger role. By delegating major tasks to other organizations DEFRA lacks control of the execution of its decisions. The research is limited by the view of the interviewed persons. As it is a pre-impact study, people could act in a different manner than originally stated if an outbreak should occur. Through identifying the motivations of participating actors, it was demonstrated that this system is prone to the same failures as already shown in the bovine spongiform encephalopathy (BSE) crisis. It is discussed if the role of government planning is really necessary or if the whole task could be done by the industry. The paper is a pre-impact study and will contribute to the debate about the system in general.

Ha, Kyoo-Man, and Ji-Young Ahn. 2008. National emergency management system: The United States and Korea. *Journal of Emergency Management* 6(2): 31-44.

The purpose of this article is to contribute to the ultimate goal of emergency management by comparing the similarities, differences, and implications of the national emergency management systems in the United States (US) and Korea. The primary tenets, or similarities, differences, and implications, are as follows: (1) Both the US and Korean governments have tried to define basic emergency terms, but the Korean definitions are less based on national consensus. It is proposed that the Korean government aim for more national agreement on its definitions. (2) Local governments in the two nations play a direct role in dealing with emergency; yet, the US national system is decentralized, while the Korean one is centralized. Each system has tried to adopt the other's principle for better management. (3) Although the roles of three nongovernment partners in these two nations are clearly outlined, each problem which they face is unique to their own environment. Through globalization, Korea has developed the framework of three nongovernmental players in emergency management. (4) Military principles, emergency exercises, and training have been used extensively in both nations. In the United States, fire officials have competed with law enforcement officials for resources, whereas the Korean fire officials have competed with civil engineers for resources. These rival groups should eliminate politicking with competition, thus fostering a common purpose among them.

Hall, Stacey, Rosalie Ward, Trey Cunningham, and Lou Marciani. 2008. Developing a new curriculum in sport security management. *Journal of Homeland Security and Emergency Management* 5(1): 1-12.

High profile sporting events in the United States have been identified by the Department of Homeland Security (DHS) as potential terrorist targets. However, there has been an identified lack of training and education for key personnel responsible for sport security operations. Recognizing the demand and need for a specialized area in sport event security management, the University of Southern Mississippi School of Human Performance and Recreation developed an emphasis area in sports event security management

as part of the Master of Science in Sport Management program. The sport security emphasis area includes three graduate level courses 1) introduction to sport security management, 2) risk assessment of sport venues, and 3) sport event emergency response planning. These courses were developed by an interdisciplinary team composed of faculty from the USM School of Human Performance and Recreation, individuals from the Center for Spectator Sports Security Management, a curriculum design specialist, and several professional sport security experts. The goal of the emphasis area is to equip current and future sport and entertainment managers with the specialization skills and knowledge needed to address the challenges of homeland security in the sports industry.

Handmer, John, and Stephen Dovers. 2008. Policy development and design for fire and emergency management. ***The Australian Journal of Emergency Management*** **23(1): 21-29.**

Fire and emergency managers have generally been more concerned with undertaking their immediate, vital mission than longer term, strategic policy development. This paper draws on a recent book by the authors to suggest a process for developing and implementing robust policy for fire and emergency management. Different approaches to policy development are discussed. The case is made that there are distinct types of policy problems in fire and emergency management, each requiring distinct approaches. The need for thought on policy implementation style, the advantages of multiple problem framing and the challenge of policy instrument choice are set out.

Laditka, Sarah B., James N. Laditka, Carol B. Cornman, Courtney B. Davis, and Maggi J. Chanlee. 2008. Disaster preparedness for vulnerable persons receiving in-home, long-term care in South Carolina. ***Prehospital and Disaster Medicine*** **23(2): 133-142.**

The purpose of this study was to examine how agencies in South Carolina that provide in-home health care and personal care services help older and/or disabled clients to prepare for disasters. The study also examines how agencies safeguard clients' records, train staff, and how they could improve their preparedness. Federal regulations require preparedness for agencies providing in-home health care. No analogous regulations were found for in-home personal care. The degree of preparedness varied substantially among personal care agencies. Most personnel care agencies were categorized as "less" prepared or "moderately" prepared. The findings for agencies in both categories generally suggest lack of preparedness in: 1) identifying clients at high risk and assisting them in planning; 2) providing written materials and/or recommendations; 3) protecting records; 4) educating staff and clients; and 5) coordinating disaster planning and response across agencies. Home health agencies were better prepared than were personal care agencies. However, some health administrators commented that they were unsure how well their plans would work during a disaster, given the lack of training. The majority of home health agency administrators spoke of a need for better coordination and/or more preparedness training. Agencies providing personal care and home health services would benefit from developing stringer linkages with their local preparedness systems. The findings support incorporating disaster planning in the certification requirements for home health agencies, and developing additional educational resources for administrators and staff of personal care agencies an their clients.

Laidlaw, Prue, Dirk H. R. Spennemann, and Catherine Allan. 2008. Protecting cultural assets from bushfires: A question of comprehensive planning. ***Disasters*** **32(1): 66-81.**

Cultural heritage sites form an nonrenewable asset that is threatened by natural disasters. Given the high bushfire risk, mandatory Bush Fire Risk Management Plans have been drawn up throughout New South Wales, Australia. The authors compared their mandatory provisions for the protection of heritage assets with an 'Ideal Heritage Disaster Plan', containing a series of nonnegotiable elements. The examined plans fell well short of the ideal. Preparedness plans generally lacked a discussion of suppression techniques (for historic heritage), prevention, prescribed drills, and communication procedures. None of the response plans or recovery plans contained any of the required core elements, such as rapid suppression techniques and stabilization procedures. Where aspects were covered, they were addressed in an inadequate level of detail. The overall quality of the cultural heritage components of the plans is judged to be poor. Suggestions are made on how to improve the situation if heritage assets are to have future following bushfire events.

Luke, Thomas C., and Jean-Paul Rodrigue. 2008. Protecting public health and global freight transportation systems during an influenza pandemic. ***American Journal of Disaster Medicine*** **3(2): 99-107.**

The H5N1 influenza threat is resulting in global preparations for the next influenza pandemic. Pandemic influenza planners are prioritizing scarce vaccine, antivirals, and public health support for different segments of society. The freight, bulk goods, and energy

transportation network comprise the maritime, rail, air, and trucking industries. It relies on small numbers of specialized workers who cannot be rapidly replaced if lost due to death, illness, or voluntary absenteeism. Because transportation networks link economies, provide critical infrastructures with working material, and supply citizens with necessary commodities, disrupted transportation systems can lead to cascading failures in social and economic systems. However, some pandemic influenza plans have assigned transportation workers a low priority for public health support, vaccine, and antivirals. The science of transportation geography demonstrates that transportation networks and workers are concentrated at, or funnel through, a small number of chokepoints and corridors. Chokepoints should be used to rapidly and efficiently vaccinate and provide prophylaxis to the transportation worker cohort and to implement transmission prevention measures and thereby protect the ability to move goods. Nations, states, the transportation industry and unions, businesses, and other stakeholders must plan, resource, and exercise, and then conduct a transportation health assurance and security campaign for an influenza pandemic.

Lust, Elaine, and Kenneth P. Hermsen. 2008. Preparing for the realities of a disaster deployment: Tips, hints, and suggestions for healthcare professionals. ***Journal of Emergency Management*** **6(2): 25-30.**

The sharing of common deployment realities learned during medical disaster deployments is intended to assist other healthcare professionals who serve on local, state, regional, or federal disaster response teams. The tips, hints, and suggestions communicated in this article are categorized into four main areas: personal realities, disaster scene realities, practice change realities, and disaster management realities. By sharing disaster realities from "boots on the ground" experience, the authors hope to soften the learning curve that can accompany a medical disaster deployment for other healthcare professionals.

McCormick, Lindsey. 2008. Hurricane Katrina and lessons learned utilization: Important findings for the emergency management community. ***Journal of Emergency Management*** **6(3): 39-44.**

Hurricane Katrina revealed several lessons learned for the emergency management community. This study was conducted to determine common lessons learned from Katrina and how emergency managers in hurricane prone areas were utilizing them. The study attempted to determine if and how the emergency management community is using the lessons learned from Katrina, if at all. The author concludes with some important findings for the emergency management community. The survey results are valuable to emergency managers in the sense that utilizing lessons learned from previous disasters of all types can lead to more effective planning and responding to future disasters. Effective emergency planning or managing effective responses in disasters saves peoples' money and most important, peoples' lives.

Nja, Ove, and Eivind L. Rake. 2008. An essay on research methodology: An alternative approach to incident command research through participatory action research. ***Journal of Contingencies and Crisis Management*** **16(2): 91-100.**

Current incident command research faces several challenges. The incident commander's behavior and related assessments in the crisis response are context bound, and our understanding of these factors requires close awareness of the context. Reconstruction of the on-scene behavior encompassing situation awareness and cognitive reasoning is difficult. There is a need to develop better understanding of decision-making in crisis settings and methods for rigorous observation and knowledge elicitation. In order to understand the importance and actual influence of incident commanding, the researchers need to assess the response in real time, not only based on studying logs etc. afterwards. Participatory action research provides ideas in which the researcher, besides being an observer, would be involved in the rescue work. This raises ethical questions, but there is a need for naturalistic decision-making research to evolve beyond descriptive models.

O'Brien, Geoff. 2008. UK emergency preparedness: A holistic response? ***Disaster Prevention and Management*** **17(2): 232-243.**

This paper offers insights into emergency preparedness in the United Kingdom. It argues that to address the consequences of climate change and variability, a greater focus on pre-emergency planning that engages a wider stakeholder group must be adopted. It also discusses UK emergency management and approaches to climate change and climate variability risk. The internal focus of UK emergency management inhibits the contribution that it can make to societal resilience and public preparedness. Effective risk reduction requires that all actors, including the public, are engaged in the social learning process. From a UK emergency management perspective this requires a culture shift to an outward proactive focus. This paper offers insights into emergency preparedness in the UK.

Reid, Pat, and Dewald van Niekerk. 2008. A model for a multi-agency response management system (MARMS) for South Africa. ***Disaster Prevention and Management*** **17(2): 244-255.**

The promulgation of disaster management legislation and policy in South Africa necessitates the development of a uniform multi-agency incident and disaster response system. This paper argues that a uniform response by numerous government agencies in South Africa can only be achieved through the application of an accepted model, which is based on the requirements of the Disaster Management Act 57 of 2002 as well as the National Disaster Risk Management Framework of South Africa. The model was developed using grounded theory methodology through the use of the internet and focus group interviews with South African as well as international experts. During the process of analyzing the data by open and axial coding, key elements emerged which were then clustered into categories from which the core concepts of the model emerged. The emergent core concepts were then dimensionalized, which formed the major constructs of the model thereby ensuring that the model was grounded in the theory. Constant comparisons were drawn with the experiences in the field throughout the process in order to ensure theoretical sensitivity. During the process of axial coding certain intervening conditions emerged which could negatively or positively affect its application. The developed model was therefore subjected to scrutiny by means of a quantitative attitudinal test amongst senior professionals involved in the field of emergency and disaster management, resulting in triangulation. The findings demonstrate that in order for the proposed model to be implemented effectively it is necessary to refine each level of response in terms of authority, communication and reporting lines. This model can be used as the foundation for the development of a comprehensive response management system for South Africa and other similar countries, and that the model can further contribute to the development of a basic training module for inclusion in the curricula of response agency personnel.

Reissman, Dori B., and John Howard. 2008. Responder safety and health: Preparing for future disasters. ***Mount Sinai Journal of Medicine*** **75(2): 135-141.**

This article reviews lessons learned about managing the safety and health of workers who were involved in disaster response, recovery, and cleanup after the 2001 World Trade Center (WTC) disaster. The first two sections review ongoing responder health burdens and the tragic toll of this disaster from a worker safety and health perspective. The remaining sections address changes in federal infrastructure, response planning, and resources for protection of response and recovery personnel. Proper preparation includes pre-event and ''just-in-time'' disaster-worker training on likely hazards, organizational assets for hazard monitoring, and hands-on instruction in the use of assigned protective equipment. Good planning includes pre-deployment medical review to ensure ''fitness for duty'' and considers the following: (1) personal risk factors, (2) hazards likely to be associated with particular field locations, and (3) risks involved with assigned tasks (e.g. workload and pace, work/rest cycles, available resources, and team/supervisory dynamics). Planning also should address worker health surveillance, medical monitoring, and availability of medical care (including mental health services). Disaster safety managers should anticipate likely hazards within planning scenarios and prepare asset inventories to facilitate making timely safety decisions. Disaster safety management begins immediately and provides ongoing real-time guidance to incident leadership at all levels of government. Robust standards must be met to reliably protect workers/responders. An integrated and measurable multiagency safety management function must be built into the incident command system before an incident occurs. This function delineates roles and responsibilities for rapid exposure assessments, ensuring cross-agency consistency in data interpretation, and timely, effective communication of information and control strategies. The ability to perform this safety management function should be tested and evaluated in exercise simulations and drills at multiple levels. Joint planning and exercising of the safety management plan and its function are effective ways to build interagency relationships and to be more systemic in managing logistics for safety equipment and converging personnel. Planning must include mechanisms to enable safety decisions to be implemented such as effective and rapid scene control (site access), personnel tracking, and safety enforcement. Worker safety and health preparedness and leadership are essential for protecting workers and promoting resiliency among personnel involved in disaster response, recovery, and cleanup.

Renger, Ralph, Anneke Jansen, Erin Peacock, Adriana Cimetta, and Jessica Surdam. 2008. Using evaluation theory to augment the homeland security exercise and evaluation program (HSEEP) guidance for evaluating operations-based exercises. ***Journal of Emergency Management*** **6(3): 45-52.**

Exercises play a crucial role in better preparing for, responding to, and recovering from an emergency by providing opportunities for responders and officials

to practice and assess their collective capabilities. Conducting a thorough evaluation of these exercises is critical to ensuring that the nation continually improves its ability to save lives and property. A major emphasis of the Homeland Security Exercise and Evaluation Program (HSEEP) is on defining and evaluating capability-based objectives to determine the impact of an exercise. Using the integrated theory of evaluation, it is shown how a cost-effective, quality evaluation of operations- based exercises can be conducted while simultaneously not interfering or adding to the burden of exercise players, controllers, or evaluators. It is hoped that this article will act as a catalyst in moving HSEEP to recognize the potential of other sources of information to assist in conducting a more comprehensive evaluation and amend their guidelines accordingly.

Schwartz, Rachel D. 2008. The impact of correctional institutions on public health during a pandemic or emerging infection disaster. ***American Journal of Disaster Medicine*** **3(3): 165-70.**
With the growing threat of a naturally occurring or man-made global pandemic, many public, private, federal, state, and local institutions have begun to develop some form of preparedness and response plans. Among those in the front lines of preparedness are hospitals and medical professionals who will be among the first responders in the event of such a disaster. At the other end of the spectrum of preparedness is the corrections community who have been working in a relative vacuum, in part because of lack of funding, but also because they have been largely left out of state, federal local planning processes. This isolation and lack of support is compounded by negative public perceptions of correctional facilities and their inmates, and a failure to understand the serious impact a jail or prison facility would have on public health in the event of a disaster. This article examines the unique issues faced by correctional facilities responding to disease disasters and emphasizes the importance of assisting them to develop workable and effective preparedness and response plans that will prevent them from becoming disease repositories spreading illness and infection throughout our communities. To succeed in such planning, it is crucial that the public health and medical community be involved in correctional disaster planning and that they should integrate correctional disaster response with their own. Failure to do so endangers the health of the entire nation.

Sadowski, Nicole Cornell, and Daniel Sutter. 2008. Mitigation motivated by past experience: Prior hurricanes and damages. ***Ocean and Coastal Management*** **51(4): 303-313.**
Hurricanes imposed a heavy toll on the U.S. in 2004 and 2005: damages from the four Florida hurricanes in 2004 exceeded Hurricane Andrew, while Hurricane Katrina was the costliest natural disaster in U.S. history. Researchers have spent years devising plans and mitigation measures to reduce damages from hurricanes. The lack of a reliable database on mitigation efforts has hampered assessment of the effectiveness of these measures. This article proposes a new test of the effectiveness of mitigation using a past land falling hurricane as a proxy, since conventional wisdom holds that communities often implement mitigation after a disaster. The authors find that a prior land falling hurricane and by implication mitigation can significantly reduce damages, by the equivalent of about a one category reduction on the Saffir-Simpson scale of hurricane intensity.

Shaheen, Maqsood Ahmad. 2008. Earthquake effects on educational institutions and libraries of Azad Kashmir: An appraisal. ***Library Review*** **57(6): 449-456.**
This paper discusses the effects of earthquakes on libraries and educational institutions in the region of Azad Kashmir in Pakistan. It is based on a review of the literature published in the newspapers, face-to-face and telephonic interviews, and donor reports from the area. Inputs (people, knowledge, material, capital, and finance), processes, outputs, and feedback mechanism of libraries in Kashmir are described. The barriers to implementing the strategies are essentially practical: resource constraints and related social or governmental factors. The paper suggests strictly following the building codes prescribed by the international standard bodies. The paper also calls for strict monitoring of the construction of the educational institutions and libraries, and for control of the corruption involved in contracting out the tenders, etc. This study attempts to highlight the importance of disaster management and training during such kind of disasters and preservation strategies for libraries. The paper is useful not only to understand what strategies should be adopted during such kind of disasters but also to review the picture of the state of libraries and educational institutions post earthquake in Pakistan. The paper would be very useful to the Government of Azad Jammu and Kashmir and the policy makers in the education department while implementing the building codes, planning disaster management strategies and the library staff in the affected areas.

Shaluf, Ibrahim Mohamed. 2008. Technological disaster stages and management. ***Disaster Prevention and Management*** **17(1): 114-126.**

This paper aims to provide graduate students, researchers, governmental and independent agencies with an overview on the stages and management of technological disasters. The technological disasters are a subject of concern to the researchers, the academicians, the governmental and independent agencies. The disasters, which involve major hazard installations (MHIs), are known as technological disasters. The information has been collected from several sources such as the technical and general articles, internet web sites, and internal reports. The technological disaster definition and stages have been reviewed. This paper presents an overview on the technological disaster management cycle. Technological disasters consist of three stages. The stages are classified into pre-, during and post-disaster stages. Disaster management is a collective term encompassing all aspects of planning for and responding to disasters, including both pre-disaster and post-disaster activities. Disaster management cycle is an open-ended process. The four phases comprising the cycle begin and end with mitigation. The stages are not mutually exclusive; there is an overlap. The stages of disaster management can be operative concurrently, because those stages are not independent. This paper presents an overview on the technological disaster definition and stages. It provides the MHIs management and the related authority with a background on the technological disaster management cycle. It motivates the members of the MHIs, particularly managerial staff, and the emergency planners to continually improve the control of MHIs. It provides the background and basis for further research in disaster and disaster management.

Shaw, Kelly A., and Tania Winzenberg. 2008. Emergency planning and preparedness in general practice. ***Journal of Emergency Management*** **6(2): 45-54.**

The aims of this study were to (1) assess general practitioners' (primary care doctors) perceptions of their role in responding to emergencies, (2) identify barriers to their involvement in emergency management, (3) measure their willingness to volunteer in an emergency, and (4) determine their level of skills and training in emergency management. The design of the study was qualitative focus group study and quantitative cross-sectional survey of general practitioners. The setting was general practices in Tasmania, an island state of Australia. Participants: All 541 general practitioners in Tasmania. Methods: Focus groups were conducted to assess general practitioners perceived roles in an emergency and issues relevant to them undertaking these roles. These data were used to design a quantitative cross-sectional survey that was administered to all Tasmanian general practitioners to assess their willingness to participate in emergency management and to measure their skills base and training needs. The response rate to the survey was 100 percent. The survey found that 42 percent of respondents were willing to volunteer their services in an emergency. Of those, 46 percent had emergency management training and/or skills and/or experience. Focus group participants felt that general practice resources, including non-doctor staff, practice infrastructure, and equipment, could make a valuable contribution to emergency management. General practitioners are willing to participate in management of emergencies. A significant number have emergency management training and experience. However, appropriate systems and supports are required to facilitate their involvement.

Smart, Colin John, and Ian Maconochie. 2008. How and why do you declare a major incident? ***Prehospital and Disaster Medicine*** **23(1): 70-75.**

The decision to declare a major incident (MI) is not one to be taken lightly, but a delay in doing so may have dire consequences. The aim of this study was to ascertain what factors make specialists from a variety of professional backgrounds in the United Kingdom determine from an initial visual assessment of a scene that a MI should be declared. Participants were presented with three different scenarios, which were presented pictorially. Their responses were noted. One hundred seventy-eight professionals took part in this study. For Scenario 1 (a road traffic incident), 101 declared a MI. For a coach rollover in Scenario 2, a MI was declared by 82 people, and a MI was declared by 156 for a rail crash in Scenario 3. Forty-six participants had attended a MI previously. The results for declaring a MI in this group were 1) Scenario 1, 25; 2) Scenario 2, 25; and 3) Scenario 3, 44. Of this group, 44 had previously had training before experiencing the MI. Those who had less than 10 years of service in emergency services were more likely to declare a MI in Scenario 2 and 3. The main problem with the existing system is the interpretation and subjective nature of the word "major". Specialists incorporate many individual factors into using the word. Future research should focus on the development of a system tied to more objective analysis.

Smith, Andy. 2008. Identifying nationally recognized emergency management skill sets: Godsend or poi-

soned chalice? ***The Australian Journal of Emergency Management*** **23(1): 58-63.**
Public Safety Training Package was first published in July 2000 by the then Public Safety Industry Training Advisory Board and provided the first nationally recognized qualification in emergency management being an Advanced Diploma in Public Safety (Emergency Management). In this paper, Smith provides an overview of nationally recognized skill sets and opportunities for the emergency management sector to identify skill sets that may strategically enhance capability and performance within the sector. He draws upon the experience of the Australian Broadcasting Corporation, the State/Territory Emergency Services sector in addition to researchers within the vocational education and training sector. Since inception, the emergency management sector has clustered competency standards to meet industry and employer needs, rather than as a strategic decision informed by the Australian Qualifications Framework.

Solana, M. C., C. R. J. Kilburn, and G. Rolandi. 2008. Communicating eruption and hazard forecasts on Vesuvius, Southern Italy. ***Journal of Volcanology and Geothermal Research*** **172(3-4): 308-314.**
Emergency response plans have been formalized for only one third of the 32 volcanoes that have erupted in the past 500 years in Europe and its dependent territories. As local and tourist populations increase around the remaining 67 percent, the need for an appropriate emergency plan becomes more urgent. A cornerstone of such a plan is to ensure that local decision makers are aware of the volcanic hazards that may be faced by their communities. Hence, instead of applying existing plans from another volcano, it is pertinent first to evaluate the impact that these plans have had on local decision makers. This paper reports results from a preliminary evaluation of interviews with decision makers at Vesuvius, in Southern Italy, for which an emergency response plan has been available since 1995. The volcano last erupted in 1944, so that none of the monitoring scientists or civil authorities has direct experience of responding to Vesuvius in eruption. The results of the surveys suggest that, although the civil authorities on the volcano are aware that Vesuvius poses a hazard, their understanding of how to respond during an emergency is incomplete. They also indicate opportunities for increasing such understanding during future revisions of the emergency plan, provided they are done before a crisis arises.

Tarn, J. Michael, H. Joseph Wen, and Stephen C. Shih. 2008. A theoretical perspective of man-made system disasters: Social-technical analysis and design. ***Disaster Prevention and Management*** **17(2): 256-280.**
The purpose of this paper is to study major man-made system disasters and to suggest a solution for filling the noted gaps in control systems interfaces and to render those vital considerations for the next-generation disaster management control systems. This research analyzes the nature of large-scale disasters and observes that most man-made system disasters are composed of many related events that interact with one another. The findings show evidence of a common path to catastrophe. These functional failures resulted from the information gaps that eventually contribute to the development of a tragedy. Because of the intricate interconnections among related events of a developed calamity, an integrated approach to man-made disaster detection and prevention as well as emergency management is required. Conducting an analysis of the typical contingency control structures, the authors suggest that disaster or emergency managers adopt a pessimistic and quasi-intelligent orientation to monitor and control critical systems. This research presents a generic threat-driven disaster management control system design with advanced model bases and decision support technologies to enhance conventional disaster management control systems and to supplement management responses so that the sphere and magnitude of damage can be minimized.

Tobin, Rick. 2008. Sheltering for catastrophes: A call for change. ***Journal of Emergency Management*** **6(3): 16-17.**

Tran, Phong, Fausto Marincioni, Massimo Sarti, and Le Van An. 2008. Flood risk management in Central Viet Nam: Challenges and potentials. ***Natural Hazards*** **46(1): 119-138.**
This article explores the impacts of floods on the economy, environment, and society and tries to clarify the rural community's coping mechanism to flood disasters in Central Viet Nam. It focuses on the social aspects of flood risk perception that shapes the responses to floods. The research findings revealed that flooding is an essential element for a coastal population, whose livelihood depend on productive functions of cyclical floods. The findings also revealed that floods, causing losses and damages, often inhibited economic development. The surveyed communities appeared to have evolved coping mechanisms to reduce the negative impacts of the floods, yet these coping mechanisms are under pressure due to environmental degradation.

Integrated flood risk management is considered as a suitable paradigm for coping with flood disasters.

Uhr, Christian, Henrik Johansson, and Lars Fredholm. 2008. Analyzing emergency response systems. *Journal of Contingencies and Crisis Management* 16(2): 80-90.
This article suggests a method that can be used for analyzing an emergency response system. Both the literature and empirical findings indicate that response operations sometimes diverge from existing plans when adapting to an event and its consequences. The method, which aims at achieving a better understanding of emergency response management, adopts a systems perspective using various relationships that exist or develop between personnel belonging to those organizations that are part of the emergency response operation. Results of a study of such an emergency response system are presented and discussed in order to demonstrate how the method can be employed.

Uhr, Christian, and Olof Elkman. 2008. Trust among decision makers and its consequences in emergency response operations. *Journal of Emergency Management* 6(3): 21-38.
In an emergency response operation, trust can have an influence on the efficiency in communication between different decision makers and how the networks of these decision makers are formed. Consequently, it might affect the efficiency, flexibility, and adaptation capability in the response system as a whole. Trust could generally be described as a relation between a trustor and a trustee where the expected behavior and competence of the trustee in a specific context, estimated by the trustor, is a central core in the concept. On the basis of a literature review and interviews with Australian emergency response practitioners, this article discusses relevant characteristics of trust and its consequences in emergency response. The content emphasizes the need for further development of descriptive analysis of the processes underlying the formal charts and documents to understand authentic conditions and further develop valid normative theories for emergency response management.

Disaster Relief

Aakko, Eric, Nathan Weed, Richard Konrad, and John Wiesman. 2008. Rethinking volunteer management using a centralized volunteer staging and training area. *Disaster Medicine and Public Health Preparedness* 2(2): 127-129.
Public health agencies simply do not have enough trained staff or volunteers to effectively respond to a large-scale disaster. Training volunteers "off the street" will be crucial but time consuming in a public health emergency. A centralized volunteer staging and training area can help to efficiently register, credential, and conduct just-in-time training of volunteers, while reducing stress, confusion, traffic congestion, and security issues at various mass dispensing clinics.

Amundson, Dennis, David Lane, and Elizabeth Ferrara. 2008. Operation aftershock: The U.S. military disaster response to the Yogyakarta earthquake May through June 2006. *Military Medicine* 173(3): 236-240.
The U.S. military has recently been involved in many humanitarian assistance and disaster response missions around the world. This newfound role is in response to the U.S. government's desire to use "medical diplomacy" rather than "military might" to shape its relationship with foreign governments. With each of these humanitarian assistance and disaster response missions, the U.S. military has learned how to more rapidly insert desperately needed services and skill sets into disaster-struck communities, how to arrange for in-country services (translation services, transportation, etc.) that cannot be readily brought in, and how to work closely with foreign governments and nongovernmental organizations to determine their needs and expectations without the U.S. military appearing as if it were trying to establish a permanent presence.

Carpenter, Michealle, James G. Hodge, and Raymond P. Pepe. 2008. Deploying and using volunteer health practitioners in response to emergencies: Proposed uniform state legislation provides liability protections and workers' compensation coverage. *American Journal of Disaster Medicine* 3(1): 17-23.
To respond effectively to natural disasters and other public health emergencies, government resources must be augmented with the resources of volunteer organizations. Governmental actors are prepared to utilize volunteer health practitioners (VHPs) to meet patient surge capacity and provide essential public health services. However, difficult legal challenges arise regarding licensure, the scope of practice of volunteers, the relationship of volunteers to local healthcare delivery systems, disciplinary enforcement, the extent of exposure to civil liability, and how to provide compensation for volunteers injured or killed during disaster response activities. The Uniform Emergency Volunteer Health Practitioner Act (UEVHPA) seeks to address these problems and provide a better legal environment that facilitates VHPs efforts. This article discusses two important provisions of the UEVHPA, Section 11 which provides immunity against claims for

negligence, under certain circumstances, for volunteers and organizations engaged in the deployment and use of volunteers, and Section 12 which provides workers' compensation benefits to VHPs when other sources of coverage are not available. Disaster relief organizations and healthcare provider organizations have consistently identified uncertainty and a lack of uniformity with respect to these issues as a major source of concern to volunteer practitioners and as a potential deterrent to their effective recruitment and utilization. Uniform state enactment of the UEVHPA would resolve many inconsistencies and gaps in the regulation and protection of VHPs across states.

Doocy, Shannon, Diane Johnson, and Courtland Robinson. 2008. Cash grants in humanitarian assistance: A nongovernmental organization in Aceh, Indonesia, following the 2004 Indian Ocean tsunami. ***Disaster Medicine and Public Health Preparedness*** **2(2): 95-103.**

Historically cash interventions, as opposed to material or in-kind aid, have been relatively uncommon in the humanitarian response to emergencies. The widespread implementation of cash-based programs following the 2004 Indian Ocean tsunami provided an opportunity to examine cash distributions following disasters. The Mercy Corps cash grant program in Aceh, Indonesia, was a short-term intervention intended to assist in recompensing losses from the December 2004 tsunami. An evaluation of the Mercy Corps cash grant program was conducted for the 12-month period following the tsunami using program monitoring data and a systematic survey of cash grant beneficiaries. In 2005, the cash grant program disbursed more than US$3.3 million to more than 53,000 beneficiaries; the average cash grant award was US$6,390, which was shared by an average of 108 beneficiaries. In a beneficiary survey, more than 95% of respondents reported the grant allocation processes were fair and transparent and that grant funds were received. The Mercy Corps experience with cash programs suggests that cash interventions in the emergency context, when properly administered, can have an immediate impact and serve as an efficient mechanism for providing assistance. Organizations involved in humanitarian relief, particularly donors and nongovernmental organizations, should consider incorporating cash-based interventions as an element of their response in future emergencies.

Kilby, Patrick. 2008. The strength of networks: The local NGO response to the tsunami in India. ***Disasters*** **32(1): 120-130.**

This paper examines the role played by a network of 12 local non-governmental organizations (NGOs) -- the East Coast Development Forum (ECDF) -- in the response to the Indian Ocean tsunami of December 26, 2004, which devastated the east coast of India. It examines how the ECDF sought to meet the needs of affected people through a direct relief program, a rehabilitation program focused on the restoration of livelihoods, and through advocacy to press for changes to government programs to make them inclusive and to ensure that they satisfy the priority needs of the people most affected. The paper concludes that it was the trust and capacity built up through past network activities of the fisher, dalit, and tribal communities that enabled the ECDF to launch an effective response to the tsunami. A lesson to emerge is that the use of similar existing networks could be employed in other disaster responses around the world.

King, David, and James Cook. 2008. How people responded to the April 2007 tsunami warning in Cairns and Townsville. ***The Australian Journal of Emergency Management*** **23(1): 10-20.**

Following the Indian Ocean Tsunami in 2004, there was heightened international awareness of this hazard and strategies were developed to improve tsunami warning systems worldwide. Australian emergency management and scientific agencies such as EMA, Geoscience Australia, the Bureau of Meteorology and state emergency management departments released warning and behavior information through websites, and the development of warning systems has been ongoing. Despite the enormity of the tsunami, research on tsunami awareness has been limited. The tsunami warning that took place on April 2, 2007 was a rare opportunity to record how people responded. Surveys carried out by the Centre for Disaster Studies showed that most (76 percent) people heard the warning while it was current during the morning of 2nd April, primarily before 0930, but that most people sought no extra information (70 percent) and took no action (53 percent). Townsville was significantly more laid back than Cairns, but only 35 percent considered future tsunami warnings to be unlikely or are not bothered about them. People called for more information and advice. There were strong levels of concern about the warning, future warnings, and knowledge of correct actions. However, significant proportions of residents did not know whether or not they lived in a storm surge zone.

Rowley, Elizabeth A., Byron L. Crape, and Gilbert M. Burnham. 2008. Violence-related mortality and morbidity of humanitarian workers. ***American Journal of Disaster Medicine*** **3(1): 39-45.**

The objectives of this paper are to: (1) to determine the rate of violence related deaths, medical evacuations, and hospitalizations occurring to national and expatriate staff of participating humanitarian organizations; (2) to describe the distribution of all-cause and cause specific mortality and morbidity of humanitarian workers with regard to possible risk factors. Surveillance study of field-based humanitarian workers; data were regularly collected from headquarters of participating organizations via e-mail and telephone between September 2002 and December 2005. The participants were eighteen humanitarian organizations reported on any death, medical evacuation, or hospitalization of any national or expatriate staff, for any cause, in any field location during the study period. The main outcome measures were risk of violence related events was calculated as the number of deaths, medical evacuations, and hospitalizations during the study period divided by the total number of field staff for organizations that had staff in those countries where events occurred to the staff of any participating organization. Distribution descriptions are presented as simple proportions. Risk of violence-related deaths, medical evacuations, and hospitalizations was six per 10,000 aid worker person-years. Fifty percent of intentional violence cases were lethal. Intentional violence accounted for 55 percent of all deaths reported, followed by coincidental illness (27 percent) and accidents (15 percent). Aid worker deaths in this group were more frequently caused by intentional violence than either accidents or coincidental illness. The rate of six intentional violence events per 10,000 person-years can be used as a baseline by which to track changes in risk over time.

Earthquakes

Amundson, Dennis, David Lane, and Elizabeth Ferrara. 2008. Operation aftershock: The U.S. military disaster response to the Yogyakarta earthquake May through June 2006. ***Military Medicine*** **173(3): 236-240.**

The U.S. military has recently been involved in many humanitarian assistance and disaster response missions around the world. This newfound role is in response to the U.S. government's desire to use "medical diplomacy" rather than "military might" to shape its relationship with foreign governments. With each of these humanitarian assistance and disaster response missions, the U.S. military has learned how to more rapidly insert desperately needed services and skill sets into disaster-struck communities, how to arrange for in-country services (translation services, transportation, etc.) that cannot be readily brought in, and how to work closely with foreign governments and nongovernmental organizations to determine their needs and expectations without the U.S. military appearing as if it were trying to establish a permanent presence.

Bana e Costa, Carlos, Carlos S. Oliveira, and Victor Vieira. 2008. Prioritization of bridges and tunnels in earthquake risk mitigation using multicriteria decision analysis: Application to Lisbon. ***Omega: The International Journal of Management Science*** **36(3): 442-450.**

This paper presents the development of a multicriteria value model enabling the prioritization of bridges and tunnels according to their structural vulnerability and strategic importance for the formulation and implementation of civil protection policies, both for retrofitting and emergency management in the face of seismic events. An interactive structuring process was developed with a group of key players to define the evaluation criteria and the MACBETH approach was extensively used (i) to facilitate the assessment from the group of the judgmental information necessary to build value functions and (ii) to establish relative weights for the criteria. The model was subsequently explored to prioritize the bridges and tunnels of a zone in Lisbon with high seismic hazard.

Bostrom, Ann, Luc Anselin, and Jeremy Farris. 2008. Visualizing seismic risk and uncertainty: A review of related research. ***Annals of the New York Academy of Sciences*** **1128(1): 29-40.**

Government agencies and other authorities often communicate earthquake risks using maps derived from geographic information systems. Yet, little is known about the effects of these maps on risk perceptions. While mental models research and other approaches are available to inform risk communication text design, similar empirically derived guidance is lacking for visual risk communications, such as maps, which are likely to trump text in their impact and appeal. This paper reviews the empirical research that might inform such guidance. Research on graphs, spatial and visual perception, and map design suggests that graphics increase risk avoidance over numerical risk representations, and countable visuals, like dots, can increase the accuracy of perceived risks, but not always. Cartographic design features, such as color, animation, interactivity, and depth cues, are all candidates to represent risk and uncertainty and to influence risk perception. While there are robust known effects of color

(e.g., red=danger), with some cultural variability, animation can increase the salience of otherwise obscure features but is not uniformly effective. Depth cues, dimensionality, and the extent to which a representation depicts versus symbolizes a scene will influence the viewer's perspective and perception, depending on the viewer's familiarity with the scene; their effects on risk perception remain unclear. The translation and representation of technical information about risk and uncertainty is critical to risk communication effectiveness. The review suggests a handful of candidate criteria for evaluating the effects of risk visualizations, short of changes in behavior: accuracy, accessibility, retention, and perceived risk and usefulness.

Gautschi, Oliver P., Dieter Cadosch, Gunesh Rajan, and Rene Zellweger. 2008. Earthquakes and trauma: Review of triage and injury-specific, immediate care. ***Prehospital and Disaster Medicine*** **23(2): 195-201.**
Earthquakes present a major threat to mankind. Increasing knowledge about geophysical interactions, progressing architectural technology, and improved disaster management algorithms have rendered modern populations less susceptible to earthquakes. Nevertheless, the mass casualties resulting from earthquakes in Great Kanto (Japan), Ancash (Peru), Tangshan (China), Guatemala, Armenia, and Izmit (Turkey) or the recent earthquakes in Bhuj (India), Bam (Iran), Sumatra (Indonesia) and Kashmir (Pakistan) indicate the devastating effect earthquakes can have on both individual and population health. Appropriate preparation and implementation of crisis management algorithms are of utmost importance to ensure a large-scale medical-aid response is readily available following a devastating event. In particular, efficient triage is vital to optimize the use of limited medical resources and to effectively mobilize these resources to maximize patient survival. However, the main priorities of disaster rescue teams are the rescue and provision of emergency care for physical trauma. Furthermore, the establishment of transport evacuation corridors, a feature often neglected, is essential in order to provide the casualties with a chance for survival. The optimal management of victims under such settings is discussed, addressing injuries of the body and psyche by means of simple diagnostic and therapeutic procedures globally applicable and available.

Karairmak, Ozlem, and Gul Aydin. 2008. Reducing earthquake-related fears in victim and nonvictim children. ***The Journal of Genetic Psychology*** **169(2): 177-185.**
In this study, the authors investigated the fears of earthquake victim and non-victim elementary school students and the effectiveness of an activity-based cognitive fear reduction (ABCF) procedure developed by the authors. To measure fear, the authors collected data from 266 participants using a modified version of the Fear Survey Schedule for Children (FSSC; W. Yule, O. Udwin, &K. Murdoch, 1990). Results demonstrated that earthquake victim children were more fearful on two subtests of the FSSC than were non-victim children and that girls had significantly stronger fears on all subscales than did boys. The ABCF procedure was not an effective approach for reducing the fears of earthquake victims. However, the control group did demonstrate a significant reduction in fears. The authors suggest that the activity designed for this group may have been an intervention in itself. The authors discuss this finding and offer suggestions for researchers and therapists.

Lazaratou, Helen, Thomas Paparrigopoulos, Gerassimos Galanos, Constantinos Psarros, Dimitris Dikeos, and Constantin Soldatos. 2008. The psychological impact of a catastrophic earthquake: A retrospective study 50 years after the event. T*he Journal of Nervous and Mental Disease* **196(4): 340-344.**
The aim of this study was to retrospectively assess the impact of a catastrophic earthquake in a sample of 121 survivors, 50 years after the event. Mean age +/- SD of the responders was 72.2 +/- 6.1 years. The majority of the victims (78%) acknowledged a strong overall impact of the earthquake on their lives, and almost all of them had intense recollection of the event at its anniversary. The most frequent symptom during the 6 months after the earthquake was persistent remembering or "reliving" of the event; women had considerably more often recurrent dreams of the earthquake and distress than did men. Women and young adults at the time of the earthquake appear to be the most vulnerable groups regarding the psychological effects of the event.

Liang, Qiao-Mei, Satochi Tsuchiya, Hirokazu Tatano, Norio Okada, and Yi-Ming Wei. 2008. An application of SCGE model to assess the labor and capital related economic loss in Nankai earthquake. ***International Journal of Risk Assessment and Management*** **8(4): 412-423.**
This paper established a spatial computable general equilibrium model to simulate the Japanese economy. Four scenarios representing different possible labor and capital loss in the prospective Nankai earthquake were set up to assess the impacts of labor and capital on regional economy.

Pal, Indrajit, Sankar Kumar Nath, Khemraj Shukla, Dilip Kumar Pal, Abhishek Raj, K. K. S. Thinkbaijam, and B. K. Bansal. 2008. Earthquake hazard zonation of Sikkim Himalaya using a GIS platform. ***Natural Hazards*** **45(3): 333-377.**

An earthquake hazard zonation map of Sikkim Himalaya is prepared using eight thematic layers: Geology (GE), Soil Site Class (SO), Slope (SL), Landslide (LS), Rock Outcrop (RO), Frequency Wave number (FK) simulated Peak Ground Acceleration (PGA), Predominant Frequency (PF), and Site Response (SR) at predominant frequencies using Geographic Information System (GIS). This necessitates a large scale seismicity analysis for seismic source zone classification and estimation of maximum earthquake magnitude or maximum credible earthquake to be used as a scenario earthquake for a deterministic or quasi-probabilistic seismic scenario generation. The International Seismological Center (ISC) and Global Centroid Moment Tensor (GCMT) catalogues have been used in the present analysis. Combining b-value, fractal correlation dimension (Dc) of the epicenters and the underlying tectonic framework, four seismic source zones are classified in the northeast Indian region. Maximum Earthquake of M W 8.3 is estimated for the Eastern Himalayan Zone (EHZ) and is used to generate the seismic scenario of the region. The Geohazard map is obtained through the integration of the geological and geomorphological themes namely GE, SO, SL, LS, and RO following a pair-wise comparison in an Analytical Hierarchy Process (AHP). Detail analysis of SR at all the recording stations by receiver function technique is performed using 80 significant events recorded by the Sikkim Strong Motion Array (SSMA). The ground motion synthesis is performed using FK integration and the corresponding PGA has been estimated using random vibration theory (RVT). Testing for earthquakes of magnitude greater than M W 5, a few cases presented here, establishes the efficacy and robustness of the FK simulation algorithm. The geohazard coverage is overlaid and sequentially integrated with PGA, PF, and SR vector layers, in order to evolve the ultimate earthquake hazard microzonation coverage of the territory. Earthquake Hazard Index (EHI) quantitatively classifies the terrain into six hazard levels, while five classes could be identified following the Bureau of Indian Standards (BIS) PGA nomenclature for the seismic zonation of India. EHI is found to vary between 0.15 to 0.83 quantitatively classifying the terrain into six hazard levels as "Low" corresponding to BIS Zone II, "Moderate" corresponding to BIS Zone III, "Moderately High" belonging to BIS Zone IV, "High" corresponding to BIS Zone V(A), "Very High" and "Severe" with new BIS zones to Zone V(B) and V(C) respectively.

Perry, Ronald W., and Michael K. Lindell. 2008. Volcanic risk perception and adjustment in a multi-hazard environment. ***Journal of Volcanology and Geothermal Research*** **172(3-4): 170-178.**

Hazard risk perceptions and protective behaviors are examined for wildfires, earthquakes and volcanic activity. Data were gathered in two northern California (USA) communities that are exposed to all three hazard types. It was found that resident risk perceptions approximated the risks calculated by experts. Personal risks associated with fires were significantly lower than property risks associated with the same threat. The discrepancy between person and property risks for earthquakes and volcanic activity was much smaller. In general, it was found that the number of protective adjustments undertaken for each hazard was small (averaging about half of the possible number measured). When combined in a regression analysis, risk perception was not a statistically significant predictor of number of adjustments for any of the three hazards. Resident's sense of responsibility for self-protection and experience with property damage were significant predictors of adjustment for all three hazards. Information seeking behavior was significantly related to protective actions for earthquakes and volcanic activity, but not for fire hazards. In general, an insufficient number of residents reported experience with personal injury or harm to make meaningful assessments of the effect of this variable on adjustments.

Sakakibara, Hiroyuki, Hitomi Murakami, Sakae Esaki, and Hisayoshi Nakata. 2008. Households' choice on reconstruction of a damaged house after an earthquake: Characteristics of decisions and effects of subsidies. ***International Journal of Risk Assessment and Management*** **8(4): 472-484.**

Reconstruction of damaged houses plays a critical role in revitalization of a region after natural disasters. In this study, households' choices on reconstruction of damaged houses were surveyed. Surveyed areas were the damages from the Tottori-Seibu Earthquake (2000) and the Miyagi-Hokubu Earthquake (2003) in Japan. Using survey data, discrete choice models on households' actual and hypothetical choices were constructed. Parameter estimation results showed that lifetime of a house, damage level and characteristics of a household (existence of children, elderly people's household etc.) affect households' choices on rebuilding. Similarity between choices in both regions was also found.

Sawada, Yasuyuki, and Satoshi Shimizutani. 2008. How do people cope with natural disasters? Evidence from the Great Hanshin-Awaji (Kobe) earthquake in 1995. *Journal of Money, Credit and Banking* 40(2-3): 463-488.
This paper investigates the coping strategies employed by victims of the Great Hanshin-Awaji (Kobe) earthquake in 1995. Using a unique household data set, the article shows that households that held a large amount of collateralizable assets before the catastrophe and were free from a binding borrowing constraint were able to maintain their consumption levels by borrowing. In contrast, households subject to a binding borrowing constraint before the disaster were unable to borrow to cope with the losses inflicted by the earthquake. On the other hand, both types of households relied on private transfers, depending on the extent of the damage.

Shaheen, Maqsood Ahmad. 2008. Earthquake effects on educational institutions and libraries of Azad Kashmir: An appraisal. *Library Review* 57(6): 449-456.
This paper discusses the effects of earthquakes on libraries and educational institutions in the region of Azad Kashmir in Pakistan. It is based on a review of the literature published in the newspapers, face-to-face and telephonic interviews, and donor reports from the area. Inputs (people, knowledge, material, capital, and finance), processes, outputs, and feedback mechanism of libraries in Kashmir are described. The barriers to implementing the strategies are essentially practical: resource constraints and related social or governmental factors. The paper suggests strictly following the building codes prescribed by the international standard bodies. The paper also calls for strict monitoring of the construction of the educational institutions and libraries, and for control of the corruption involved in contracting out the tenders, etc. This study attempts to highlight the importance of disaster management and training during such kind of disasters and preservation strategies for libraries. The paper is useful not only to understand what strategies should be adopted during such kind of disasters but also to review the picture of the state of libraries and educational institutions post earthquake in Pakistan. The paper would be very useful to the Government of Azad Jammu and Kashmir and the policy makers in the education department while implementing the building codes, planning disaster management strategies and the library staff in the affected areas.

Shooshtary, Mitra Hakim, Laily Panaghi, and Jafar Attari Moghadam. 2008. Outcome of cognitive behavioral therapy in adolescents after natural disaster. J*ournal of Adolescent Health* 42(5): 466-472.
The authors evaluated the effectiveness of cognitive behavioral therapy (CBT) among adolescents exposed to the 2004 earthquake in Bam, Iran. Four months after the earthquake, 135 adolescents as a case group and 33 adolescents as a comparison group were evaluated with the Impact of Event Scale Revised (IES-R). Two therapists were trained in CBT in 3-day classes according to a manual provided by mental health services. After conducting CBT in the case group, both groups were evaluated again with IES-R. The severity of posttraumatic stress symptoms significantly decreased among the subjects given CBT in the case group. The improvement in posttraumatic stress symptoms was attributable to improvement in each of three-symptom categories (intrusion, avoidance, and arousal) and in the total score of posttraumatic stress disorder ($p < .05$). The findings demonstrate the efficacy of CBT in alleviating posttraumatic stress symptoms among adolescents after a catastrophic disaster.

Varela, Emily, Vasiliki Koustouki, Constantinos H. Davos, and Kiriakidou Eleni. 2008. Psychological consequences among adults following the 1999 earthquake in Athens, Greece. *Disasters* 32(2): 280-291.
One year after the September 7, 1999 earthquake in Athens, Greece, the authors investigated the psychological consequences among 305 individuals (71 per cent female) residing in the settlements of Ano Liosia Municipality. Adaptability was difficult (63 per cent) due to limited space (50 per cent). Insecurity feelings were predictive of difficult adaptability (÷2=29.8, p<0.0001) and were common (63 per cent) among married subjects, independent of age (÷2=5.0, odds ratio). Eighty per cent expressed stress feelings, mainly nervousness/tension (60 per cent). Adaptability (÷2=5.3, OR: 0.5, 95 per cent CI: 0.270.9), age (÷2=6.5, OR: 1.03, 95 per cent CI: 1.011.06), and female gender (÷2=4.7, OR: 0.48, 95 per cent CI: 0.250.90) were independent predictors of stress feelings. The majority (55 per cent) developed sleep disorders, chiefly insomnia (60 per cent). Adaptability problems were the only predictor of sleep disorders (÷2=6.4, OR: 0.5, 95 per cent CI: 0.330.87). Psychiatric medication use increased after the earthquake.

Wyss, Max. 2008. Estimated human losses in future earthquakes in central Myanmar. *Seismological Research Letters* 79(4): 520-525.

Zhou, P. G., and H. Q. Chen. 2008. Research on geologic hazard risk management in China based on geologic hazard survey and zoning. ***International Journal of Risk Assessment and Management*** **8(4): 362-372.**
China is a typical developing country. Risk management has become an inevitable trend in China's geologic hazard management so it is imperative to conduct geologic hazard risk evaluation. Although China has laid the foundation for geologic hazards survey and zoning, the large-scale geologic environment information is not fully available and the geologic hazard risk evaluation must be pressed ahead steadily. Based on the research on existing conditions and problems of geologic hazard survey and zoning in China, the paper proposes the planning for geologic hazard risk evaluation in the coming ten years. It will no doubt help the country with a large population and vast territory in its fast pace of economic development to conduct the geologic hazard risk evaluation.

Floods

Bin, Okmyung, Jamie Brown Kruse, and Craig E. Landry. 2008. Flood hazards, insurance rates, and amenities: Evidence from the coastal housing market. ***The Journal of Risk and Insurance*** **75(1): 63-82.**
This study employs the hedonic property price method to examine the effects of flood hazard on coastal property values. It utilizes Geographic Information System data on National Flood Insurance Program flood zones and residential property sales from Carteret County, North Carolina. Results indicate that location within a flood zone lowers property value. Price differentials for flood risk and the capitalized value of flood insurance premiums are roughly equivalent both exhibiting a nonlinear relationship in flood probability. The results support the conclusion that flood zone designation and insurance premiums convey risk information to potential buyers in the coastal housing market.

Botzen, W. J. W., and J. C. J. M. van den Bergh. 2008. Insurance against climate change and flooding in the Netherlands: Present, future, and comparison with other countries. ***Risk Analysis*** **28(2): 413-426.**
Climate change is projected to cause severe economic losses, which has the potential to affect the insurance sector and public compensation schemes considerably. This article discusses the role insurance can play in adapting to climate change impacts. The particular focus is on the Dutch insurance sector, in view of the Netherlands being extremely vulnerable to climate change impacts. The usefulness of private insurance, which is currently unavailable in the Netherlands, as an adaptation instrument to increased flood risks is examined. It is questioned whether the currently dominant role of the Dutch government in providing damage relief is justified from an economic efficiency perspective. Characteristics of flood insurance arrangements in the Netherlands, the United Kingdom, Germany, and France are compared in order to identify possible future directions for arrangements in the Netherlands. It is argued that social welfare improves when insurance companies take responsibility for part of the risks associated with climate change.

Brody, Samuel D., Sammy Zahran, Wesley E. Highfield, Himanshu Grover, and Arnold Vedlitz. 2008. Identifying the impact of the built environment on flood damage in Texas. ***Disasters*** **32(1): 1-18.**
Floods continue to pose the greatest threat to the property and safety of human communities among all natural hazards in the United States. This study examines the relationship between the built environment and flood impacts in Texas, which consistently sustains the most damage from flooding of any other state in the country. Specifically, the authors calculate property damage resulting from 423 flood events between 1997 and 2001 at the county level. They identify the effect of several built environment measures, including wetland alteration, impervious surface, and dams on reported property damage while controlling for biophysical and socio-economic characteristics. Statistical results suggest that naturally occurring wetlands play a particularly important role in mitigating flood damage. These findings provide guidance to planners and flood managers on how to alleviate most effectively the costly impacts of floods at the community level.

Burningham, Kate, Jane Fielding, and Diana Thrush. 2008. "It'll never happen to me": Understanding public awareness of local flood risk. ***Disasters*** **32(2): 216-238.**
Following the severe flood events of 1998 and 2000, the United Kingdom's Environment Agency prioritized the need to increase public flood risk awareness. Drawing on data collected during research undertaken for the Environment Agency, this paper contributes to understanding of one aspect of flood awareness: people's recognition that their property is in an area that is potentially at risk of flooding. Quantitative analyses indicate that class is the most influential factor in predicting flood risk awareness, followed by flood experience and length of time in residence. There are also significant area differences. The authors' qualitative work explores how those defined as 'at risk' account for their lack of awareness or concern about their risk status. The

authors conclude that the problem is often not simply a lack of awareness, but rather, assessments of local risk based on experience that underestimate the impact of rare or extreme events. The authors underline the importance of engaging with local perspectives on risk and making local people part of 'awareness-raising' processes.

Cai, Y., B. Gouldby, P. Hawkes, and P. Dunning. 2008. Statistical simulation of flood variables: Incorporating short-term sequencing. ***Journal of Flood Risk Management*** **1(1): 3-12.**

The pluvial and fluvial flooding in the United Kingdom over the summer of 2007 arose as a result of anomalous climatic conditions that persisted for over a month. Gaining an understanding of the sequencing of storm events and representing their characteristics within flood risk analysis is therefore of importance. This paper provides a general method for simulating univariate time series data, with a given marginal extreme value distribution and required autocorrelation structure, together with a demonstration of the method with synthetic data. The method is then extended to the multivariate case, where cross-variable correlations are also represented. The multivariate method is shown to work well for a two-variable simulation of wave heights and sea surges at Lerwick. This work was prompted by an engineering need for long time series data for use in continuous simulation studies where gradual deterioration is a contributory factor to flood risk and potential structural failure.

Copien, C., C. Frank, and M. Becht. 2008. Natural hazards in the Bavarian Alps: A historical approach to risk assessment. ***Natural Hazards*** **45(2): 173-181.**

The Bavarian Alps region is strongly affected by various natural hazards, mainly hydrological events (floods, debris flows), geomorphic/geological events (landslides, rock falls), and avalanches. Extraordinary floods, like in 2002 or in the summer of 2005 in south Bavaria, have again posed the question of the possible extent and frequency of recurrence of catastrophic events. To put risk assessment on a broader basis, historical data about all kinds of past natural hazards were detected in the archives of local authorities and administrative offices for water management. More than 10,000 sources (written accounts, maps, and photographs) were collated in a database. The majority of this information reaches back to the middle of the 19th century. In addition, many documents referring to events dating back even as far as the Middle Ages were found. The Historische Analyse von NaturGefahren (HANG, historical analysis of natural hazards) project at the University of Eichstaett mainly focuses on a small-scale examination of the data. Initial results of the data analysis show that most catastrophic events in the Bavarian Alps only affect parts of the area, but not the whole region. Therefore it is necessary to assess the risk potential on a local scale like valleys, the catchment areas of mountain streams, or even single streams. First, the presented data is aimed to help engineers in future planning of hazard-protection measures. Second, the information can form a vital component to enhance our knowledge of hydrological and geomorphic/geological dynamics in the Alps.

Furdada, G., L. E. Calderon, and M. A. Marques. 2008. Flood hazard map of La Trinidad (NW Nicaragua). Methods and results. ***Natural Hazards*** **45(2): 183-195.**

During the Mitch Hurricane event (October 1998), severe floods occurred in the village of La Trinidad (Departamento de Estelí, NW Nicaragua), which spreads at the margin of La Trinidad River. As a consequence, the need for hazard assessment and land use planning to reduce the effects of these natural processes arose. Nicaragua is a developing country, which means that there is a scarcity of good quality data on which to base these hazard assessments (i.e., lack of detailed topographic maps, lack of meteorological and discharge data series). Therefore, the main objective of the present work was to generate a flood hazard map of La Trinidad by means of a simple method, with a resulting map easy to understand and to use by the municipality for land use planning. There is no topographic map of the area at a more detailed scale than 1:50,000. So the main document that supports all the data and on which the final hazard map was based is the orthophotograph at 1:5,000 scale (generated from vertical aerial photographs taken in 2000). The method used was based on classical interpretation of vertical aerial photographs (pre-Mitch and a post-Mitch event), detailed field work, inquiries among the population and analysis of the main pattern of storms occurring in the area. All these data allowed the reconstruction of different extensions and water levels corresponding to events of different frequency and magnitude, and the qualitative association of them to three hazard levels by means of energy and frequency. The use of orthophotographs of 1:5,000 proved to be very useful both for the development of the work and for the presentation of the final map, because they are very easily understandable for people not trained in the interpretation of topographic maps.

Gaillard, Jean-Christophe, Michael R. M. Pangilnan, Jake Rom Cadag, and Virginia Le Masson. 2008.

Living with increasing floods: Insights from a rural Philippine community. ***Disaster Prevention and Management*** **17(3): 383-395.**

The purpose of this paper is to consider people's ways of coping with increasing flooding in a Philippine rural community. The paper relies on extensive field work conducted between July and August 2006. It cross-checks data from different sources including interviews with key informants, a questionnaire-based survey, informal group discussions, passive and stationary observations, and photographic documentation. Field work was completed by the collection of secondary written documents. The paper emphasizes that the capacity of flood-affected people to cope with increasing hazards is rooted in their ability to adjust their everyday lifestyles. Flood-affected people seldom rely on extraordinary measures to face nature's extremes. People's ability to adjust their daily life is deeply dependent on the strength of their livelihoods and social network. The kind and variety of livelihoods turned out to be a critical factor in securing the financial means to purchase enough food to satisfy daily needs. Social networking was also found to be critical in providing alternative support in times of crisis. This paper fosters the use of community-based disaster risk reduction programs coupled with development objectives to enhance people's capacity to cope with natural hazards. It further underlines the need to empower people to make them less vulnerable in the face of natural hazards through fair access to resources. This article contributes to the understanding of how people cope with natural hazards in the Philippines and provides an array of possible remedial strategies for community-based disaster risk reduction.

Gupta, Vikram, and M. P. Sah. 2008. Impact of the Trans-Himalayan Landslide Lake Outburst Flood (LLOF) in the Satluj catchment, Himachal Pradesh, India. ***Natural Hazards*** **45(3): 379-390.**

Landslide Lake Outburst Floods (LLOFs) are common in the Himalayan river basins. These are caused by breaching of lakes created by landslides. The active and paleo-landslide mapping along the Satluj and Spiti Rivers indicate that these rivers were blocked and breached at many places during the Quaternary period. In the present article, the authors document LLOFs during 2000 and 2005 caused by the breaching of landslide lakes created in the Trans-Himalayan region along the Satluj River and Paree Chu (stream), respectively, both in the Tibetan region of China and its impact on the channel and infrastructure in the Kinnaur district of Himachal Pradesh, India. It has been observed that the loss of life and property due to these LLOFs is directly related to the disposition of the Quaternary materials and the different morphological zones observed in the area.

Hankin, B., S. Waller, G. Astle, and R. Kellagher. 2008. Mapping space for water: Screening for urban flash flooding. ***Journal of Flood Risk Management*** **1(1): 13-22.**

This paper builds on the 'Flooding from Other Sources' project (HA4a), funded as part of Defra's Making Space for Water strategy. The HA4a study concluded that flood risk mapping is feasible for many of the sources of flooding that were investigated, which are not currently covered by the Environment Agency Flood Map, using existing flow modeling and GIS tools. However, there are some major constraints in terms of the need to undertake extensive data collection to allow the generation of useful flood maps that are not dominated by modeling uncertainties. The project anticipated that different levels of data collection and modeling might be needed for different purposes, given the hierarchical nature of United Kingdom flood risk assessment and management in the UK under PPS25 and the EC Floods Directive. This paper compares and contrasts three different approaches to urban flood modeling using topographic analysis, blanket extreme rainfall and semi-coupled sewer/overland routing. The UK summer floods 2007 have highlighted the pressing need for mapping the risk from urban flash flooding, and the Pitt Review has recommended that areas at high risk from surface waters should be urgently identified. This can be done now at some level of detail, and we can be guided as to what level, from our increasing knowledge of vulnerable populations, from records of historical flooding and by using some of the screening methods described herein.

Ho, Ming-Chou, Daigee Shaw, Shuyeu Lin, and Yao-Chu Chiu. 2008. How do disaster characteristics influence risk perception? ***Risk Analysis*** **28(3): 635-643.**

The main purpose of this study is to examine how risk perception is influenced by the type of disaster (flood or landslide) and victim characteristics. The data reported here are based on the National Risk Perception Survey (NRPS) that was administered for the victims and the general public in Taiwan in 2004. In that year, many towns in Taiwan were seriously affected by floods and landslides, resulting in huge economic losses and fatalities. The primary findings are: (1) the

victims and the general public are concerned about the different potential hazards that might affect their residential area; (2) the negative associations between the sense of controllability and the perceived impact is high for landslide victims, but not for flood victims; and (3) disaster type, gender, and previously experienced disasters are good predictors of victims' attitudes toward natural disasters.

Jiqing, Li, Ji Changming, Zhang Yushan, and Wang Liping. 2008. Matter-element model of integrated risk assessment for flood control systems. ***International Journal of Risk Assessment and Management*** **8(4): 342-352.**

The matter-element model of integrated risk assessment for flood control systems is established with matter-element analysis theory and correlative function of extension set, on the basis of classification of flood situations and risk indexes of typical flood control works. By this model, quantitative indexes of integrated risk assessment can be derived for flood control systems on a basin or regional scale. A case study proves its practicality, rationality and effectiveness.

Lastra, J., E. Fernandez, A. Diez-Herrero, and J. Marquinez. 2008. Flood hazard delineation combining geomorphological and hydrological methods: An example in the Northern Iberian Peninsula. ***Natural Hazards*** **45(2): 277-293.**

Flood mapping requires the combination and integration of geomorphological and hydrological-hydraulic methods; however, despite this, there is very little scientific literature that compares and validates both methods. Two types of analysis are addressed in the present article. On the one hand, maps of flood plains have been elaborated using geomorphological evidence and historical flood data in the mountainous area of northwestern Spain, covering an area of more then 232 km2 of floodplains. On the other hand, a hydrometeorological model has been developed (Clark semi distributed unit hydrograph) in the Sarria River basin (155 km2, NW Spain). This basin is not gauged; hence the model was subjected to a goodness-of-fit test of its parameter (curve number) by means of Monte Carlo simulation. The peak flows obtained by means of the hydrological model were used for hydraulic modeling (one-phase, one-dimensional and steady flow) in a 4 km2 urban stretch of the river bed. The delineation of surface areas affected by floods since 1918, as well as those analyzed subsequent to the geomorphological study, reveals a high degree of reliability in the delineation of the flooded areas with frequent recurrence intervals (<50 years). If these flooded surface areas are compared with the estimate obtained by the hydrological-hydraulic method we can see that the latter method overestimates the extent of the surface water by 144 percent for very frequent recurrence intervals (>10 years) and underestimates it as the recurrence interval increases, by up to 80 percent less floodplain for exceptional events (>500 years). Finally, a management map is put forth combining the most reliable results available by integrating both methods.

Lindell, Michael K., and Seong Nam Hwang. 2008. Households' perceived personal risk and responses in a multihazard environment. ***Risk Analysis*** **28(2): 539-556.**

This study proposed and tested a multistage model of household response to three hazards -- flood, hurricane, and toxic chemical release in Harris County Texas. The model, which extends Lindell and Perry's (1992, 2004) Protective Action Decision Model, proposed a basic causal chain from hazard proximity through hazard experience and perceived personal risk to expectations of continued residence in the home and adoption of household hazard adjustments. Data from 321 households generally supported the model, but the mediating effects of hazard experience and perceived personal risk were partial rather than complete. In addition, the data suggested that four demographic variables gender, age, income, and ethnicity affect the basic causal chain at different points.

Menoni, Scira, and Giulia Pesaro. 2008. Is relocation a good answer to prevent risk? Criteria to help decision makers choose candidates for relocation in areas exposed to high hydrogeological hazards. ***Disaster Prevention and Management*** **17(1): 33-53.**

The purpose of this paper is to illustrate the results of a research mandated by the regional government of Lombardia, Italy. The results identify the criteria used to decide in what situations the relocation from areas subject to high levels of hydrogeological hazards is a viable preventive strategy. In the first part, the state-of-the-art regarding voluntary relocation from hazardous areas supported by governmental funding and incentives is described, showing that very few examples are available for reference. Therefore, lessons learned from involuntary relocation have been considered regarding specific strategies that must be designed to address societal needs. In the second part of the article, the criteria developed to help decision makers decide when and if

relocation may be considered a preventive option are described in detail. Finally, it shows what results have been obtained by applying the criteria to the case of the Lombardia region. Four sets of criteria were proposed, shaped according to different geographical scales and to different demands, recognizing that relocation is a rather extreme solution that must be carefully evaluated and proposed to interested parties and citizens. Those criteria have been applied to assess some specific cases in the Lombardia region, and to identify potential candidates for relocation in the whole region, by querying a complex database that was prepared integrating layers representing hydrogeological hazards on one side, and exposed settlements on the other. Until now, most of the laws to prevent risks have imposed limitations to building and development in hazardous areas, while rarely focusing on existing settlements. The experience described in this article concerns a region that has decided to design a specific law to promote preventive relocation in the most critical situations, where structural measures have failed a number of times, and losses are frequent and large. The criteria proposed in this paper provide a method and a tool for deciding in what cases and circumstances relocation can be considered a viable preventive option to lessen the risk in particularly critical zones, exposed to high hydrogeological hazards. In doing so, it shows that relocation can be considered not as an "emergency" and episodic measure, but rather as a part of a more comprehensive policy, in which candidates for relocation can be determined on a regional scale respecting basic social, political and economic conditions.

Merz, Ralf, Gunter Bloschl, and Gunter Humer. 2008. National flood discharge mapping in Austria. ***Natural Hazards*** **46(1): 53-72.**

This article presents the approach and the results of a study in which 30, 100 and 200 year return period flood discharges were estimated for 26,000 km of Austrian streams. Three guiding principles were adopted: combination of automatic methods and manual assessments by hydrologists to allow speedy processing and account for the local hydrological situation; combination of various sources of information including flood peak samples, rainfall data, runoff coefficients and historical flood data; and involvement of the Hydrographic Services to increase the accuracy and enhance the acceptance of results. The flood discharges for ungauged catchments were estimated by the Top-kriging approach with manual adjustment to the local flood characteristics. The adopted combination approach proved to be very efficient both in terms of the project time required and in terms of the accuracy and acceptability of the estimated flood discharges of given return periods.

Moyo, Otrude, and Vadim Moldovan. 2008. Lessons for social workers: Hurricane Katrina as a social disaster. ***Social Development Issues*** **30(1): 1-12.**

The New Orleans disaster resulted from preexisting social and structural problems exacerbated by Hurricane Katrina. In the aftermath of the flood, the lack of effective community rehabilitation efforts has prolonged the misery of its victims. With the rest of society, the social work profession bears the responsibility for this tragedy. This article looks at the Katrina disaster in the historical context of several other flood disasters caused in part by society's neglect of the poor and community infrastructures. An ideological reorientation of the social work profession with an emphasis on social justice is discussed as a moral imperative in the current political climate.

Osti, Rabindra, Shigenobu Tanaka, and Toshikazu Tokioka. 2008. Flood hazard mapping in developing countries: Problems and prospects. ***Disaster Prevention and Management*** **17(1): 104-113.**

This paper describes the major causes of massive destruction due to floods in developing countries and to elaborate the usefulness of flood hazard maps under the framework of community-based flood management. It is a clear perception that flood risk management cannot be treated in isolation, but should be a part of community development. In this context, it is essential to build a community's capacity to understand their vulnerabilities, strategies, activities, and the role they could play in managing flood risks without relying on external entities. Therefore the proposed community-based flood hazard-mapping technique can be a good solution for addressing current issues. The approach will not only focus on the effective development and application of FHM but also it will correct the defects of the top-down approach in disaster planning and also encourage all stakeholders' participation in an integrated and sustainable manner. Based on the findings, it is strongly recommended that agencies should adhere and incorporate the idea while developing programs and projects for communities. In addition, It is simple to understand and easy to implement by the community. It is hoped that the idea will be beneficial and a catalyst to promote a community's response for flood disaster management in developing countries, thereby helping agencies to develop an operational strategy in advance.

Siegrist, Michael, and Heinz Gutscher. 2008. Natural hazards and motivation for mitigation behavior: People cannot predict the affect evoked by a severe flood. ***Risk Analysis*** **28(3): 771-778.**

Past research indicates that personal flood experience is an important factor in motivating mitigation behavior. It is not fully clear, however, why such experience is so important. This study tested the hypothesis that people without flooding experience underestimate the negative affect evoked by such an event. People who were affected by a severe recent flood disaster were compared with people who were not affected, but who also lived in flood-prone areas. Face-to-face interviews with open and closed questions were conducted (n = 201). Results suggest that people without flood experience envisaged the consequences of a flood differently from people who had actually experienced severe losses due to a flood. People who were not affected strongly underestimated the negative affect associated with a flood. Based on the results it can be concluded that risk communication must not focus solely on technical aspects; in order to trigger motivation for mitigation behavior, successful communication must also help people to envisage the negative emotional consequences of natural disasters.

Tapsell, S. M., and S. M. Tunstall. 2008. "I wish I'd never heard of Banbury": The relationship between 'place' and the health impacts from flooding. ***Health & Place*** **14(2): 133-154.**

This paper focuses upon a small qualitative study of two communities in England that were flooded over the Easter weekend in 1998. It reports on the only known longitudinal study of flood-affected respondents in the UK with the same participants over a four-and-a-half-year period. It examines how 'place,' both as a physical location within the floodplain and in terms of social places, may impact upon the health of those affected. It also demonstrates how floods may influence people's relationship with and perception of place, further impacting upon health outcomes. Illustrations in the form of narratives are provided by those who were flooded. Findings demonstrate that even relatively small, localized flood events may seriously disrupt people's lives and have a significant impact upon their physical but particularly their mental health and well-being.

Theilen-Willige, Barbara. 2008. Tsunami hazard assessment in the Northern Aegean Sea. ***Science of Tsunami Hazards*** **27(1): 1-16.**

Emergency planning for the assessment of tsunami hazard inundation and of secondary effects of erosion and landslides requires mapping that can help identify coastal areas that are potentially vulnerable. The present study reviews tsunami susceptibility mapping for coastal areas of Turkey and Greece in the Aegean Sea. Potential locations vulnerable to tsunamis were identified from LANDSAT ETM imageries, Shuttle Radar Topography Mission (SRTM, 2000) data and QuickBird imageries and from a GIS integrated spatial database. LANDSAT ETM and Digital Elevation Model (DEM) data derived by the SRTM-Mission were investigated to help detect traces of past flooding events. LANDSAT ETM imageries, merged with digitally processed and enhanced SRTM data, clearly indicate the areas that may be prone to flooding if catastrophic tsunami events or storm surges occur.

Todhunter, Paul E., and Bradley C. Rundquist. 2008. Pervasive wetland flooding in the glacial drift prairie of North Dakota (USA). ***Natural Hazards*** **46(1): 73-88.**

This article describes a unique flood hazard, produced by the dramatic expansion of wetlands in Nelson County, located within the North American Prairie Pothole Region of North Dakota, USA. There has been an unprecedented increase in the number, average size, and permanence of prairie wetlands, and a significant increase in the size of a closed lake (Stump Lake) due to a decade-long wet spell that began in 1993 following a prolonged drying trend. Base-line land cover information from the 1992 USGS National Land Cover Characterization dataset, and a Landsat TM scene acquired July 9, 2001 are used to assess the growth of the closed lake and wetland pond surface areas, and to analyze the type and area of various land cover classes inundated between 1992 and 2001. The open water profile in Nelson County changed from one marked by relatively comparable coverage of closed lake and wetland pond areas in 1992, to one in which wetland open water accounted for the vast majority of total open water in 2001. The bulk of the wetland pond area expansion occurred by displacing existing wetland vegetation and agricultural cropland. Producers responded to the flood hazard by filing Federal Crop Insurance Corporation (FCIC) claims and enrolling cropland in the Conservation Reserve Program (CRP), a federal land retirement program. Land taken out of agricultural production has had an enormous impact upon the agricultural sector that forms the economic base of the rural economy. In 2001 the land taken out of production due to CRP enrollment and preventive

planting claims represented nearly 42 percent of Nelson County's 205.2 K ha base agricultural land. The patterns obtained from this detailed study of Nelson County are likely to be the representative of the more publicized flood disaster occurring within the Devils Lake Basin of North Dakota.

Tran, Phong, Fausto Marincioni, Massimo Sarti, and Le Van An. 2008. Flood risk management in Central Viet Nam: Challenges and potentials. ***Natural Hazards*** **46(1): 119-138.**

This article explores the impacts of floods on the economy, environment, and society and tries to clarify the rural community's coping mechanism to flood disasters in Central Viet Nam. It focuses on the social aspects of flood risk perception that shapes the responses to floods. The research findings revealed that flooding is an essential element for a coastal population, whose livelihood depend on productive functions of cyclical floods. The findings also revealed that floods, causing losses and damages, often inhibited economic development. The surveyed communities appeared to have evolved coping mechanisms to reduce the negative impacts of the floods, yet these coping mechanisms are under pressure due to environmental degradation. Integrated flood risk management is considered as a suitable paradigm for coping with flood disasters.

Willis, Vogt, and Vince Willis. 2008. Weighing up the risks: The decision to purchase housing on a flood plain. T*he Australian Journal of Emergency Management* 23(1): 49-53.

This paper examines how residents living in a floodplain perceive risk. Sixty residents in Invermay/ Inveresk in Launceston, Tasmania, were interviewed in a study conducted by Launceston City Council and the University of Tasmania to identify their level of worry, flood preparedness and risk communication strategies. In order to explore ideas of voluntary and involuntary risk, this paper analyses the views of those residents
who were owners and/or renovators in the floodprone area. The authors argue that risk decision-making is a complex undertaking involving the consideration and weighing-up of a range of factors. In addition, the authors found that just as people may be viewed as 'risk takers', they are also 'at risk' and they see broader social factors such as development in the area as contributing to their risk.

Gender and Vulnerable Populations

Abramson, David, Tasha Stehling-Ariza, Richard Garfield, and Irwin Redlener. 2008. Prevalence and predictors of mental health distress post-Katrina: Findings from the Gulf Coast Child and Family Health Study. ***Disaster Medicine and Public Health Preparedness*** **2(2): 77-86.**

Catastrophic disasters often are associated with massive structural, economic, and population devastation; less understood are the long-term mental health consequences. This study measures the prevalence and predictors of mental health distress and disability of hurricane survivors over an extended period of recovery in a post-disaster setting. A representative sample of 1,077 displaced or greatly affected households was drawn in 2006 using a stratified cluster sampling of federally subsidized emergency housing settings in Louisiana and Mississippi, and of Mississippi census tracts designated as having experienced major damage from Hurricane Katrina in 2005. Two rounds of data collection were conducted: a baseline face-to-face interview at six to 12 months post-Katrina and a telephone follow-up at 20 to 23 months after the disaster. Mental health disability was measured using the Medical Outcome Study Short Form 12, version 2 mental component summary score. Bivariate and multivariate analyses were conducted examining socioeconomic, demographic, situational, and attitudinal factors associated with mental health distress and disability. More than half of the cohort at both baseline and follow-up reported significant mental health distress. Self-reported poor health and safety concerns were persistently associated with poorer mental health. Nearly two years after the disaster, the greatest predictors of poor mental health included situational characteristics such as greater numbers of children in household and attitudinal characteristics such as fatalistic sentiments and poor self-efficacy. Informal social support networks were associated significantly with better mental health status. Housing and economic circumstances were not independently associated with poorer mental health. Mental health distress and disability are pervasive issues among the US Gulf Coast adults and children who experienced long-term displacement or other serious effects as a result of Hurricanes Katrina and Rita. As time progresses post-disaster, social and psychological factors may play greater roles in accelerating or impeding recovery among affected populations. Efforts to expand disaster recovery and preparedness policies to include long-term social re-engagement

efforts post-disaster should be considered as a means of reducing mental health sequelae.

Ballow, Shana, Solomon Behar, Ilene Claudius, Kathleen Stevenson, Robert Neches, and Jeffrey S. Upperman. 2008. Hospital-based disaster preparedness for pediatric patients: How to design a realistic set of drill victims. ***American Journal of Disaster Medicine*** **3(3): 171-180.**

The purpose of this report is to describe an innovative idea for hospital pediatric victim disaster planning. This is a descriptive manuscript outlining an innovative approach to exercise planning. In this report, the authors describe a model set of patients for pediatric disaster simulation. The results were an epidemiologically based set of mock victims. The authors believe that by enhancing pediatric disaster simulation exercises, hospital personnel and decision makers will be better prepared for an actual disaster event involving pediatric victims.

Birkmann, Jorn, and Nishara Fernando. 2008. Measuring revealed and emergent vulnerabilities of coastal communities to tsunami in Sri Lanka. ***Disasters*** **32(1): 82-105.**

This paper presents the important findings of a study undertaken in two selected tsunami-affected coastal cities in Sri Lanka (Batticaloa and Galle) to measure the revealed and emergent vulnerability of coastal communities. International risk studies have failed to demonstrate the high vulnerability of coastal communities to tsunami in Sri Lanka. Therefore, indirect assessment tools to measure pre-event vulnerability have to be complemented by assessment tools that analyze revealed and emergent vulnerability in looking at the aftermath and impact patterns of a real scenario, as well as in examining the dynamics of disaster recovery in which different vulnerabilities can be identified. The paper first presents a conceptual framework for capturing vulnerability within a process-oriented approach linked to sustainable development. Next, it highlights selected indicators and methods to measure revealed and emergent vulnerability at the local level using the examples of Batticaloa and Galle. Finally, it discusses the usefulness and application of vulnerability indicators within the framework of reconstruction.

Cannon, Terry. 2008. Vulnerability, "innocent" disasters and the imperative of cultural understanding. ***Disaster Prevention and Management*** **17(3): 350-357.**

The purpose of this paper is to make an argument that there are different types of social construction of disasters. The focus is on disasters triggered by natural hazards. It is now widely accepted that disasters are a product of a natural hazard having an impact on a vulnerable population. But the value of the concept of vulnerability is in danger of becoming less meaningful because it is removed from the political and economic processes that generate some vulnerability. On the other hand, there are some types of disasters that are relatively "innocent," in the sense that people live in places that are exposed to risk for purposes of access to their livelihood, and not because social forces or power relations have forced them to live there, or made some groups more vulnerable than others. If it is the case that some vulnerability is "innocent," then forms of explanation are needed of people's willingness to expose themselves to risk that go beyond the "strong" forms of social construction (where power relations are a key factor in generating the social construction of disasters). Instead, it is essential to examine "cultural" and psychological explanations of people's behavior, including an understanding of group behavior, religious beliefs and other aspects that often distinguish the perspective on risk taken by "insiders" compared with the supposedly rational and policy-oriented approach of "outsiders" who see it as their role to help reduce disaster risks. The discussion of different types of social construction of disasters is original. Debate on the need to include analysis of cultural and psychological aspects in disaster risk reduction is not very well developed and, according to this paper, is of absolutely crucial importance in reducing the impact of natural hazards.

Cherniack, E. Paul. 2008. The impact of natural disasters on the elderly. ***American Journal of Disaster Medicine*** **3(3): 133-139.**

The purpose of this article is to review and draw conclusions about the impact of natural disasters on the elderly from the published medical literature. Articles were obtained by searching the PubMed database and Google search engines using terms such as "disaster," "elderly," "hurricane," "tornado," "earthquake," and "flood." More articles were obtained from the reference lists of those obtained in the initial search. Forty-five journal articles were reviewed. Many, but not all, studies have found that older individuals are more likely to suffer adverse physical consequences. This is not surprising considering the elderly are more likely to be in worse health before disasters and less able to

seek assistance afterward. The lack of agreement between studies is not surprising either, considering heterogeneity in disasters, populations, and survey methods. This heterogeneity also precludes determination as to whether older individuals have a worse or more favorable psychological outcome than younger individuals. Several investigations, however, have noted that individuals may be more resilient to some of the psychological manifestations of disasters with more frequent exposure, often including the elderly. Many suggestions have been proposed to address the potential needs of older individuals such as involving existing organizations and those with existing geriatric expertise to design disaster plans, develop education, communication systems, and warnings for people with sensory impairment, create new methods for identifying, tracking, and following older individuals, and make special arrangements to provide disaster-related aid. However, there are only anecdotal reports of the success of the application of such methods.

Chokshi, Nikuni K., Solomon Behar, Alan L. Nagar, Fred Dorey, and Jeffrey S. Upperman. 2008. Disaster management among pediatric surgeons: Preparedness, training and involvement. ***American Journal of Disaster Medicine*** **3(1): 5-14.**
Contemporary events in the United States (e.g. September 2001, school shootings), Europe (e.g. Madrid train bombings), and the Middle East have raised awareness of mass casualty events and the need for a capable disaster response. Recent natural disasters have highlighted the poor preparation and infrastructure in place to respond to mass casualty events. In response, public health policy makers and emergency planners developed plans and prepared emergency response systems. Emergency response providers include first responders, a subset of emergency professionals, including firemen, law enforcement, paramedics, who respond to the incident scene and first receivers, a set of healthcare workers who receive the disaster victims at hospital facilities. The role of pediatric surgeons in mass casualty emergency response plans remains undefined. The authors hypothesize that pediatric surgeons' training and experience will predict their willingness and ability to be activated first receivers. The objective of our study was to determine the baseline experience, preparedness, willingness, and availability of pediatric surgeons to participate as activated first receivers. After institutional review board approval, the authors conducted an anonymous online survey of members of the American Pediatric Surgical Association in 2007. The authors explored four domains in this survey: (1) demographics, (2) disaster experience and perceived preparedness, (3) attitudes regarding responsibility and willingness to participate in a disaster response, and (4) availability to participate in a disaster response. The authors performed univariate and bivariate analyses to determine significance. Finally, the authors conducted a logistic regression to determine whether experience or preparedness factors affected the respondent's availability or willingness to respond to a disaster as a first receiver. Results: The authors sent 725 invitations and received 265 (36.6 percent) completed surveys. Overall, the authors found that 77 percent of the respondents felt "definitely" responsible for helping out during a disaster but only 24 percent of respondents felt "definitely" prepared to respond to a disaster. Most felt they needed additional training, with 74 percent stating that they definitely or probably needed to do more training. Among experiential factors, the authors found that attendance at a national conference was associated with the highest sense of preparedness. The authors determined that subjects with actual disaster experience were about four times more likely to feel prepared than those with no disaster experience ($p < 0.001$). The authors also demonstrated that individuals with a defined leadership position in a disaster response plan are twice as likely to feel prepared ($p = 0.002$) and nearly five times more willing to respond to a disaster than those without a leadership role. The authors found other factors that predicted willingness including the following: a contractual agreement to respond (OR 2.3); combat experience (OR 2.1); and prior disaster experience (OR 2.0). Finally, the authors found that no experiential variables or training types were associated with an increased availability to respond to a disaster. A minority of pediatric surgeons feel prepared, and most feel they require more training. Current training methods may be ineffectual in building a prepared and willing pool of first receivers. Disaster planners must plan for healthcare worker related issues, such as transportation and communication. Further work and emphasis is needed to bolster participation in disaster preparedness training.

Dalisay, Soledad Natalia M. 2008. Survival strategies to overcome inaagosto and nordeste in two coastal communities in Batangas and Mindoro, the

Philippines. ***Disaster Prevention and Management*** **17(3): 373-382.**
The purpose of this study is to describe how the people in two coastal communities in Batangas and Mindoro respond to the effects of these seasonal changes on their lives and livelihood. The study makes use of findings from a previous study conducted by the author in Batangas and from primary data gathered in Mindoro through interviews with key informants. The study shows that people in the two communities visited viewed the monsoon rains and typhoons brought about by seasonal changes as being part of the daily life challenges they had to face. The rainy season was also the lean food season which they called inaagosto in Batangas and nordeste in Mindoro. Hence, their responses were mostly at the individual or household level, rarely taking advantage of community programs and projects that could help them survive the lean food season. Although divided by a body of water, the people in Batangas and Mindoro employed very similar strategies. These strategies included negotiating for entitlements, engaging in extra-income-earning activities, and reallocating scarce food resources in the home. They differed, however, in ways in which they had "reinvented" food during the lean season. In both communities, coping was seen to be gendered. The paper provides an understanding of how people respond to hazards that accompany the lean season and how best to approach these responses to achieve optimum results that would truly address the challenges faced by affected communities. The paper contributes to the development of more appropriate programs and projects that would alleviate the effects of inaagosto and nordeste.

Freyberg, Christopher W., Bonnie Arquilla, Baruch S. Fertel, Michael G. Tunik, Cooper, Arthur, Dennis Heon, Stephan A. Kohlhoff, Katherine I. Uraneck, and George L. Foltin. 2008. Disaster preparedness: Hospital decontamination and the pediatric patient —Guidelines for hospitals and emergency planners. ***Prehospital and Disaster Medicine*** **23(2): 166-173.**
In recent years, attention has been given to disaster preparedness for first responders and first receivers (hospitals). One such focus involves the decontamination of individuals who have fallen victim to a chemical agent from an attack or an accident involving hazardous materials. Children often are overlooked in disaster planning. Children are vulnerable and have specific medical and psychological requirements. There is a need to develop specific protocols to address pediatric patients who require decontamination at the entrance of hospital emergency departments. Currently, there are no published resources that meet this need. An expert panel convened by the New York City Department of Health and Mental Hygiene developed policies and procedures for the decontamination of pediatric patients. The panel was comprised of experts from a variety of medical and psychosocial areas. Using an iterative process, the panel created guidelines that were approved by the stakeholders and are presented in this paper. These guidelines must be utilized, studied, and modified to increase the likelihood that they will work during an emergency situation.

Gaillard, Jean-Christophe, Michael R. M. Pangilnan, Jake Rom Cadag, and Virginia Le Masson. 2008. Living with increasing floods: Insights from a rural Philippine community. ***Disaster Prevention and Management*** **17(3): 383-395.**
The purpose of this paper is to consider people's ways of coping with increasing flooding in a Philippine rural community. The paper relies on extensive field work conducted between July and August 2006. It cross-checks data from different sources including interviews with key informants, a questionnaire-based survey, informal group discussions, passive and stationary observations, and photographic documentation. Field work was completed by the collection of secondary written documents. The paper emphasizes that the capacity of flood-affected people to cope with increasing hazards is rooted in their ability to adjust their everyday lifestyles. Flood-affected people seldom rely on extraordinary measures to face nature's extremes. People's ability to adjust their daily life is deeply dependent on the strength of their livelihoods and social network. The kind and variety of livelihoods turned out to be a critical factor in securing the financial means to purchase enough food to satisfy daily needs. Social networking was also found to be critical in providing alternative support in times of crisis. This paper fosters the use of community-based disaster risk reduction programs coupled with development objectives to enhance people's capacity to cope with natural hazards. It further underlines the need to empower people to make them less vulnerable in the face of natural hazards through fair access to resources. This article contributes to the understanding of how people cope with natural hazards in the Philippines and provides an array of possible remedial strategies for community-based disaster risk reduction.

Karairmak, Ozlem, and Gul Aydin. 2008. Reducing earthquake-related fears in victim and nonvictim children. *The Journal of Genetic Psychology* 169(2): 177-185.

In this study, the authors investigated the fears of earthquake victim and non-victim elementary school students and the effectiveness of an activity-based cognitive fear reduction (ABCF) procedure developed by the authors. To measure fear, the authors collected data from 266 participants using a modified version of the Fear Survey Schedule for Children (FSSC; W. Yule, O. Udwin, &K. Murdoch, 1990). Results demonstrated that earthquake victim children were more fearful on two subtests of the FSSC than were non-victim children and that girls had significantly stronger fears on all subscales than did boys. The ABCF procedure was not an effective approach for reducing the fears of earthquake victims. However, the control group did demonstrate a significant reduction in fears. The authors suggest that the activity designed for this group may have been an intervention in itself. The authors discuss this finding and offer suggestions for researchers and therapists.

Kieser, Jules, Jacob de Feijter, and Raymond TeMoananui. 2008. Automated dental aging for child victims of disasters. *American Journal of Disaster Medicine* 3(2): 109-119.

In disasters, one of the major challenges is the identification of the dead. This is complicated in cases where young victims and, sometimes, young survivors are involved. Often, there are no dental treatment records that can be usefully employed and, hence, identification has to be relied heavily on aging. Developing teeth are generally considered to be the most reliable indicators of maturation and, by extension, of chronological age at death. This is because teeth are more durable, their degree of development can be observed directly from the living or deceased individual, and tooth formation is relatively unaffected by disease, malnutrition, or endocrine disorders. Unfortunately, the calculation of dental maturation and its conversion to a useful indicator of chronological age is a time-consuming process, which can be frustrating in the face of an overwhelming demand after a disaster such as the Thai Tsunami or Hurricane Katrina. The authors report on the development of a novel, automated "point and click" graphical user interface that can be used to calculate the age of a known individual from a simple dental radiograph. The authors apply the method to three ethnic populations living in New Zealand: children of European, Maori, and Pacific Island descent.

Laditka, Sarah B., James N. Laditka, Carol B. Cornman, Courtney B. Davis, and Maggi J. Chanlee. 2008. Disaster preparedness for vulnerable persons receiving in-home, long-term care in South Carolina. *Prehospital and Disaster Medicine* 23(2): 133-142.

The purpose of this study was to examine how agencies in South Carolina that provide in-home health care and personal care services help older and/or disabled clients to prepare for disasters. The study also examines how agencies safeguard clients' records, train staff, and how they could improve their preparedness. Federal regulations require preparedness for agencies providing in-home health care. No analogous regulations were found for in-home personal care. The degree of preparedness varied substantially among personal care agencies. Most personnel care agencies were categorized as "less" prepared or "moderately" prepared. The findings for agencies in both categories generally suggest lack of preparedness in: 1) identifying clients at high risk and assisting them in planning; 2) providing written materials and/or recommendations; 3) protecting records; 4) educating staff and clients; and 5) coordinating disaster planning and response across agencies. Home health agencies were better prepared than were personal care agencies. However, some health administrators commented that they were unsure how well their plans would work during a disaster, given the lack of training. The majority of home health agency administrators spoke of a need for better coordination and/or more preparedness training. Agencies providing personal care and home health services would benefit from developing stringer linkages with their local preparedness systems. The findings support incorporating disaster planning in the certification requirements for home health agencies, and developing additional educational resources for administrators and staff of personal care agencies an their clients.

Landrigan, Philip J., Joel Forman, Maida Galvez, Brooke Newman, Stephanie M. Engel, and Claude Chemtob. 2008. Impact of September 11 World Trade Center disaster on children and pregnant women. *Mount Sinai Journal of Medicine* 75(2): 129-134.

Children are uniquely sensitive to toxic exposures in the environment. This sensitivity reflects children's disproportionately heavy exposures coupled with the biological vulnerability that is a consequence of their passage through the complex transitions of early development. To assess effects on children's health associated with the attacks on the World Trade Center (WTC) of September 11, 2001, research teams at the Mount Sinai School of Medicine and other academic health centers in New York City launched a series of clinical and epidemiologic studies. Mount Sinai investigators undertook a prospective analysis of pregnancy outcomes in 182 women who were pregnant on September 11, 2001, and who had been either inside or within 0.5 miles of the WTC at the time of the attacks; they found a doubling in incidence of intrauterine growth retardation (IUGR) among infants born to exposed mothers as compared to infants born to unexposed women in northern Manhattan. A Columbia research team examined pregnancy outcomes in 329 women who lived, worked or gave birth in lower Manhattan in the nine months after September 11; they found that these women gave birth to infants with significantly lower birth weight and shorter length than women living at greater distances from Ground Zero. NYU investigators documented increased numbers of new asthma cases and aggravations of preexisting asthma in children living in lower Manhattan. Mount Sinai mental health researchers documented a significant increase in mental health problems in children who directly witnessed the attacks and subsequent traumatic events; these problems were most severe in children with a past history of psychological trauma. The New York City Department of Health and Mental Hygiene established a WTC Registry that has enrolled over 70,000 persons of all ages in lower Manhattan and will follow the health of these populations to document on a continuing basis the health consequences of September 11.

Lavigne, Franck, Benjamon De Coster, Nancy Juvin, Francois Flohic, Jean-Christophe Gaillard, Pauline Texier, Julie Morin, and Junun Sartohadi. 2008. People's behavior in the face of volcanic hazards: Perspectives from Japanese communities, Indonesia. ***Journal of Volcanology and Geothermal Research*** **172(3-4): 273-287.**

This paper is concerned with the way in which the Indonesian people living on the slopes or near active volcanoes behave in the face of volcanic threats. It explores the role of three factors in the shaping of this behavior, e.g. risk perception, cultural beliefs and socio-economic constraints. The paper is mainly based on field data collected during the last 5 years on four volcanoes in Central Java, namely Sumbing, Sindoro, Dieng, and Merapi. The common assumption that hazard knowledge, risk perception and people's behavior are closely related and conditional on volcanic activity is debatable in the Indonesian context. Factors that play a role in hazard knowledge -- e.g. basic knowledge of volcanic processes, personal experience of volcanic crisis, time lapsed since the last volcanic eruption, etc. -- differ from those that influence risk perception. Indeed, local people often underestimate the scientifically or statistically estimated risk. This poor risk perception is characterized by an approximate personal representation of the volcanic processes, an excess of trust in concrete countermeasures, the presence of a physical-visual obstructions, or cultural beliefs related to former eruptions. In addition, the commonly acknowledged factors that influence hazard knowledge and/or risk perception may be at odds with the nonhazard-related factors that prompt or force people to live in or to exploit areas at risk. These factors may be either socio-cultural e.g., attachment to place, cultural beliefs, etc. or social and socio-economical e.g., standard of living, strength of people's livelihoods, or well-being. These factors are fundamental in explaining the short-term behavior in the face of a developing threat during a volcanic crisis.

Nelson, Larry P. 2008. A resiliency profile of Hurricane Katrina adolescents: A psychosocial study of disaster. ***Canadian Journal of School Psychology*** **23(1): 57-69.**

Information about the psychological status of children following a natural disaster is rare. Therefore, the purpose of this investigation is to create a psychosocial profile of relocated Hurricane Katrina youth (N = 83, ages 13 to 17) and integrate the findings into a growing body of literature on the psychological effects of disaster. Data were collected using the Resiliency Scales for Children and Adolescents. Findings indicate the population had overall below-average resiliency resources. The greatest of these resources are reflected in their ability to maintain a positive attitude, ask for and receive help, and solve problems. Other resiliency strengths emerged in the form of feeling calm and comfortable with people. Findings also indicate the population as showing above-average vulnerability and sensitivity to psychosomatic reactions, including high levels of impairment by and recovery from emotional upset. Suggestions for intervention are aimed at meaningful social support activities that emphasize the rebuilding

of community via outdoor adventure education and service learning.

Rabito, Felicia A., Shahed Iqbal, Michael P. Kierman, and Ginger L. Chew. 2008. Children's respiratory health and mold levels in New Orleans after Katrina: A preliminary look. ***Journal of Allergy and Clinical Immunology*** **21(3): 622-625.**

When the federal levee system broke after Hurricane Katrina, 80 percent of New Orleans, approximately 134,000 homes, flooded. As repopulation and revitalization activities continue, exposure to mold and other respiratory irritants has emerged as a major health concern; however, there has been no study examining children's respiratory health and indoor mold levels in the post-Katrina environment. The Children's Respiratory Health Study was designed as a preliminary examination of indoor air levels of mold, children's lung function, and common indices of respiratory health in a select sample of children returning to live in New Orleans immediately after Hurricane Katrina. Children were recruited from a private primary school in the Garden District of New Orleans. Respiratory health questionnaire and spirometric data were collected on children seven to 14 years of age, and mold air sampling was conducted at baseline and again after two months. There was an overall decrease in mold levels and respiratory symptoms over the study period, and indoor mold levels were low despite reported hurricane damage.

Lazaratou, Helen, Thomas Paparrigopoulos, Gerassimos Galanos, Constantinos Psarros, Dimitris Dikeos, and Constantin Soldatos. 2008. The psychological impact of a catastrophic earthquake: A retrospective study 50 years after the event. ***The Journal of Nervous and Mental Disease*** **196(4): 340-344.**

The aim of this study was to retrospectively assess the impact of a catastrophic earthquake in a sample of 121 survivors, 50 years after the event. Mean age +/- SD of the responders was 72.2 +/- 6.1 years. The majority of the victims (78%) acknowledged a strong overall impact of the earthquake on their lives, and almost all of them had intense recollection of the event at its anniversary. The most frequent symptom during the 6 months after the earthquake was persistent remembering or "reliving" of the event; women had considerably more often recurrent dreams of the earthquake and distress than did men. Women and young adults at the time of the earthquake appear to be the most vulnerable groups regarding the psychological effects of the event.

Proudly, Mae. 2008. Fire, families and decisions. ***The Australian Journal of Emergency Management*** **23(1): 37-43.**

Scant attention is paid to women and their roles in the emergency management landscape. This is particularly relevant in the field of community bushfire preparedness and mitigation. The culture of emergency management remains a very masculine field with the command and control system continuing to dominate and influence the roles and processes of emergency events. Within this context, research into gaining a deeper
understanding of families and the role of women in bushfire has been neglected. Acknowledging and understanding how families and women make decisions in critical times must help shape future bushfire education programs. This includes the modification, application and implementation of the 'prepare, stay and defend, or leave early' policy. The family and a woman's role within the family are where crucial decisions are made in advance of and during a bushfire. The family unit, in its various forms, is an important and frequently overlooked field of bushfire research. This paper explores how family dynamics inform critical decisions and suggests that there is significant value in listening to the narratives of families and couples who have experienced a major bushfire. A people-centered focus, not a predetermined system or a theory, is needed. In order to reduce or eliminate last minute decisions to evacuate at the height of a bushfire, there must be recognition and understanding of how family dynamics and women's role within the family influence behavior during a crisis.

Richter, Roxane, and Thomas Flowers. 2008. Gendered dimensions of disaster care: Critical distinctions in female psychosocial needs, triage, pain assessment, and care. ***American Journal of Disaster Medicine*** **3(1): 31-37.**

This research highlights and identifies some critical distinctions in female disaster care including the following: socially constructed gender risk factors; gender and posttraumatic stress; women and pain (presentation and sensitivity); and post-disaster support and services, especially in the arenas of obstetrics and gynecology (breastfeeding, menstruation,

contraception, rape, and sexually transmitted disease). The research also includes a brief, anonymous survey of 50 adult female Hurricane Katrina evacuees which queried women on their usage of post-disaster health and counseling services. The literature review shows a pattern of gender differentiation in all areas of the disaster processing preparedness, response, physical and psychological impact, risk perception and exposure, recovery, and reconstruction. Some research highlights include: six disaster gender risk factors affecting vulnerability, impact and exposure; heightened risks and differing clinical manifestations of posttraumatic stress disorder and pain presentation; "pregnancy status" triage screening; as well gender-sensitive supplies and services (private breastfeeding and obstetrics and gynecology exam areas, birth control, feminine hygiene, and prenatal nutrition advocacy). The results of the small voluntary survey are presented that supports the contention that many gender-sensitive services were needed in post hurricane Katrina clinical settings, but were inadequate or nonexistent. This research not only identified issues, but emphasized feasible interventions, which could significantly reduce pain, suffering, and long-term post-disaster care costs. The research's most important conclusions are the current dearth of gender-disaggregated disaster data, as well as the tremendous need for disaster healthcare planners and providers to take a more cognizant and proactive approach to gender-specific care in triage, psychosocial needs assessment, medical care, and advocacy.

Shooshtary, Mitra Hakim, Laily Panaghi, and Jafar Attari Moghadam. 2008. Outcome of cognitive behavioral therapy in adolescents after natural disaster. ***Journal of Adolescent Health*** **42(5): 466-472.**
The authors evaluated the effectiveness of cognitive behavioral therapy (CBT) among adolescents exposed to the 2004 earthquake in Bam, Iran. Four months after the earthquake, 135 adolescents as a case group and 33 adolescents as a comparison group were evaluated with the Impact of Event Scale Revised (IES-R). Two therapists were trained in CBT in 3-day classes according to a manual provided by mental health services. After conducting CBT in the case group, both groups were evaluated again with IES-R. The severity of posttraumatic stress symptoms significantly decreased among the subjects given CBT in the case group. The improvement in posttraumatic stress symptoms was attributable to improvement in each of three-symptom categories (intrusion, avoidance, and arousal) and in the total score of posttraumatic stress disorder ($p < .05$). The findings demonstrate the efficacy of CBT in alleviating posttraumatic stress symptoms among adolescents after a catastrophic disaster.

Spence, Patric R., Kenneth A. Lachlan, and Jennifer A. Burke. 2008. Crisis preparation, media use, and information seeking: Patterns across Katrina evacuees and lessons learned for crisis communication. ***Journal of Emergency Management*** **6(2): 11-23.**
This study examined crisis preparation, information seeking patterns, and media use in the aftermath of Hurricane Katrina. Surveys were collected from 964 Katrina evacuees. Results indicated a continued need to create messages encouraging crisis preparation, especially among at-risk subpopulations. Differences in information seeking behavior were detected across age, income, and sex, while new media proved to be a non factor. The findings are discussed in terms of pragmatic implications for crisis communication practitioners regarding message design and placement.

Thacker, Maria T. F., Robin Lee, Raquel I. Sabogal, and Alden Henderson. 2008. Overview of deaths associated with natural events, United States, 1979-2004. ***Disasters*** **32(2): 303-315.**
Analysis of the National Center for Health Statistics' Compressed Mortality File showed that between 1979 and 2004, natural events caused 21,491 deaths in the United States. During this 26-year period, there were 10,827 cold-related deaths and 5,279 heat-related deaths. Extreme cold or heat accounted for 75 percent of the total number of deaths attributed to natural events more than all of deaths resulting from lightning, storms and floods, and earth movements, such as earthquakes and landslides. Cold-related death rates were highest in the states of Alaska, Montana, New Mexico, and South Dakota, while heat-related deaths were highest in the states of Arizona, Missouri, and Arkansas. These deaths occurred more often among the elderly and black men. Other deaths were attributed to lightning (1,906), storms and floods (2,741), and earth movements (738). Most deaths associated with natural events are preventable and society can take action to decrease the morbidity and mortality connected with them.

Thierry, Pierre, Laurent Stieltjes, Emmanuel Kouokam, Pierre Ngueya, and Paul M. Salley. 2008. Multi-hazard risk mapping and assessment on an active volcano: The GRINP project at Mount Cameroon. ***Natural Hazards*** **45(3): 429-456.**

The purpose of this paper is to help improve the safety of its population faced with natural disasters, the Cameroon Government, with the support of the French Government, initiated a program of geological risk analysis and mapping on Mount Cameroon. This active volcano is subject to a variety of hazards: volcanic eruptions, slope instability and earthquakes. Approximately 450,000 people live or work around this volcano, in an area which includes one of Cameroon's main economic resources. An original methodology was used for obtaining the information to reply to questions raised by the authorities. It involves several stages: identifying the different geological hazard components, defining each phenomenon's threat matrix by crossing intensity and frequency indices, mapping the hazards, listing and mapping the exposed elements, analyzing their respective values in economic, functional and strategic terms, establishing typologies for the different element-at-risk groups and assessing their vulnerability to the various physical pressures produced by the hazard phenomena, and establishing risk maps for each of the major element-at-risk groups (population, infrastructures, vegetation, atmosphere). At the end of the study we were able (a) to identify the main critical points within the area, and (b) provide quantified orders of magnitude concerning the dimensions of the risk by producing a plausible eruption scenario. The results allowed us to put forward a number of recommendations to the Cameroon Government concerning risk prevention and management. The adopted approach corresponds to a first level of response to the authorities. Later developments should make it possible to refine the quality of the methodology.

Varela, Emily, Vasiliki Koustouki, Constantinos H. Davos, and Kiriakidou Eleni. 2008. Psychological consequences among adults following the 1999 earthquake in Athens, Greece. ***Disasters*** **32(2): 280-291.**

One year after the September 7, 1999 earthquake in Athens, Greece, the authors investigated the psychological consequences among 305 individuals (71 per cent female) residing in the settlements of Ano Liosia Municipality. Adaptability was difficult (63 per cent) due to limited space (50 per cent). Insecurity feelings were predictive of difficult adaptability (÷2=29.8, p<0.0001) and were common (63 per cent) among married subjects, independent of age (÷2=5.0, odds ratio). Eighty per cent expressed stress feelings, mainly nervousness/tension (60 per cent). Adaptability (÷2=5.3, OR: 0.5, 95 per cent CI: 0.270.9), age (÷2=6.5, OR: 1.03, 95 per cent CI: 1.011.06), and female gender (÷2=4.7, OR: 0.48, 95 per cent CI: 0.250.90) were independent predictors of stress feelings. The majority (55 per cent) developed sleep disorders, chiefly insomnia (60 per cent). Adaptability problems were the only predictor of sleep disorders (÷2=6.4, OR: 0.5, 95 per cent CI: 0.330.87). Psychiatric medication use increased after the earthquake.

Homeland Security and Terrorism

Andersson, K. G., T. Mikkelsen, P. Astrup, S. Thykier-Nielsen, L. H. Jacobsen, L. Schou-Jensen, S. C. Hoe, and S. P. Nielsen. 2008. Estimation of health hazards resulting from a radiological terrorist attack in a city. Radiation Protection Dosimetry. ePub.

In recent years, the concern for protection of urban populations against terror attacks involving radiological, biological or chemical substances has attracted increasing attention. It sets new demands to decision support and consequence assessment tools, where the focus has traditionally been on accidental exposure. The aim of the present study was to illustrate issues that need to be considered in evaluating the radiological consequences of a 'dirty bomb' explosion. This is done through a worked example of simplified calculations of relative dose contributions for a specific 'dirty bomb' scenario leading to atmospheric dispersion of 90Sr contamination over a city area. Also, the requirements of atmospheric dispersion models for such scenarios are discussed.

Avery, George H., Mark Lawley, Sandra Garrett, Barrett Caldwell, Marshall P. Durr, Dulcy Abraham, Feng Lin, Po-Ching C. DeLaurentis, Maria L. Peralta, Renata A. Kopach-Conrad, Lalaine M. Ignacio, Rebecca Sandino, and Deanna J. Staples. 2008. Planning for pandemic influenza: Lessons from the experiences of thirteen Indiana counties. ***Journal of Homeland Security and Emergency Management*** **5(1): 1-26.**

Significant concerns exist over the ability of the healthcare and public health systems to meet the surge demands that would result from an event such as an influenza pandemic. Current guidance for public health planners is largely based on expert opinion and may lack connection to the problems of street-level public health practice. To identify the problems of local planners and prepare a state-level planning template for increasing health care surge

capacity that accounted for these issues, a study was conducted of local pandemic planning efforts in 13 counties, finding that cognitive biases, coordination problems, institutional structures in the healthcare system, and resource shortfalls are significant barriers to preparing and implementing a surge capacity plan. In addition, local planners identify patient demand management through triage and education efforts as a viable means of ensuring adequate capacity, in contrast to guidance proposing an increased supply of care as a primary tool.

Bellavita, Christopher. 2008. Changing homeland security: What is homeland security? *Homeland Security Affairs* 4(2): 1-30.

There are at least seven defensible definitions of homeland security, based on claims about what homeland security emphasizes or ought to emphasize. The definitions focus on (1) terrorism, (2) all hazards, (3) terrorism and catastrophe, (4) jurisdictional hazards, (5) metahazards, (6) national security, and (7) government efforts to curtail civil liberties. In a metaphorical sense, each definition represents a set of interests that seeks a niche in the homeland security ecosystem. As in a biological system, these semantic entities struggle for resources that give advantage for organizational or political survival and growth. The resources include space on the public policy agenda, money, semantic dominance, and doctrinal preeminence. The argument has been made that a single definition would be desirable and beneficial for reasons having to do with efficiency and effectiveness. But there is no one authority that can command everyone to use language the same way. Other important and often used terms like terrorism, justice, disaster, or emergency management also do not have single definitions. Yet we make progress in understanding and using each of those ideas. The absence of agreement can be seen as grist for the continued evolution of homeland security as a practice and as an idea. Even if people did agree to define homeland security with a single voice, there would still be the matter of behavior. What people, organizations, and jurisdictions do under the homeland security banner is as instructive as how they define the term.

Bills, Corey B., Nancy A. S. Levy, Vansh Sharma, Dennis S. Charney, Robin Herbert, Jacqueline Moline, and Craig L. Katz. 2008. Mental health of workers and volunteers responding to events of 9/11: Review of the literature. *Mount Sinai Journal of Medicine* 75(2): 115-127.

Disaster workers responding to the events of September 11th were exposed to traumatic events. No study has systematically investigated the diverse mental health status and needs of the heterogeneous population of disaster workers responding to the events of September 11th. Using PubMed and Medline and the search terms of ''September 11, 2001'' or ''September 11'' or ''9/11''or ''WTC'' or ''World Trade Center'', the authors reviewed all articles that examined the mental health outcomes of workers at one of the three September 11th crash sites or the Fresh Kills landfill in New York City. In total, 25 articles met study inclusion criteria, often using different methodologies. The articles described varying degrees of mental health symptomatology, risk factors for adverse mental health outcomes, and utilization of mental health services. The mental health needs of workers exposed to the events of September 11th ranged from little to no care to pharmacotherapy. A range of risk factors, including exposures at the WTC site and occupational activities, impacted on these needs but the role of specific mental health interventions was less clear. These findings suggest the need for a future program for disaster workers consisting of an accessible mental health treatment service supported by comprehensive postdisaster surveillance and emphasis on pre-disaster mental wellness. A number of areas for further consideration and study were identified, including the need for a more diverse exploration of involved responder populations as well as investigation of potential mental health outcomes beyond post-traumatic stress disorder (PTSD).

Brandeau, Margaret L., Gregory S. Zaric, Johannes Freiesleben, Frances L. Edwards, and Dena M. Bravata. 2008. An ounce of preventing is worth a pound of cure: Improving communication to reduce mortality during bioterrorism responses. *American Journal of Disaster Medicine* 3(2): 65-78.

The objective of this paper is to identify communication needs and evaluate the effectiveness of alternative communication strategies for bioterrorism responses. The authors provide a framework for evaluating communication needs during a bioterrorism response. Then, using a simulation model of a hypothetical response to anthrax bioterrorism in a large metropolitan area, the costs and benefits of alternative strategies for communication during a response are evaluated. Expected mortality increases significantly with increases in the time for attack detection and announcement; decreases in the rate at which exposed individuals seek and receive prophylaxis; increases in the number of unex-

posed people seeking prophylaxis; and increases in workload imbalances at dispensing centers. Thus, the timeliness, accuracy, and precision of communications about the mechanisms of exposure and instructions for obtaining prophylaxis and treatment are critical. Investment in strategies that improve adherence to prophylaxis is likely to be highly cost effective, even if the improvement in adherence is modest, and even if such strategies reduce the prophylaxis dispensing rate. Communication during the response to a bioterrorism attack must involve the right information delivered at the appropriate time in an effective manner from trusted sources. Because the response system for bioterrorism communication is only fully operationalized once an attack has occurred, tabletop planning and simulation exercises, and other up-front investments in the design of an effective communication strategy, are critical for effective response planning.

Carresi, Alejandro Lopez. 2008. The 2004 Madrid train bombings: An analysis of pre-hospital management. ***Disasters*** **32(1): 41-65.**
The terrorist train bombings in Madrid, Spain, on March 11, 2004 triggered a swift and massive medical response. This paper analyses the pre-hospital response to the attacks to gain insight into current trends in disaster management among Madrid's Emergency Medical Services (EMSs). To this end, the existing emergency planning framework is described, the basic structures of the different EMSs are presented, and the attacks are briefly depicted before consideration is given to pre-hospital management. Finally, an explanation of the main underlying misconceptions in emergency planning and management in Madrid is provided to aid understanding of the origins of some of the problems detected during the response. These are attributable mainly to inappropriate planning rather than to mistakes in field-level decisionmaking. By contrast, many of the successes are attributable to individual initiatives by frontline medics who compensated for the lack of clear command by senior managers by making adaptive and flexible decisions.

Chen, Zuanjuan, Helen Doerpinghaus, Bing-Xuan Lin, and Tong Yu. 2008. Catastrophic losses and insurer profitability: Evidence from 9/11. ***The Journal of Risk and Insurance*** **75(1): 39-62.**
This article examines the effects of 9/11 on the insurance industry, hypothesizing a short-run claim effect, resulting from insufficient premium ex ante for catastrophic losses, and a long-run growth effect, resulting from ex post insurance supply reductions and risk updating. Following Yoon and Starks (1995) the authors use short- and long-run abnormal forecast revisions to measure both effects, analyzing them as a function of firm-specific characteristics. They find that firm type, loss estimates, reinsurance use, and tax position are important determinants of the short-run position. Firm type, loss estimates, financial strength, underwriting risk, and reinsurance are key determinants of the firm's long run position.

Flynn, Stephen E. 2008. America the resilient: Defying terrorism and mitigating natural disasters. ***Foreign Affairs*** **87(2): 2-8.**
A climate of fear and a sense of powerlessness caused by the threats of terrorism and natural disasters are undermining American ideals and fueling political demagoguery. Rebuilding the resilience of American society is the way to reverse this and respond to today's challenges.

Gee, Christopher J., Jeremy Bonkowske, and Shree K. Kurup. 2008. Visual disability in selected acts of terror, warfare, and natural disasters of the last 25 years: A concise narrative review. ***American Journal of Disaster Medicine*** **3(1): 25-30.**
This paper gives a review of ocular injury related to mass disaster over the past 25 years, including injury type, treatment, and final visual outcome. The design was a retrospective review. The main outcome measures were: injury types, treatment, and final visual acuity. Acts of terror and war result in significant and increasingly more common ocular injury. Natural disasters were much less likely to cause lasting or permanent injury. Final visual acuity was rarely reported. Primary prevention is superior to treatment in acts of war and terror. Ocular injury is rarely reported by first response to natural disaster.

Hall, Stacey, Rosalie Ward, Trey Cunningham, and Lou Marciani. 2008. Developing a new curriculum in sport security management. ***Journal of Homeland Security and Emergency Management*** **5(1): 1-12.**
High profile sporting events in the United States have been identified by the Department of Homeland Security (DHS) as potential terrorist targets. However, there has been an identified lack of training and education for key personnel responsible for sport security operations. Recognizing the

demand and need for a specialized area in sport event security management, the University of Southern Mississippi School of Human Performance and Recreation developed an emphasis area in sports event security management as part of the Master of Science in Sport Management program. The sport security emphasis area includes three graduate level courses 1) introduction to sport security management, 2) risk assessment of sport venues, and 3) sport event emergency response planning. These courses were developed by an interdisciplinary team composed of faculty from the USM School of Human Performance and Recreation, individuals from the Center for Spectator Sports Security Management, a curriculum design specialist, and several professional sport security experts. The goal of the emphasis area is to equip current and future sport and entertainment managers with the specialization skills and knowledge needed to address the challenges of homeland security in the sports industry.

Krekeler, Mark, and C. Scott Allen. 2008. Remote sensing spectra of cesium chloride provide a potential emergency management tool for response to a radiological dispersal device detonation. ***Journal of Emergency Management*** **6(2): 60-64.**

Delineating affected areas from radiological dispersal device (RDD) events is a major challenge in emergency response. Remote sensing is one promising technique for detecting and discriminating dangerous from benign materials over large areas and from a safe distance. Remote sensing spectra of one major threat, cesium chloride (CsCl) powders, identifies previously unrecognized emissivity features at 2.96 m (>30 percent), 6.01 m (>20 percent), a broad feature at 7.10-7.49 m (6-8 percent), and a triplet at 8.46 (6 percent), 8.89 (11-15 percent), and 9.33 m (5-7 percent). While the features at 2.96, 6.01, and 7.10-7.49 m are masked by atmospheric gases such as water vapor, the triplet at 8.46, 8.89, and 9.33 m provides a unique spectral fingerprint that can be safely exploited from platforms at standoff distances.

Moline, Jaqueline M., Robert Herbert, Stephen Levin, Diane Stein, Benjamin Luft, Iris G. Udasin, and Philip J. Landrigan. 2008. WTC medical monitoring and treatment program: Comprehensive health care response in aftermath of Disaster. ***Mount Sinai Journal of Medicine*** **75(2): 67-75.**

The attack on the World Trade Center (WTC) on September 11th, 2001 exposed thousands of individuals to an unprecedented mix of chemicals, combustion products and micronized building materials. Clinicians at the Mount Sinai Irving Selikoff Center for Occupational and Environmental Medicine, in partnership with affected stakeholder organizations, developed a medical screening program to evaluate the health status of workers and volunteers who spent time at the WTC site and thus sustained exposure in the aftermath of September 11th. Standardized questionnaires were adapted for use in this unique population and all clinicians underwent training to ensure comparability. The WTC Worker and Volunteer Medical Screening Program (MSP) received federal funding in April 2002 and examinations began in July 2002. The MSP and the follow up medical monitoring program has successfully recruited nearly 22,000 responders, and serves as a model for the rapid development of a medical screening program to assess the health of populations exposed to environmental hazards as a result of natural and man-made disasters. The MSP constitutes a successful screening program for WTC responders. The authors discuss the challenges that confronted the program; the absence of a prior model for the rapid development of a program to evaluate results from mixed chemical exposures; little documentation of the size of the exposed population or of who might have been exposed; and uncertainty about both the nature and potential severity of immediate and long-term health effects.

Palumbo, John P., James I. Meek, Darcy M. Fazio, Susan B. Turner, James L. Hadler, and Andre N. Sofair. 2008. Unexplained deaths in Connecticut, 2002-2003: Failure to consider Category A Bioterrorism Agents in Differential Diagnosis. ***Disaster Medicine and Public Health Preparedness*** **2(2): 87-94.**

Recognition of bioterrorism-related infections by hospital and emergency department clinicians may be the first line of defense in a bioterrorist attack. The authors identified unexplained infectious deaths consistent with the clinical presentation of anthrax, tularemia, smallpox, and botulism using Connecticut death certificates and hospital chart information. Minimum work-up criteria were established to assess the completeness of diagnostic testing. Of 4,558 unexplained infectious deaths, 133 were consistent with anthrax (2.9 percent) and 6 (0.13 percent) with tularemia. None were consistent with smallpox or botulism. No deaths had anthrax or tularemia listed in the differential diagnosis or had disease-specific serology performed. Minimum work-up criteria were met for only 53 percent of cases. Except for anthrax, few unexplained deaths in Connecticut

could possibly be the result of the bioterrorism agents studied. In 47 percent of deaths from illnesses that could be anthrax, the diagnosis would likely have been missed. As of 2004, Connecticut physicians were not well prepared to intentionally or incidentally diagnose initial cases of anthrax or tularemia. More effective clinician education and surveillance strategies are needed to minimize the potential to miss initial cases in a bioterrorism attack.

Park, JiYoung. 2008. The economic impacts of dirty bomb attacks on the Los Angeles and Long Beach ports: Applying the Supply-Driven NIEMO (National Interstate Economic Model). ***Journal of Homeland Security and Emergency Management*** **5(1): 1-20.**

As homeland security policy makers seek to funnel scarce resources to the most vulnerable areas, geographic impact studies have become ever more crucial since the events of September 11, 2001. In the sense that the Los Angeles and Long Beach ports are among the largest in the world, service interruptions there would have nationwide economic impacts. Because foreign and domestic imports are in greater volumes than exports, the interruption of imports should be examined with a supply-side MRIO-type model. Hence, a new supply-side National Interstate Economic Model (NIEMO) yields extra information with important political implications in addition to the previously estimated demand-side results because both simulations show that terrorist attacks in one state have significant economic impacts in other states. Especially in the U.S. Senate where political power is evenly distributed among the states, the supply-side and demand-side results could help garner nationwide support for prevention measures in specific places, often distant from the states where the measures are taken.

Reddick, Christopher G. 2008. Collaboration and homeland security preparedness: A survey of U.S. city managers. ***Journal of Homeland Security and Emergency Management*** **5(1): 1-19.**

This article examines collaboration and homeland security preparedness in city governments in the United States. This is done through a survey of city managers in cities serving populations of 100,000 residents or greater. Based on a survey of the perceptions of city managers on homeland security preparedness from across the United States, these officials believe that there is high level of collaboration in their cities. The survey responses from city managers indicate that there is the most collaboration occurring in city government and the least with organizations statewide. City managers believe that they have a high capacity to coordinate and control homeland security preparedness; but they believe that there is a low probability of their city actually being a future terrorist target. The most prominent factors that explained homeland security preparedness were a city having a favorable economic and political climate. In a regression model, current homeland security preparedness is explained by the median family income of a city, the gender of the city manager, and the city manager having a graduate degree.

Regnier, Philippe, Bruno Neri, Stefania Scuteri, and Stefano Miniati. 2008. From emergency relief to livelihood recovery: Lessons learned from post-tsunami experiences in Indonesia and India. ***Disaster Prevention and Management*** **17(3): 410-429.**

This paper investigates post-disaster livelihood recovery through economic rehabilitation, with the illustration of post-tsunami promotion of microentrepreneurship activities generating employment and income among the affected populations. The paper examines two field case studies in Aceh (Indonesia) and Tamil Nadu (India), where a well-established European nongovernmental organization carried out economic relief and microentrepreneurship rehabilitation in 2005-2007. Despite unlimited trust in rapid reconstruction capacity, post-tsunami livelihood recovery has been chaotic and uncoordinated. Contrary to humanitarian agencies in charge of emergency relief, only a few development agencies and NGOs were able to deliver a rapid rehabilitation of microeconomic activities existing locally before the disaster. There are values but also obvious limits to comparing the micro-level experiences of a major European NGO in two different locations such as Aceh and Tamil Nadu, and to deducing macro- and meso-level lessons to be learned. There are difficulties in benchmarking the division of labor but necessary coordination among development agencies and their humanitarian counterparts in the field of post-disaster sustainable economic rehabilitation. Post-disaster economic security and livelihood recovery are at the forefront of current international policy research in humanitarian and development cooperation circles. Documented case studies and

lessons to be learned are still scarce for feeding possible best practices.

Renger, Ralph, Anneke Jansen, Erin Peacock, Adriana Cimetta, and Jessica Surdam. 2008. Using evaluation theory to augment the homeland security exercise and evaluation program (HSEEP) guidance for evaluating operations-based exercises. ***Journal of Emergency Management*** **6(3): 45-52.**
Exercises play a crucial role in better preparing for, responding to, and recovering from an emergency by providing opportunities for responders and officials to practice and assess their collective capabilities. Conducting a thorough evaluation of these exercises is critical to ensuring that the nation continually improves its ability to save lives and property. A major emphasis of the Homeland Security Exercise and Evaluation Program (HSEEP) is on defining and evaluating capability-based objectives to determine the impact of an exercise. Using the integrated theory of evaluation, it is shown how a cost-effective, quality evaluation of operations- based exercises can be conducted while simultaneously not interfering or adding to the burden of exercise players, controllers, or evaluators. It is hoped that this article will act as a catalyst in moving HSEEP to recognize the potential of other sources of information to assist in conducting a more comprehensive evaluation and amend their guidelines accordingly.

Ruwanpura, Rohan, Kiribathgalage Sunil Kumara, Hermamal Jayawardane, and Lalantha B. L. de Alwis. 2008. Suicidal bomb explosions in Sri Lanka. ***American Journal of Disaster Medicine*** **3(1): 47-51.**
Injuries due to explosive devices are often seen in Sri Lanka. The involvement of suicide bombers is the peculiar feature of these bomb explosions. Analysis of injuries observed in the suicide bombers showed distinctive injury patterns consisting of detachment of the head and limbs, severe disruption of the trunk, burns at the transected tissue margins, presence of cyanide capsule in the neck, and absence of the shrapnel injuries. These findings are helpful in recognition of the perpetrator for the subsequent legal proceedings and also important in organization of preventive measures. In this context, suicide bomber could be defined as an individual carrying high explosive device, attached to his/her body and must be recognized as a separate medicolegal entity.

Hurricanes and Coastal Hazards

Abramson, David, Tasha Stehling-Ariza, Richard Garfield, and Irwin Redlener. 2008. Prevalence and predictors of mental health distress post-Katrina: Findings from the Gulf Coast Child and Family Health Study. ***Disaster Medicine and Public Health Preparedness*** **2(2): 77-86.**
Catastrophic disasters often are associated with massive structural, economic, and population devastation; less understood are the long-term mental health consequences. This study measures the prevalence and predictors of mental health distress and disability of hurricane survivors over an extended period of recovery in a post-disaster setting. A representative sample of 1,077 displaced or greatly affected households was drawn in 2006 using a stratified cluster sampling of federally subsidized emergency housing settings in Louisiana and Mississippi, and of Mississippi census tracts designated as having experienced major damage from Hurricane Katrina in 2005. Two rounds of data collection were conducted: a baseline face-to-face interview at six to 12 months post-Katrina and a telephone follow-up at 20 to 23 months after the disaster. Mental health disability was measured using the Medical Outcome Study Short Form 12, version 2 mental component summary score. Bivariate and multivariate analyses were conducted examining socioeconomic, demographic, situational, and attitudinal factors associated with mental health distress and disability. More than half of the cohort at both baseline and follow-up reported significant mental health distress. Self-reported poor health and safety concerns were persistently associated with poorer mental health. Nearly two years after the disaster, the greatest predictors of poor mental health included situational characteristics such as greater numbers of children in household and attitudinal characteristics such as fatalistic sentiments and poor self-efficacy. Informal social support networks were associated significantly with better mental health status. Housing and economic circumstances were not independently associated with poorer mental health. Mental health distress and disability are pervasive issues among the US Gulf Coast adults and children who experienced long-term displacement or other serious effects as a result of Hurricanes Katrina and Rita. As time progresses post-disaster, social and psychological factors may play greater roles in accelerating or impeding recovery among affected populations. Efforts to expand disaster recovery and preparedness policies to include long-term social re-engagement efforts post-di-

saster should be considered as a means of reducing mental health sequelae.

Barnes, Michael D., Carl L. Hanson, Len M. B. Novilla, Aaron T. Meacham, Emily McIntyre, and Brittany C. Erickson. 2008. Analysis of media agenda setting during and after Hurricane Katrina: Implications for emergency preparedness, disaster response, and disaster policy. ***American Journal of Public Health 98*****(4): 604-610.**
Media agenda setting refers to the deliberate coverage of topics or events with the goal of influencing public opinion and public policy. The authors conducted a quantitative content analysis of four prominent newspapers to examine how the media gathered and distributed news to shape public policy priorities during Hurricane Katrina. The media framed most Hurricane Katrina stories by emphasizing government response and less often addressing individuals' and communities' level of preparedness or responsibility. Hence, more articles covered response and recovery than mitigation and preparation. The newspapers studied focused significantly more on government response than on key public health roles in disaster management. The article discusses specific implications for public health professionals, policymakers, and mass media so that, in the future, coordination can be enhanced among these entities before, during, and after disasters occur.

Bin, Okmyung, Jamie Brown Kruse, and Craig E. Landry. 2008. Flood hazards, insurance rates, and amenities: Evidence from the coastal housing market. ***The Journal of Risk and Insurance*** **75(1): 63-82.**
This study employs the hedonic property price method to examine the effects of flood hazard on coastal property values. It utilizes Geographic Information System data on National Flood Insurance Program flood zones and residential property sales from Carteret County, North Carolina. Results indicate that location within a flood zone lowers property value. Price differentials for flood risk and the capitalized value of flood insurance premiums are roughly equivalent both exhibiting a nonlinear relationship in flood probability. The results support the conclusion that flood zone designation and insurance premiums convey risk information to potential buyers in the coastal housing market.

Chen, Xuwei. 2008. Microsimulation of hurricane evacuation strategies of Galveston Island. ***The Professional Geographer*** **60(2): 160-173.**
This article investigates the effectiveness of simultaneous and staged evacuation strategies for hurricane evacuations of Galveston Island using agent-based microsimulation techniques. In the simultaneous strategy the entire population is informed to evacuate simultaneously, whereas in a staged evacuation strategy, people are informed to evacuate in a sequence. The results suggest that (1) the most efficient staged evacuation strategy can help reduce the evacuation time for Galveston Island by approximately one hour, (2) previous studies might have underestimated the evacuation time of Galveston, and (3) an evacuation under the rapid response assumption does not necessarily lead to an effective evacuation.

Dalisay, Soledad Natalia M. 2008. Survival strategies to overcome inaagosto and nordeste in two coastal communities in Batangas and Mindoro, the Philippines. ***Disaster Prevention and Management*** **17(3): 373-382.**
The purpose of this study is to describe how the people in two coastal communities in Batangas and Mindoro respond to the effects of these seasonal changes on their lives and livelihood. The study makes use of findings from a previous study conducted by the author in Batangas and from primary data gathered in Mindoro through interviews with key informants. The study shows that people in the two communities visited viewed the monsoon rains and typhoons brought about by seasonal changes as being part of the daily life challenges they had to face. The rainy season was also the lean food season which they called inaagosto in Batangas and nordeste in Mindoro. Hence, their responses were mostly at the individual or household level, rarely taking advantage of community programs and projects that could help them survive the lean food season. Although divided by a body of water, the people in Batangas and Mindoro employed very similar strategies. These strategies included negotiating for entitlements, engaging in extra-income-earning activities, and reallocating scarce food resources in the home. They differed, however, in ways in which they had "reinvented" food during the lean season. In both communities, coping was seen to be gendered. The paper provides an understanding of how people respond to hazards that accompany the

lean season and how best to approach these responses to achieve optimum results that would truly address the challenges faced by affected communities. The paper contributes to the development of more appropriate programs and projects that would alleviate the effects of inaagosto and nordeste.

Dass-Brailsford, Priscilla. 2008. After the Storm: Recognition, recovery, and reconstruction. ***Professional Psychology: Research and Practice*** **39(1): 24-30.**

On August 29, 2005, when Hurricane Katrina made landfall near the Louisiana/Mississippi border, it exposed a large number of people to extraordinary loss and suffering. The enormous swath of physical devastation wreaked across the marshes of Louisiana's Plaquemines Parish to the urban communities of New Orleans and the coastal landscape of Mississippi and Alabama caused a notable change to the demographics of the Gulf Region, making it the most expensive natural disaster in U.S. history. This article describes a disaster responder's experiences of working with displaced survivors of Hurricane Katrina, providing crisis and mental health support in the acute phase of the disaster. This is followed by a discussion of the importance of a multicultural approach to helping survivors of a natural disaster; several guidelines to improve multicultural competence are proposed. In particular, the importance of attending to survivors' racial, socioeconomic, language, and religious differences is discussed.

De Pippo, Tommaso, Carlo Donadio, Micla Pennetta, Carmela Petrosino, Francesco Terlizzi, and Alessio Valente. 2008. Coastal hazard assessment and mapping in Northern Campania, Italy. ***Geomorphology*** **3(4): 451-466.**

In the Northern Campanian coastal zone, over 150 km long, three geomorphic units are recognized: (1) sandy beaches that are well developed in the northern area, where a prominent river mouth (Volturno River) is also present; (2) steep and rocky shores, often with gravelly beaches or debris cones at their base, are mainly diffuse in the southern area (Sorrentine Peninsula); and, lastly, (3) "techno coast," shorelines stabilized with revetments and seawalls as well as former natural environments no longer clearly operational because of urbanization, as is visible in Naples and in the Vesuvian coast. Six primary hazards are considered in this investigation: shoreline erosion, riverine flooding, storms, landslides, seismicity and volcanism, and man-made structures. These hazards do not have a uniform distribution along this coast in terms of their frequency and intensity; moreover both their interaction and the intensive action of humans, often uncontrolled, make it difficult to assess the overall coastal hazard. In this paper a semi-quantitative method with which to quantify, rank and map the distribution of hazard is applied along this particular stretch of coast. In such a stretch, previously characterized in terms of types and processes and compartmentalized into geomorphic units, the effect of individual hazards, based on their magnitude and recurrence, is evaluated. Dominant and subordinate hazards for each geomorphic unit are identified, assigning a rank that is also a weighting. Comparison of each weighting through an interaction matrix permits the calculation of a resultant, which is the overall hazard assessment and which can be expressed cartographically. The results obtained for a coastal zone with one of the highest pressures from urbanization in the world, help us to recognize that this approach could become a useful tool to aid decision-making regarding coastal land-use and planning.

Evans-Cowley, Jennifer S., and Meghan Zimmerman Gough. 2008. Evaluating environmental protection in post-Hurricane Katrina plans in Mississippi. ***Journal of Environmental Planning and Management*** **51(3): 399-419.**

Immediately following Hurricane Katrina, the Mississippi Governor's Commission for Recovery, Rebuilding and Renewal provided planning teams to work with coastal communities to prepare long-range rebuilding plans followed by further community-initiated plans. Eighteen months after Katrina, this paper examines the degree to which environmental protection has been incorporated into the long-range plans developed in Harrison County, Mississippi. This study finds that environmental protection has not been adequately integrated into the plans. It concludes by offering recommendations on how these communities can improve their plans relative to environmental protection measures as they move into their next phase of planning.

Faust, Douglas S., F. William Black, Joel P. Abrahams, Melinda S. Warner, and B. Jayne Bellando. 2008. After the storm: Katrina's impact on psychological practice in New Orleans. ***Professional Psychology: Research and Practice*** **39(1): 1-6.**

The impact of Hurricane Katrina on four senior New Orleans based psychologists, both professionally and

personally, is described. The authors are pediatric, adult, and family therapists and neuropsychologists; by employment, they are medical center academics, independent practitioners, administrators, and staff/consulting psychologists at medical and psychiatric hospitals. Their diverse experiences following Katrina are similar to the experiences of many individuals in the professional community of the Gulf Coast. In the face of the storm, they departed New Orleans and afterward returned at varying intervals. The homes of all of the four New Orleans authors were damaged or destroyed. All of their practice locations were closed for varying periods, and two were closed permanently. Of the four who returned to New Orleans, only two remained 18 months after the storm; the others had relocated to other states. This article reflects on their collective experience as mental health professionals living in New Orleans after Katrina and lessons learned from that experience.

Hallegatte, Stephane. 2008. An adaptive regional input-output model and its application to the assessment of the economic cost of Katrina. ***Risk Analysis*** **28(3): 779-799.**

This article proposes a new modeling framework to investigate the consequences of natural disasters and the following reconstruction phase. Based on input-output tables, its originalities are (1) the taking into account of sector production capacities and of both forward and backward propagations within the economic system; and (2) the introduction of adaptive behaviors. The model is used to simulate the response of the economy of Louisiana to the landfall of Katrina. The model is found consistent with available data, and provides two important insights. First, economic processes exacerbate direct losses, and total costs are estimated at $149 billion, for direct losses equal to $107 billion. When exploring the impacts of other possible disasters, it is found that total losses due to a disaster affecting Louisiana increase nonlinearly with respect to direct losses when the latter exceed $50 billion. When direct losses exceed $200 billion, for instance, total losses are twice as large as direct losses. For risk management, therefore, direct losses are insufficient measures of disaster consequences. Second, positive and negative backward propagation mechanisms are essential for the assessment of disaster consequences, and the taking into account of production capacities is necessary to avoid overestimating the positive effects of reconstruction. A systematic sensitivity analysis shows that, among all parameters, the overproduction capacity in the construction sector and the adaptation characteristic time are the most important.

Kapucu, Naim. 2008. Collaborative emergency management: Better community organizing, better public preparedness and response. ***Disasters*** **32(2): 239-262.**

Community coordination requires communication and planning of precautions to take when faced with a severe threat of disaster. The unique case of the four Florida hurricanes of 2004 Charley, Frances, Ivan, and Jeanne is used here to assess community responses to repeated threats of hurricanes. The paper examines how effectiveness in coordinating community disaster response efforts affects future public preparedness. The findings suggest that pre-season planning; open communication between emergency managers and elected officials, and the use of technology all had a significant impact on community responses. The repeated threat scenario indicates that emergency managers must work vigilantly to keep residents informed of the seriousness of a situation. The study describes how emergency managers in Florida countered public complacency during four hurricanes in six weeks. The strategies identified as useful by public managers in the context of hurricanes are applicable to other natural and man-made disasters.

Kelman, Ilan. 2008. Lessons relearned from Katrina? ***American Journal of Disaster Medicine*** **3(2): 61-62.**

Kessler, R. C., S. Galea, M. J. Gruber, N. A. Sampson, R. J. Ursano, and S. Wessely. 2008. Trends in mental illness and suicidality after Hurricane Katrina. ***Molecular Psychiatry*** **13(4): 374-384.**

A representative sample of 815 pre-hurricane residents of the areas affected by Hurricane Katrina was interviewed 58 months after the hurricane and again 1 year later as the Hurricane Katrina Community Advisory Group (CAG). The follow-up survey was carried out to study patterns-correlates of recovery from hurricane-related post-traumatic stress disorder (PTSD), broader anxiety-mood disorders and suicidality. The Trauma Screening Questionnaire screening scale of PTSD and the K6 screening scale of anxiety-mood disorders were used to generate DSM-IV prevalence estimates. Contrary to results in other disaster studies, where post-disaster men-

tal disorder typically decreases with time, prevalence increased significantly in the CAG for PTSD (20.9 percent vs. 14.9 percent at baseline), serious mental illness (SMI; 14.0 percent vs. 10.9 percent), suicidal ideation (6.4 percent vs. 2.8percent) and suicide plans (2.5 percent vs. 1.0 percent). The increases in PTSD-SMI were confined to respondents not from the New Orleans Metropolitan Area, while the increases in suicidal ideation-plans occurred both in the New Orleans sub-sample and in the remainder of the sample. Unresolved hurricane-related stresses accounted for large proportions of the inter-temporal increases in SMI (89.2 percent), PTSD (31.9 percent) and suicidality (61.6 percent). Differential hurricane-related stress did not explain the significantly higher increases among respondents from areas other than New Orleans, though, as this stress was both higher initially and decreased less among respondents from the New Orleans Metropolitan Area than from other areas affected by the hurricane. Outcomes were only weakly related to socio-demographic variables, meaning that high prevalence of hurricane-related mental illness remains widely distributed in the population nearly 2 years after the hurricane.

Lindell, Michael K., and Seong Nam Hwang. 2008. Households' perceived personal risk and responses in a multihazard environment. *Risk Analysis* 28(2): 539-556.

This study proposed and tested a multistage model of household response to three hazards -- flood, hurricane, and toxic chemical release in Harris County Texas. The model, which extends Lindell and Perry's (1992, 2004) Protective Action Decision Model, proposed a basic causal chain from hazard proximity through hazard experience and perceived personal risk to expectations of continued residence in the home and adoption of household hazard adjustments. Data from 321 households generally supported the model, but the mediating effects of hazard experience and perceived personal risk were partial rather than complete. In addition, the data suggested that four demographic variables gender, age, income, and ethnicity affect the basic causal chain at different points.

Madrid, Paula A., and Roy Grant. 2008. Meeting mental health needs following a natural disaster: Lessons from Hurricane Katrina. *Professional Psychology: Research and Practice* 39(1): 86-92.

Hurricane Katrina had a devastating impact on hundreds of thousands of Louisiana and Mississippi families. Housing was destroyed, jobs were lost, and family members were separated, sometimes in different states and without communication. Post-disaster stress reactions were common, with vulnerable individuals most affected. Mental health services were not adequate to meet immediate needs, and post-disaster mental health issues often emerge over time. This article describes the mental health needs of dislocated and evacuee children and families and the steps that were taken to develop mental health programs that would be sustainable over time to meet this new level of need.

Malhorta, Neil, and Alexander G. Kuo. 2008. Attributing blame: The public's response to Hurricane Katrina. *The Journal of Politics* 70(1): 120-135.

When government fails, whom do citizens blame? Do these assessments rely on biased or content-rich information? Despite the vast literatures on retrospective voting in political science and attribution in psychology, there exists little theory and evidence on how citizens apportion blame among public officials in the wake of government failure. The authors of this article designed a survey experiment in which respondents ranked seven public officials in order of how much they should be blamed for the property damage and loss of life in New Orleans after Hurricane Katrina. The authors manipulated the information provided to respondents, with some receiving the officials' party affiliations, others receiving their job titles, and others receiving both cues. They find that party cues cause individuals to blame officials of the opposite party, but citizens make more principled judgments when provided with information about officials' responsibilities. These results have implications for our understanding of the impact of heuristics and information on retrospective evaluations of government performance.

McCormick, Lindsey. 2008. Hurricane Katrina and lessons learned utilization: Important findings for the emergency management community. *Journal of Emergency Management* 6(3): 39-44.

Hurricane Katrina revealed several lessons learned for the emergency management community. This study was conducted to determine common lessons learned from Katrina and how emergency managers in hurricane prone areas were utilizing them. The study attempted to determine if and how the emergency management community is using the lessons learned from Katrina, if at all. The author concludes with some important findings for the emergency management community. The survey results are valuable to emer-

gency managers in the sense that utilizing lessons learned from previous disasters of all types can lead to more effective planning and responding to future disasters. Effective emergency planning or managing effective responses in disasters saves peoples' money and most important, peoples' lives.

McLeish, Alison C., and Kevin S. Del Ben. 2008. Symptoms of depression and posttraumatic stress disorder in an outpatient population before and after Hurricane Katrina. ***Depression and Anxiety*** **25(5): 416-421.**

The aim of the present investigation was to evaluate symptoms of depression and posttraumatic stress disorder (PTSD) in an outpatient psychiatric population before and after Hurricane Katrina. The sample consisted of 156 patients (110 females; Mage=41.2 years, SD=10.9) at an outpatient psychiatric clinic who completed measures of psychological symptoms as part of their regular clinical care in the month before (n=76; 49 percent) and the one month after (n=80; 51%) Hurricane Katrina made landfall. Partially consistent with prediction, depression scores were significantly higher in the month following the hurricane, but PTSD scores were not significantly different. Depressive symptoms after the hurricane were predicted by watching television coverage of the looting that occurred in New Orleans and by the amount of time the participant was without electricity. Symptoms of PTSD after the hurricane were predicted by the participants' use of general television viewing as a coping strategy, the amount of time they spent watching television coverage of the looting in New Orleans, and the use of prayer as a coping behavior. Of these variables, only prayer was associated with a decrease in PTSD symptoms. Findings are discussed in relation to the need for collaborative efforts between clinically oriented and research oriented institutions to study the impact of large-scale disasters on a variety of populations.

Moyo, Otrude, and Vadim Moldovan. 2008. Lessons for social workers: Hurricane Katrina as a social disaster. ***Social Development Issues*** **30(1): 1-12.**

The New Orleans disaster resulted from preexisting social and structural problems exacerbated by Hurricane Katrina. In the aftermath of the flood, the lack of effective community rehabilitation efforts has prolonged the misery of its victims. With the rest of society, the social work profession bears the responsibility for this tragedy. This article looks at the Katrina disaster in the historical context of several other flood disasters caused in part by society's neglect of the poor and community infrastructures. An ideological reorientation of the social work profession with an emphasis on social justice is discussed as a moral imperative in the current political climate.

Nelson, Larry P. 2008. A resiliency profile of Hurricane Katrina adolescents: A psychosocial study of disaster. ***Canadian Journal of School Psychology*** **23(1): 57-69.**

Information about the psychological status of children following a natural disaster is rare. Therefore, the purpose of this investigation is to create a psychosocial profile of relocated Hurricane Katrina youth (N = 83, ages 13 to 17) and integrate the findings into a growing body of literature on the psychological effects of disaster. Data were collected using the Resiliency Scales for Children and Adolescents. Findings indicate the population had overall below-average resiliency resources. The greatest of these resources are reflected in their ability to maintain a positive attitude, ask for and receive help, and solve problems. Other resiliency strengths emerged in the form of feeling calm and comfortable with people. Findings also indicate the population as showing above-average vulnerability and sensitivity to psychosomatic reactions, including high levels of impairment by and recovery from emotional upset. Suggestions for intervention are aimed at meaningful social support activities that emphasize the rebuilding of community via outdoor adventure education and service learning.

Rabito, Felicia A., Shahed Iqbal, Michael P. Kierman, and Ginger L. Chew. 2008. Children's respiratory health and mold levels in New Orleans after Katrina: A preliminary look. ***Journal of Allergy and Clinical Immunology*** **21(3): 622-625.**

When the federal levee system broke after Hurricane Katrina, 80 percent of New Orleans, approximately 134,000 homes, flooded. As repopulation and revitalization activities continue, exposure to mold and other respiratory irritants has emerged as a major health concern; however, there has been no study examining children's respiratory health and indoor mold levels in the post-Katrina environment. The Children's Respiratory Health Study was designed as a preliminary examination of indoor air levels of mold, children's lung function, and common indices of respiratory health in a select sample of children returning to live in New Orleans immediately after

Hurricane Katrina. Children were recruited from a private primary school in the Garden District of New Orleans. Respiratory health questionnaire and spirometric data were collected on children seven to 14 years of age, and mold air sampling was conducted at baseline and again after two months. There was an overall decrease in mold levels and respiratory symptoms over the study period, and indoor mold levels were low despite reported hurricane damage.

Robinson, William T., Debbie Wendell, DeAnn Gruber, Joseph Foxhood, Beth Scalco, and Amy Zapata. 2008. Estimating the return of persons living with HIV/AIDS to New Orleans: Methods for conducting disease surveillance in the wake of a natural disaster. ***American Journal of Public Health*** **98(4): 666-668.**
Hurricane Katrina disrupted HIV/AIDS surveillance by invalidating the New Orleans surveillance and population data on persons living with HIV/AIDS. This article describes two methods population return and HIV surveillance data to estimate the return of the infected population to New Orleans. It is estimated that 58 percent to 64 percent of 7,068 persons living with HIV/AIDS returned by summer 2006. Although developed for HIV planning, these methods could be used with other disease surveillance programs.

Roca, Elisabet, Gonzalo Gamboa, and J. David Tabara. 2008. Assessing the multidimensionality of coastal erosion risks: Public participation and multicriteria analysis in a Mediterranean coastal system. ***Risk Analysis*** **28(2): 399-412.**
The complex and multidimensional nature of coastal erosion risks makes it necessary to move away from single-perspective assessment and management methods that have conventionally predominated in coastal management. This article explores the suitability of participatory multicriteria analysis (MCA) for improving the integration of diverse expertise and values and enhancing the social-ecological robustness of the processes that lead to the definition of relevant policy options to deal with those risks. We test this approach in the Mediterranean coastal locality of Lido de Sète in France. Results show that the more adaptive alternatives such as "retreating the shoreline" were preferred by our selected stakeholders to those corresponding to "protecting the shoreline" and the business as usual proposals traditionally put forward by experts and policymakers on these matters. Participative MCA contributed to represent coastal multidimensionality, elicit and integrate different views and preferences, facilitated knowledge exchange, and allowed highlighting existing uncertainties.

Sadowski, Nicole Cornell, and Daniel Sutter. 2008. Mitigation motivated by past experience: Prior hurricanes and damages. ***Ocean and Coastal Management*** **51(4): 303-313.**
Hurricanes imposed a heavy toll on the U.S. in 2004 and 2005: damages from the four Florida hurricanes in 2004 exceeded Hurricane Andrew, while Hurricane Katrina was the costliest natural disaster in U.S. history. Researchers have spent years devising plans and mitigation measures to reduce damages from hurricanes. The lack of a reliable database on mitigation efforts has hampered assessment of the effectiveness of these measures. This article proposes a new test of the effectiveness of mitigation using a past land falling hurricane as a proxy, since conventional wisdom holds that communities often implement mitigation after a disaster. The authors find that a prior land falling hurricane and by implication mitigation can significantly reduce damages, by the equivalent of about a one category reduction on the Saffir-Simpson scale of hurricane intensity.

Sharma, Andrea J., Edward C. Weiss, Stacy L. Young, Kevin Stephens, Raoult Ratard, Susanne Straif-Bourgeois, Theresa M. Sokol, Peter Vranken, and Carol H. Rubin. 2008. Chronic disease and related conditions at emergency treatment facilities in the New Orleans area after Hurricane Katrina. ***Disaster Medicine and Public Health Preparedness*** **2(1): 27-32.**
Disaster preparations usually focus on preventing injury and infectious disease. However, people with chronic disease and related conditions (CDRCs), including obstetric/gynecological conditions, may be vulnerable to disruptions caused by disasters. The authors used surveillance data collected after Hurricane Katrina to characterize the burden of visits for CDRCs at emergency treatment facilities (e.g., hospitals, disaster medical assistance teams, military aid stations). In 6 parishes in and around New Orleans, health care providers at 29 emergency treatment facilities completed a standardized questionnaire for injury and illness surveillance from September 8 through October 22, 2005. Of 21,673 health care visits, 58.0 percent were for illness (24.3 percent CDRCs, 75.7 percent non-CDRCs), 29.1 percent for injury, 7.2 percent for medication refills, and 5.7 percent for routine or follow-up care. The proportion of visits for CDRCs increased with age. Among men presenting with CDRCs, the most common illnesses were cardiovascular disease (36.8 percent), chronic lower-respiratory disease (12.3 percent), and diabetes/glucose abnor-

malities (7.7 percent). Among women presenting with CDRCs, the most common were cardiovascular disease (29.2 percent), obstetric/gynecological conditions (18.2 percent), and chronic lower-respiratory disease (12.0 percent). Subsequent hospitalization occurred among 28.7 percent of people presenting with CDRCs versus 10.9 percent of those with non-CDRCs and 3.8 percent of those with injury. Our data illustrate the importance of including CDRCs as a part of emergency response planning.

Schulenberg, Stefan E., Kirsten A. Dellinger, Angela J. Koestler, Ann Marie K. Kinnell, David A. Swanson, Mark V. Van Boening, and Richard G. Forgette. 2008. Psychologists and Hurricane Katrina: Natural disaster response through training, public education, and research. ***Training and Education in Professional Psychology*** **2(2): 83-88.**

The purpose of this article was to describe a model of clinical/disaster psychology and illustrate how one psychologist applied training in the aftermath of Hurricane Katrina. The primary focus of the article relates to training graduate students of clinical psychology and assisting evacuees, public education and dissemination, and research. Psychologists may find themselves in similar positions when disasters occur in the future, and the linkage of research and theory with anecdotal accounts may provide mental health professionals with ideas regarding avenues of training to pursue and the various roles that may be served in times of disaster. Recommendations are offered to training programs with regard to infusing tenets of clinical/disaster psychology into their curriculum.

Sinha, Prakash C., Indu Jain, Neetu Bhardwaj, Ambarukhana D. Rao, and Shishir K. Dube. 2008. Numerical modeling of tide-surge interaction along Orissa coast of India. ***Natural Hazards*** **45(3): 413-427.**

The Orissa coast of India is one of the most vulnerable regions of extreme sea levels associated with severe tropical cyclones. There was extensive loss of life and property due to the October 1999 super cyclone, which devastated large part of the Orissa coast. The shallow nature of the head bay, presence of a large number of deltas formed by major rivers of Orissa such as Mahanadi and Dhamra, and high tidal range are responsible for storm surge flooding in the region. Specifically, rising and falling tidal phases influence the height, duration, and arrival time of peak surge along the coast. The objective of the present study is to evaluate the tide-surge interaction during the 1999 Orissa cyclone by using nonlinear vertically integrated numerical models. The pure tidal solution for the head bay region of the Bay of Bengal provides the initial condition for the fine resolution nested grid Orissa model. However, the feedback from the Orissa model does not affect the head bay model as the study provides a one-way interaction. Numerical experiments are performed to study the tide-surge interaction by considering various relative phases of the tidal waves with the surge-wave produced by 1999 Orissa cyclone. The comparison, although utilizing only the limited estimates of tidal data, appears adequate to assert that the principal features are reproduced correctly.

Spence, Patric R., Kenneth A. Lachlan, and Jennifer A. Burke. 2008. Crisis preparation, media use, and information seeking: Patterns across Katrina evacuees and lessons learned for crisis communication. ***Journal of Emergency Management*** **6(2): 11-23.**

This study examined crisis preparation, information seeking patterns, and media use in the aftermath of Hurricane Katrina. Surveys were collected from 964 Katrina evacuees. Results indicated a continued need to create messages encouraging crisis preparation, especially among at-risk subpopulations. Differences in information seeking behavior were detected across age, income, and sex, while new media proved to be a non factor. The findings are discussed in terms of pragmatic implications for crisis communication practitioners regarding message design and placement.

West, Christine, Bruce Bernard, Charles Mueller, Margaret Kitt, Richard Driscoll, and Sangwoo Tak. 2008. Mental health outcomes in police personnel after Hurricane Katrina. ***Journal of Occupational and Environmental Medicine*** **50(6): 689-695.**

The authors examined symptoms of depression and posttraumatic stress disorder (PTSD) among New Orleans Police Department (NOPD) personnel who provided law enforcement and relief services to affected communities following Hurricane Katrina. They conducted a cross-sectional survey of mental health outcomes related to personal and work-related exposures of police personnel eight weeks after the Hurricane. Of the 912 police personnel who completed the questionnaire, 227 (26 percent) reported symptoms consistent with depression and 170 (19 percent) reported symptoms consistent with PTSD. Risk factors associated with PTSD include recovery of bodies, crowd control, assault, and injury to a family member. Depressive symptoms were associated with rare family

contact, uninhabitable home, isolation from the NOPD, assault, and injury to a family member. Police personnel reported symptoms of PTSD and depression associated with work-related and personal factors following Hurricane Katrina.

Information and Spatial Technology

Bin, Okmyung, Jamie Brown Kruse, and Craig E. Landry. 2008. Flood hazards, insurance rates, and amenities: Evidence from the coastal housing market. ***The Journal of Risk and Insurance*** **75(1): 63-82.**

This study employs the hedonic property price method to examine the effects of flood hazard on coastal property values. It utilizes Geographic Information System data on National Flood Insurance Program flood zones and residential property sales from Carteret County, North Carolina. Results indicate that location within a flood zone lowers property value. Price differentials for flood risk and the capitalized value of flood insurance premiums are roughly equivalent both exhibiting a nonlinear relationship in flood probability. The results support the conclusion that flood zone designation and insurance premiums convey risk information to potential buyers in the coastal housing market.

De Pippo, Tommaso, Carlo Donadio, Micla Pennetta, Carmela Petrosino, Francesco Terlizzi, and Alessio Valente. 2008. Coastal hazard assessment and mapping in Northern Campania, Italy. ***Geomorphology*** **3(4): 451-466.**

In the Northern Campanian coastal zone, over 150 km long, three geomorphic units are recognized: (1) sandy beaches that are well developed in the northern area, where a prominent river mouth (Volturno River) is also present; (2) steep and rocky shores, often with gravelly beaches or debris cones at their base, are mainly diffuse in the southern area (Sorrentine Peninsula); and, lastly, (3) "techno coast," shorelines stabilized with revetments and seawalls as well as former natural environments no longer clearly operational because of urbanization, as is visible in Naples and in the Vesuvian coast. Six primary hazards are considered in this investigation: shoreline erosion, riverine flooding, storms, landslides, seismicity and volcanism, and man-made structures. These hazards do not have a uniform distribution along this coast in terms of their frequency and intensity; moreover both their interaction and the intensive action of humans, often uncontrolled, make it difficult to assess the overall coastal hazard. In this paper a semi-quantitative method with which to quantify, rank and map the distribution of hazard is applied along this particular stretch of coast. In such a stretch, previously characterized in terms of types and processes and compartmentalized into geomorphic units, the effect of individual hazards, based on their magnitude and recurrence, is evaluated. Dominant and subordinate hazards for each geomorphic unit are identified, assigning a rank that is also a weighting. Comparison of each weighting through an interaction matrix permits the calculation of a resultant, which is the overall hazard assessment and which can be expressed cartographically. The results obtained for a coastal zone with one of the highest pressures from urbanization in the world, help us to recognize that this approach could become a useful tool to aid decision-making regarding coastal land-use and planning.

Furdada, G., L. E. Calderon, and M. A. Marques. 2008. Flood hazard map of La Trinidad (NW Nicaragua). Methods and results. ***Natural Hazards*** **45(2): 183-195.**

During the Mitch Hurricane event (October 1998), severe floods occurred in the village of La Trinidad (Departamento de Estelí, NW Nicaragua), which spreads at the margin of La Trinidad River. As a consequence, the need for hazard assessment and land use planning to reduce the effects of these natural processes arose. Nicaragua is a developing country, which means that there is a scarcity of good quality data on which to base these hazard assessments (i.e., lack of detailed topographic maps, lack of meteorological and discharge data series). Therefore, the main objective of the present work was to generate a flood hazard map of La Trinidad by means of a simple method, with a resulting map easy to understand and to use by the municipality for land use planning. There is no topographic map of the area at a more detailed scale than 1:50,000. So the main document that supports all the data and on which the final hazard map was based is the orthophotograph at 1:5,000 scale (generated from vertical aerial photographs taken in 2000). The method used was based on classical interpretation of vertical aerial photographs (pre-Mitch and a post-Mitch event), detailed field work, inquiries among the population and analysis of the main pattern of storms occurring in the area. All these data allowed the reconstruction of different extensions and water levels corresponding to events of different frequency and magnitude, and the qualitative association of them to three hazard levels by means of energy and frequency. The use of orthophotographs of 1:5,000 proved to be very useful both for the development of the work and for the presentation

of the final map, because they are very easily understandable for people not trained in the interpretation of topographic maps.

Gitas, I. Z., A. Polychronaki, T. Katagis, and G. Mallinis. 2008. Contribution of remote sensing to disaster management activities: A case study of the large fires in the Peloponnese, Greece. ***International Journal of Remote Sensing*** **29(6): 1847-1853.**

Natural disasters such as floods, wildfires, earthquakes and volcanic eruptions usually result in significant human losses and environmental degradation. To minimize the consequences of these catastrophic events, fire managers and national authorities are in need of accurate information regarding the geographic extent of the affected areas, both during the outbreak and shortly after the suppression of the fire event. The aim of this study was to ascertain whether analysis of Earth Observation (EO) data acquired through the International Charter 'Space and Major Disasters' can be successfully used to address the requirements of environmental disaster management. Specifically, operational information extracted through reliable and robust object-based classification models was provided on the extent of the total burned area and the environmental implications in the Peloponnese (southern Greece) following a request from the National Forest Service and the World Wide Fund for Nature (WWF) Hellas. The results not only revealed the size of the disaster but also indicated the potential operational use of remote sensing in order to provide immediate and precise information to local, national and international organizations in relation to the post-fire impact assessment.

Gomes, Roberto A. T., Renato F. Guimaraes, Osmar A. Carvalho, Nelson F. Fernandes, Euripedes A. Vargas, and Eder S. Martins. 2008. Identification of the affected areas by mass movement through a physically based model of landslide hazard combined with an empirical model of debris flow. ***Natural Hazards*** **45(2): 197-209.**

In tropical areas, mass movements are common phenomena, especially during periods of heavy rainfall, which frequently take place in the summer season. These phenomena have caused loss of life and serious damage to infrastructure and properties. The most prominent of these phenomena are landslides that can produce debris flows. Thus, this article aims at determining affected areas using a model to predict landslide prone areas (SHALSTAB) combined with an empirical model designed to define the debris flow travel distance and area of deposition. The methodology of this work consists of the following steps: (a) elaboration of a digital elevation model (DEM), (b) application of the deterministic SHALSTAB model to locate the landslide prone areas, (c) identification of the debris flow travel distance and area of deposition, and (d) mapping of the affected areas (landslides and debris flows). This work was developed in an area in which many mass movements occurred after intense rainfall during the summer season (February 1996) in the state of Rio de Janeiro, southeast Brazil. All of the scars produced by that event were mapped, allowing for validation of the applied models. The model results show that the mapped landslide locations can adequately be simulated by the model.

Hankin, B., S. Waller, G. Astle, and R. Kellagher. 2008. Mapping space for water: Screening for urban flash flooding. ***Journal of Flood Risk Management*** **1(1): 13-22.**

This paper builds on the 'Flooding from Other Sources' project (HA4a), funded as part of Defra's Making Space for Water strategy. The HA4a study concluded that flood risk mapping is feasible for many of the sources of flooding that were investigated, which are not currently covered by the Environment Agency Flood Map, using existing flow modeling and GIS tools. However, there are some major constraints in terms of the need to undertake extensive data collection to allow the generation of useful flood maps that are not dominated by modeling uncertainties. The project anticipated that different levels of data collection and modeling might be needed for different purposes, given the hierarchical nature of United Kingdom flood risk assessment and management in the UK under PPS25 and the EC Floods Directive. This paper compares and contrasts three different approaches to urban flood modeling using topographic analysis, blanket extreme rainfall and semi-coupled sewer/overland routing. The UK summer floods 2007 have highlighted the pressing need for mapping the risk from urban flash flooding, and the Pitt Review has recommended that areas at high risk from surface waters should be urgently identified. This can be done now at some level of detail, and we can be guided as to what level, from our increasing knowledge of vulnerable populations, from records of historical flooding and by using some of the screening methods described herein.

Hu, Wan, Yang Qing, Yu Ming-huo, and Fei Qi. 2008. Grid-based platform for disaster response plan simulation over Internet. *Simulation Modeling Practice and Theory* 16(3): 379-386.

Efficient emergency response for disasters needs systematic response preparedness and planning. Distributed computer simulation drilling can help to perfect the disaster response plan. Since the disaster response simulation drilling participants are geographically distributed and subjected to different organizations, they need to communicate via the Internet. The HLA-based distributed simulation has been widely used, but presently it is difficult to implement an HLA-based distributed simulation application that needs resources from multi-organizations or communicates on the public Internet environment. The advantages of computational grid in distributed resources collaboration and management provide a new development opportunity for distributed simulation. In this paper, a distributed simulation framework which realizes extending HLA/RTI to Internet based on grid service is proposed. The framework aims to the advantage of grid technology as well as the reusability and interoperability of simulation modules. The results of experiments of the prototype indicate the feasibility of the framework, which provide a platform for disaster emergency response drilling distributed simulation over Internet. At the end of paper, the future development plan has been discussed.

Jurmain, Jacob C., Andrew J. Blancero, James A. Geiling, Andrew Bennett, Chris Jones, Jeff Berkley, Marc Vollenweider, Margaret Minsky, Jon C. Bowersox, and Joseph M. Rosen. 2008. HazBot: Development of a telemanipulator robot with haptics for emergency response. *American Journal of Disaster Medicine* 3(2): 87-97.

The objective of this paper is to design a remotely operated robot, "HazBot," for bioevent disaster response; specifically, to improve existing commercial robots' capabilities in handling fixed-facility hazmat incidents via a unique robot controller that allows the human operator to easily manipulate HazBot in disaster situations. The HazBot's design objectives were for a robot to approach a building, open doors, enter, and navigate the building. The robot's controlling device was designed to provide features not available in current robots: dexterous manipulation and enhanced sensory (touch) feedback via 'haptic' technology. The design included a companion simulator to train operators on HazBot. The HazBot met its design goals to do several hazmat-related tasks in place of a human operator: to enter and navigate a building, passing debris and doors as necessary. HazBot's controller reduced the time for inexperienced users of manipulator robots to complete a door-opening task by 55 percent. HazBot overcame previous problems in operator control of robots, via its dexterous manipulation feature, its partially implemented haptic touch feedback, and via its companion simulator. The HazBot system demonstrates superior capability over existing robots: it is technically sophisticated, yet moderately priced; it has dexterous manipulation to make operator tasks easier, haptic feedback, and an excellent companion simulator. HazBot is optimized for hazmat cleanups; is mobile and scaleable; can serve in multiple environments and uncontrolled conditions; and is optimal for disaster situations. It could potentially be used in other disaster situations to deliver medicine to isolated patients, evaluate such patients, assess a downed fire fighter, etc.

Krekeler, Mark, and C. Scott Allen. 2008. Remote sensing spectra of cesium chloride provide a potential emergency management tool for response to a radiological dispersal device detonation. *Journal of Emergency Management* 6(2): 60-64.

Delineating affected areas from radiological dispersal device (RDD) events is a major challenge in emergency response. Remote sensing is one promising technique for detecting and discriminating dangerous from benign materials over large areas and from a safe distance. Remote sensing spectra of one major threat, cesium chloride (CsCl) powders, identifies previously unrecognized emissivity features at 2.96 m (>30 percent), 6.01 m (>20 percent), a broad feature at 7.10-7.49 m (6-8 percent), and a triplet at 8.46 (6 percent), 8.89 (11-15 percent), and 9.33 m (5-7 percent). While the features at 2.96, 6.01, and 7.10-7.49 m are masked by atmospheric gases such as water vapor, the triplet at 8.46, 8.89, and 9.33 m provides a unique spectral fingerprint that can be safely exploited from platforms at standoff distances.

Lastra, J., E. Fernandez, A. Diez-Herrero, and J. Marquinez. 2008. Flood hazard delineation combining geomorphological and hydrological methods: An example in the Northern Iberian Peninsula. *Natural Hazards* 45(2): 277-293.

Flood mapping requires the combination and integration of geomorphological and hydrological-hydraulic methods; however, despite this, there is very little scientific literature that compares and validates both

methods. Two types of analysis are addressed in the present article. On the one hand, maps of flood plains have been elaborated using geomorphological evidence and historical flood data in the mountainous area of northwestern Spain, covering an area of more then 232 km2 of floodplains. On the other hand, a hydrometeorological model has been developed (Clark semi distributed unit hydrograph) in the Sarria River basin (155 km2, NW Spain). This basin is not gauged; hence the model was subjected to a goodness-of-fit test of its parameter (curve number) by means of Monte Carlo simulation. The peak flows obtained by means of the hydrological model were used for hydraulic modeling (one-phase, one-dimensional and steady flow) in a 4 km2 urban stretch of the river bed. The delineation of surface areas affected by floods since 1918, as well as those analyzed subsequent to the geomorphological study, reveals a high degree of reliability in the delineation of the flooded areas with frequent recurrence intervals (<50 years). If these flooded surface areas are compared with the estimate obtained by the hydrological-hydraulic method we can see that the latter method overestimates the extent of the surface water by 144 percent for very frequent recurrence intervals (>10 years) and underestimates it as the recurrence interval increases, by up to 80 percent less floodplain for exceptional events (>500 years). Finally, a management map is put forth combining the most reliable results available by integrating both methods.

Machane, D., Y. Bouhadad, G. Cheikhlounis, J. L. Chatelain, E. H. Oubaiche, K. Abbes, B. Guillier, and R. Bensalem. 2008. Examples of geomorphologic and geological hazards in Algeria. ***Natural Hazards*** **45(2): 295-308.**

The authors present three geomorphologic and geological phenomena that have occurred in Algeria in recent years: (i) the Bab El Oued mudflow on November 11, 2001, which claimed several hundred lives, (ii) a soil collapse induced by sand liquefaction triggered by the Boumerdes earthquake on May 21, 2003, and (iii) landslides that are threatening Constantine city, for which a hazard map is presented using a qualitative approach. The authors briefly describe and analyze these natural disasters, and in the first two cases propose the application of geophysical techniques such as ambient noise recordings and electrical imagery to help evaluate their extent and potential threat. Finally a landslide hazard map of Constantine is proposed.

Munoz-Salinas, Esperanza, C. S. Renschler, D. Palacios, and L. M. Namikawa. 2008. Updating channel morphology in digital elevation models: Lahar assessment for Tenenepanco-Huiloac Gorge, Popocatépetl volcano, Mexico. ***Natural Hazards*** **45(2): 309-320.**

In contrast to dramatic flow regime changes by less frequent large-scale volcanic eruptions, those caused by more frequent small-scale processes in volcanic landscapes may also drastically change the direction and dynamics of flow in a drainage system formed solely by fluvial processes. During such periods of channel morphology change, it is necessary to frequently update channel flow parameters to assess preventive measures for civil protection purposes. Often aerial photography is impracticable, since parts of the channels are covered by dense vegetation, while total station and laser topographic surveys are often too slow and costly, particularly during a high frequency of events. This article introduces and validates a new methodology for updating the representation of channel morphology in Digital Elevation Models (DEM) used specifically for assessing the dangers of frequently occurring lahars along gorges in volcanic landscapes during eruptive and non-eruptive periods. The updating of channel cross-sections was achieved by inserting more detailed representative profiles of homogeneous channel sectors in DEMs derived from existing less detailed topographic maps. The channel profiles were surveyed along the thalweg in equidistant points according to Universal Transverse Mercator (UTM) (x,y) coordinates and elevation derived from the existing DEM. The proposed technique was applied at Tenenepanco-Huiloac Gorge on Popocatépetl volcano, Mexico, in an area affected by major lahars during the volcano's most recent eruptive period from 1994 to 2005. The proposed method can reduce the cost and person-hours of a regular channel topographic survey dramatically and the enhanced DEM can determine volume parameters and flood zones associated with the July 1, 1997 and January 21, 2001 lahars, respectively. In addition, the updated DEM with better channel representation allowed a more realistic fluid flow and lahar simulation with the process-based TITAN2D model.

Osti, Rabindra, Shigenobu Tanaka, and Toshikazu Tokioka. 2008. Flood hazard mapping in developing countries: Problems and prospects. ***Disaster Prevention and Management*** **17(1): 104-113.**

This paper describes the major causes of massive destruction due to floods in developing countries and to elaborate the usefulness of flood hazard maps under

the framework of community-based flood management. It is a clear perception that flood risk management cannot be treated in isolation, but should be a part of community development. In this context, it is essential to build a community's capacity to understand their vulnerabilities, strategies, activities, and the role they could play in managing flood risks without relying on external entities. Therefore the proposed community-based flood hazard-mapping technique can be a good solution for addressing current issues. The approach will not only focus on the effective development and application of FHM but also it will correct the defects of the top-down approach in disaster planning and also encourage all stakeholders' participation in an integrated and sustainable manner. Based on the findings, it is strongly recommended that agencies should adhere and incorporate the idea while developing programs and projects for communities. In addition, It is simple to understand and easy to implement by the community. It is hoped that the idea will be beneficial and a catalyst to promote a community's response for flood disaster management in developing countries, thereby helping agencies to develop an operational strategy in advance.

Pal, Indrajit, Sankar Kumar Nath, Khemraj Shukla, Dilip Kumar Pal, Abhishek Raj, K. K. S. Thinkbaijam, and B. K. Bansal. 2008. Earthquake hazard zonation of Sikkim Himalaya using a GIS platform. ***Natural Hazards*** **45(3): 333-377.**

An earthquake hazard zonation map of Sikkim Himalaya is prepared using eight thematic layers: Geology (GE), Soil Site Class (SO), Slope (SL), Landslide (LS), Rock Outcrop (RO), Frequency Wave number (FK) simulated Peak Ground Acceleration (PGA), Predominant Frequency (PF), and Site Response (SR) at predominant frequencies using Geographic Information System (GIS). This necessitates a large scale seismicity analysis for seismic source zone classification and estimation of maximum earthquake magnitude or maximum credible earthquake to be used as a scenario earthquake for a deterministic or quasi-probabilistic seismic scenario generation. The International Seismological Center (ISC) and Global Centroid Moment Tensor (GCMT) catalogues have been used in the present analysis. Combining b-value, fractal correlation dimension (Dc) of the epicenters and the underlying tectonic framework, four seismic source zones are classified in the northeast Indian region. Maximum Earthquake of M W 8.3 is estimated for the Eastern Himalayan Zone (EHZ) and is used to generate the seismic scenario of the region. The Geohazard map is obtained through the integration of the geological and geomorphological themes namely GE, SO, SL, LS, and RO following a pair-wise comparison in an Analytical Hierarchy Process (AHP). Detail analysis of SR at all the recording stations by receiver function technique is performed using 80 significant events recorded by the Sikkim Strong Motion Array (SSMA). The ground motion synthesis is performed using FK integration and the corresponding PGA has been estimated using random vibration theory (RVT). Testing for earthquakes of magnitude greater than M W 5, a few cases presented here, establishes the efficacy and robustness of the FK simulation algorithm. The geohazard coverage is overlaid and sequentially integrated with PGA, PF, and SR vector layers, in order to evolve the ultimate earthquake hazard microzonation coverage of the territory. Earthquake Hazard Index (EHI) quantitatively classifies the terrain into six hazard levels, while five classes could be identified following the Bureau of Indian Standards (BIS) PGA nomenclature for the seismic zonation of India. EHI is found to vary between 0.15 to 0.83 quantitatively classifying the terrain into six hazard levels as "Low" corresponding to BIS Zone II, "Moderate" corresponding to BIS Zone III, "Moderately High" belonging to BIS Zone IV, "High" corresponding to BIS Zone V(A), "Very High" and "Severe" with new BIS zones to Zone V(B) and V(C) respectively.

Peltz, Rami, Avisar-Shohat Galit, Miri Ventura-Gabay, and Yaron Bar-Dayan. 2008. Differences in sources of information used by the population between the affected area and the general population during the first phase of a bird flu outbreak. ***Prehospital and Disaster Medicine*** **23(1): 56-62.**

In March 2006, a few cases of bird flu were discovered in approximately 10 rural settlements in Israel. As a result, approximately one million birds were destroyed within a three kilometer radius of the settlements. The Israeli population was instructed to take preventive measures against the spread of the infection. The objective of this study was to compare the frequency of use of different sources of information by the population in the affected area with the general population during the first phase of a bird flu outbreak in Israel. A telephone survey among the two randomly selected representative samples of adults was concluded. One sample involved 500 adult Israeli residents; the other sample involved 103 adult residents from the affected area during the first phase of the outbreak. The use of different sources of information by the population concerning the disease was assessed. Television was a

significantly more common source of information in Israel as a whole, whereas friends and local authorities were significantly more common sources of information in the affected area. The frequency of use of the sources of information by the population during the early phase of a bird flu outbreak is different in the affected area compared with the general population in the same country. Authorities must pay attention to this phenomenon and use the correct sources of information in each area in order to achieve better exposure of the population to the recommended behaviors during an outbreak.

Sirikulchayanon, Poonthip, Wanxiao Sun, and Tonny J. Oyana. 2008. Assessing the impact of the 2004 tsunami on mangroves using remote sensing and GIS techniques. ***International Journal of Remote Sensing*** **29(12): 3553-3576.**

While tsunami characteristics and effects are not fully understood in the countries around the Indian Ocean, there are reports suggesting that mangroves, acting as a barrier, significantly reduce the devastation caused by the waves. This study proposes a creative approach to investigating the impact of the 2004 tsunami on mangrove vegetation. The approach involves a combination of Geographic Information System (GIS) proximity analyses and change detection methods in remote sensing to delineate multiple buffer distances from the coastline into four homogeneous subregions. The changes in land cover are then assessed in these subregions before and after the tsunami event. The proposed approach provides a more reliable and accurate means than conventional methods to evaluate spatial patterns of damaged areas through different land characteristics along the coastline. There are major damages to land cover, representing an average of 26.87 percent change, in those geographic locations with low mangrove coverage that are in close proximity to the coastline in all four subregions, whereas less damage is apparent in locations with high mangrove coverage, representing an average of only 2.77 percent change. The optimum distance between 1000 and 1500 m of mangrove buffer would be favorable and most effective for reducing the damage by potential tsunami waves. The findings support the need for mangrove replanting and management in the future and may serve as a prototype for studying impacts of tsunamis in other countries.

Tarn, J. Michael, H. Joseph Wen, and Stephen C. Shih. 2008. A theoretical perspective of man-made system disasters: Social-technical analysis and design. ***Disaster Prevention and Management*** **17(2): 256-280.**

The purpose of this paper is to study major man-made system disasters and to suggest a solution for filling the noted gaps in control systems interfaces and to render those vital considerations for the next-generation disaster management control systems. This research analyzes the nature of large-scale disasters and observes that most man-made system disasters are composed of many related events that interact with one another. The findings show evidence of a common path to catastrophe. These functional failures resulted from the information gaps that eventually contribute to the development of a tragedy. Because of the intricate interconnections among related events of a developed calamity, an integrated approach to man-made disaster detection and prevention as well as emergency management is required. Conducting an analysis of the typical contingency control structures, the authors suggest that disaster or emergency managers adopt a pessimistic and quasi-intelligent orientation to monitor and control critical systems. This research presents a generic threat-driven disaster management control system design with advanced model bases and decision support technologies to enhance conventional disaster management control systems and to supplement management responses so that the sphere and magnitude of damage can be minimized.

Theilen-Willige, Barbara. 2008. Tsunami hazard assessment in the Northern Aegean Sea. ***Science of Tsunami Hazards*** **27(1): 1-16.**

Emergency planning for the assessment of tsunami hazard inundation and of secondary effects of erosion and landslides requires mapping that can help identify coastal areas that are potentially vulnerable. The present study reviews tsunami susceptibility mapping for coastal areas of Turkey and Greece in the Aegean Sea. Potential locations vulnerable to tsunamis were identified from LANDSAT ETM imageries, Shuttle Radar Topography Mission (SRTM, 2000) data and QuickBird imageries and from a GIS integrated spatial database. LANDSAT ETM and Digital Elevation Model (DEM) data derived by the SRTM-Mission were investigated to help detect traces of past flooding events. LANDSAT ETM imageries, merged with digitally processed and enhanced SRTM data, clearly indicate the areas that may be prone to flooding if catastrophic tsunami events or storm surges occur.

Thierry, Pierre, Laurent Stieltjes, Emmanuel Kouokam, Pierre Ngueya, and Paul M. Salley. 2008. Multi-hazard risk mapping and assessment on an active volcano: The GRINP project at Mount Cameroon. *Natural Hazards* 45(3): 429-456.

The purpose of this paper is to help improve the safety of its population faced with natural disasters, the Cameroon Government, with the support of the French Government, initiated a program of geological risk analysis and mapping on Mount Cameroon. This active volcano is subject to a variety of hazards: volcanic eruptions, slope instability and earthquakes. Approximately 450,000 people live or work around this volcano, in an area which includes one of Cameroon's main economic resources. An original methodology was used for obtaining the information to reply to questions raised by the authorities. It involves several stages: identifying the different geological hazard components, defining each phenomenon's threat matrix by crossing intensity and frequency indices, mapping the hazards, listing and mapping the exposed elements, analyzing their respective values in economic, functional and strategic terms, establishing typologies for the different element-at-risk groups and assessing their vulnerability to the various physical pressures produced by the hazard phenomena, and establishing risk maps for each of the major element-at-risk groups (population, infrastructures, vegetation, atmosphere). At the end of the study we were able (a) to identify the main critical points within the area, and (b) provide quantified orders of magnitude concerning the dimensions of the risk by producing a plausible eruption scenario. The results allowed us to put forward a number of recommendations to the Cameroon Government concerning risk prevention and management. The adopted approach corresponds to a first level of response to the authorities. Later developments should make it possible to refine the quality of the methodology.

Todhunter, Paul E., and Bradley C. Rundquist. 2008. Pervasive wetland flooding in the glacial drift prairie of North Dakota (USA). *Natural Hazards* 46(1): 73-88.

This article describes a unique flood hazard, produced by the dramatic expansion of wetlands in Nelson County, located within the North American Prairie Pothole Region of North Dakota, USA. There has been an unprecedented increase in the number, average size, and permanence of prairie wetlands, and a significant increase in the size of a closed lake (Stump Lake) due to a decade-long wet spell that began in 1993 following a prolonged drying trend. Base-line land cover information from the 1992 USGS National Land Cover Characterization dataset, and a Landsat TM scene acquired July 9, 2001 are used to assess the growth of the closed lake and wetland pond surface areas, and to analyze the type and area of various land cover classes inundated between 1992 and 2001. The open water profile in Nelson County changed from one marked by relatively comparable coverage of closed lake and wetland pond areas in 1992, to one in which wetland open water accounted for the vast majority of total open water in 2001. The bulk of the wetland pond area expansion occurred by displacing existing wetland vegetation and agricultural cropland. Producers responded to the flood hazard by filing Federal Crop Insurance Corporation (FCIC) claims and enrolling cropland in the Conservation Reserve Program (CRP), a federal land retirement program. Land taken out of agricultural production has had an enormous impact upon the agricultural sector that forms the economic base of the rural economy. In 2001 the land taken out of production due to CRP enrollment and preventive planting claims represented nearly 42 percent of Nelson County's 205.2 K ha base agricultural land. The patterns obtained from this detailed study of Nelson County are likely to be the representative of the more publicized flood disaster occurring within the Devils Lake Basin of North Dakota.

Troy, Douglas A., Anne Carson, Jean Vanderbeek, and Anne Hutton. 2008. Enhancing community-based disaster preparedness with information technology. *Disasters* 32(1): 149-165.

A critical component of community-based disaster preparedness (CBDP) is a local resource database of suppliers providing physical, information and human resources for use in disaster response. Maintenance of such a database can become a collaborative responsibility among community-based non-governmental organizations (NGOs) and public and private community organizations. In addition to mobilizing resources, this process raises awareness within the community and aids in assessing local knowledge and resources. This paper presents the results of a pilot study on implementing a community-based resource database through collaboration with local American Red Cross chapters and public and private community organizations. The design of the resource database is described. The resource database is accessible via the internet and offline using laptops and handheld Personal Digital Assistants. The study concludes that CBDP is strengthened through a combination of appropriate

information technology and collaborative relationships between NGOs and community-based organizations.

Wei, Fangqiang, Kaiheng Hu, Peng Cui, and Qun Guan. 2008. A decision support system for debris-flow hazard mitigation in towns based on numerical simulation: A case study at Dongchuan, Yunnan Province. ***International Journal of Risk Assessment and Management*** **8(4): 373-383.**
The hazard mitigation decision support system is an efficient method to avoid severe human damage by debris flow. Using modern technology, the multi-functional synthetical mitigation decision support system integrates debris flow monitoring, information transmission, disaster forecast and alarm, disaster estimate, evacuation and rescue plan to provide support for making mitigation strategic decision in all aspects before and after the disaster. The system was successfully utilized in debris flow hazard mitigation in the Dongchuan suburb in Yunnan Province. According to the data of monitoring and predicting, the system can simulate the movement of debris flow, and define the range and hazard zone of debris flow disaster. The result can be used to conduct disaster estimation, and prepare evacuation and rescue plan, which increases the degree of disaster mitigation.

Insurance and Economic Impacts

Botzen, W. J. W., and J. C. J. M. van den Bergh. 2008. Insurance against climate change and flooding in the Netherlands: Present, future, and comparison with other countries. ***Risk Analysis*** **28(2): 413-426.**
Climate change is projected to cause severe economic losses, which has the potential to affect the insurance sector and public compensation schemes considerably. This article discusses the role insurance can play in adapting to climate change impacts. The particular focus is on the Dutch insurance sector, in view of the Netherlands being extremely vulnerable to climate change impacts. The usefulness of private insurance, which is currently unavailable in the Netherlands, as an adaptation instrument to increased flood risks is examined. It is questioned whether the currently dominant role of the Dutch government in providing damage relief is justified from an economic efficiency perspective. Characteristics of flood insurance arrangements in the Netherlands, the United Kingdom, Germany, and France are compared in order to identify possible future directions for arrangements in the Netherlands. It is argued that social welfare improves when insurance companies take responsibility for part of the risks associated with climate change.

Bin, Okmyung, Jamie Brown Kruse, and Craig E. Landry. 2008. Flood hazards, insurance rates, and amenities: Evidence from the coastal housing market. ***The Journal of Risk and Insurance*** **75(1): 63-82.**
This study employs the hedonic property price method to examine the effects of flood hazard on coastal property values. It utilizes Geographic Information System data on National Flood Insurance Program flood zones and residential property sales from Carteret County, North Carolina. Results indicate that location within a flood zone lowers property value. Price differentials for flood risk and the capitalized value of flood insurance premiums are roughly equivalent both exhibiting a nonlinear relationship in flood probability. The results support the conclusion that flood zone designation and insurance premiums convey risk information to potential buyers in the coastal housing market.

Brody, Samuel D., Sammy Zahran, Wesley E. Highfield, Himanshu Grover, and Arnold Vedlitz. 2008. Identifying the impact of the built environment on flood damage in Texas. ***Disasters*** **32(1): 1-18.**
Floods continue to pose the greatest threat to the property and safety of human communities among all natural hazards in the United States. This study examines the relationship between the built environment and flood impacts in Texas, which consistently sustains the most damage from flooding of any other state in the country. Specifically, the authors calculate property damage resulting from 423 flood events between 1997 and 2001 at the county level. They identify the effect of several built environment measures, including wetland alteration, impervious surface, and dams on reported property damage while controlling for biophysical and socio-economic characteristics. Statistical results suggest that naturally occurring wetlands play a particularly important role in mitigating flood damage. These findings provide guidance to planners and flood managers on how to alleviate most effectively the costly impacts of floods at the community level.

Chen, Zuanjuan, Helen Doerpinghaus, Bing-Xuan Lin, and Tong Yu. 2008. Catastrophic losses and insurer profitability: Evidence from 9/11. ***The Journal of Risk and Insurance*** **75(1): 39-62.**
This article examines the effects of 9/11 on the insurance industry, hypothesizing a short-run claim effect, resulting from insufficient premium ex ante for cata-

strophic losses, and a long-run growth effect, resulting from ex post insurance supply reductions and risk updating. Following Yoon and Starks (1995) the authors use short- and long-run abnormal forecast revisions to measure both effects, analyzing them as a function of firm-specific characteristics. They find that firm type, loss estimates, reinsurance use, and tax position are important determinants of the short-run position. Firm type, loss estimates, financial strength, underwriting risk, and reinsurance are key determinants of the firm's long run position.

Cuaresma, Jesus Crespo, Jaroslava Hilouskova, and Michael Obersteiner. 2008. Natural disasters as creative destruction? Evidence from developing countries. ***Economic Inquiry*** **46(2): 214-226.**

Recent studies found a robust positive correlation between the frequency of natural disasters and the long-run economic growth after conditioning for other determinants. This result is interpreted as evidence that disasters provide opportunities to update the capital stock and adopt new technologies, thus acting as some type of Schumpeterian creative destruction. The results of cross-country and panel data regressions indicate that the degree of catastrophic risk tends to have a negative effect on the volume of knowledge spillovers between industrialized and developing countries. Only countries with relatively high levels of development benefit from capital upgrading through trade after a natural catastrophe.

Doocy, Shannon, Diane Johnson, and Courtland Robinson. 2008. Cash grants in humanitarian assistance: A nongovernmental organization in Aceh, Indonesia, following the 2004 Indian Ocean tsunami. ***Disaster Medicine and Public Health Preparedness*** **2(2): 95-103.**

Historically cash interventions, as opposed to material or in-kind aid, have been relatively uncommon in the humanitarian response to emergencies. The widespread implementation of cash-based programs following the 2004 Indian Ocean tsunami provided an opportunity to examine cash distributions following disasters. The Mercy Corps cash grant program in Aceh, Indonesia, was a short-term intervention intended to assist in recompensing losses from the December 2004 tsunami. An evaluation of the Mercy Corps cash grant program was conducted for the 12-month period following the tsunami using program monitoring data and a systematic survey of cash grant beneficiaries. In 2005, the cash grant program disbursed more than US$3.3 million to more than 53,000 beneficiaries; the average cash grant award was US$6,390, which was shared by an average of 108 beneficiaries. In a beneficiary survey, more than 95% of respondents reported the grant allocation processes were fair and transparent and that grant funds were received. The Mercy Corps experience with cash programs suggests that cash interventions in the emergency context, when properly administered, can have an immediate impact and serve as an efficient mechanism for providing assistance. Organizations involved in humanitarian relief, particularly donors and nongovernmental organizations, should consider incorporating cash-based interventions as an element of their response in future emergencies.

Hallegatte, Stephane. 2008. An adaptive regional input-output model and its application to the assessment of the economic cost of Katrina. ***Risk Analysis*** **28(3): 779-799.**

This article proposes a new modeling framework to investigate the consequences of natural disasters and the following reconstruction phase. Based on input-output tables, its originalities are (1) the taking into account of sector production capacities and of both forward and backward propagations within the economic system; and (2) the introduction of adaptive behaviors. The model is used to simulate the response of the economy of Louisiana to the landfall of Katrina. The model is found consistent with available data, and provides two important insights. First, economic processes exacerbate direct losses, and total costs are estimated at $149 billion, for direct losses equal to $107 billion. When exploring the impacts of other possible disasters, it is found that total losses due to a disaster affecting Louisiana increase nonlinearly with respect to direct losses when the latter exceed $50 billion. When direct losses exceed $200 billion, for instance, total losses are twice as large as direct losses. For risk management, therefore, direct losses are insufficient measures of disaster consequences. Second, positive and negative backward propagation mechanisms are essential for the assessment of disaster consequences, and the taking into account of production capacities is necessary to avoid overestimating the positive effects of reconstruction. A systematic sensitivity analysis shows that, among all parameters, the overproduction capacity in the construction sector and the adaptation characteristic time are the most important.

Jiang, Xiaohui. 2008. Impact of natural disaster on the national economies in China. *International Journal of Risk Assessment and Management* 8(4): 433-443.
The development of human society is accompanied by changes in the natural environment. Existence of natural disaster affects human society consequentially. Along with the advance of human society the relationship between mankind and nature becomes more consanguineous and complex. In addition the damage due to natural disaster becomes more and more serious. In order to strengthen the consciousness and improve the ability to mitigate natural disasters, it is necessary to study the relationship between the natural disaster and national economies development.

Kellenberg, Derek K., and Ahmed Mushfiq Mobarak. 2008. Does rising income increase or decrease damage risk from natural disasters? *Journal of Urban Economics* 63(3): 788-802.
Recent empirical literature has found a negative relationship between income per capita and measures of risk from natural disaster, supportive of logic that higher incomes allow countries to mitigate disaster risk. The article argues that behavioral changes at the micro level in response to increasing income (such as location choice and extent of costly abatement activity) may lead to a non-linear relationship between aggregate incomes and disaster damages, where the risks increase with income before they decrease. In a country-year panel data set, the authors show that disaster risk associated with flooding, landslides and windstorms increases with income up to GDP per capita levels of $5,044, $3,360, and $4,688 per year respectively and decrease thereafter. Such non-linear impacts are absent for other disaster types such as extreme temperature events and earthquakes where the links between human behavioral choices and exposure to risk are not as strong. From a policy perspective, this suggests that for the least developed countries, the dual goals of disaster risk prevention and economic development cannot be assumed to be complementary for all forms of natural disaster. In addition to allocating resources to manage disaster risk, the poorest nations may have to be more proactive in enacting policies that alter the behavioral choices of citizens that impact a country's exposure to natural disaster risk.

Liang, Qiao-Mei, Satochi Tsuchiya, Hirokazu Tatano, Norio Okada, and Yi-Ming Wei. 2008. An application of SCGE model to assess the labor and capital related economic loss in Nankai earthquake. *International Journal of Risk Assessment and Management* 8(4): 412-423.
This paper established a spatial computable general equilibrium model to simulate the Japanese economy. Four scenarios representing different possible labor and capital loss in the prospective Nankai earthquake were set up to assess the impacts of labor and capital on regional economy.

Mendelsohn, Robert. 2008. Is the Stern Review an economic analysis? *Review of Environmental Economics and Policy* 2(1): 45-60.
This article offers four answers to this question, "Is the Stern Review an economic analysis?" First, it argues that the Stern Review does not seek to minimize the present value of the sum of abatement costs and climate damages, and instead compares the abatement cost of a single aggressive program with the climate damages of doing nothing for two centuries. Second, it states that the Stern Review fails to use consistent assumptions in these two cases. Third, it argues that the Stern Review makes strong assumptions about abatement that may significantly underestimate near-term costs. And fourth, it claims that the Stern Review makes even stronger assumptions about climate damages that may greatly overestimate damages. The article concludes that a policy of very aggressive near-term abatement would be a mistake.

Park, JiYoung. 2008. The economic impacts of dirty bomb attacks on the Los Angeles and Long Beach ports: Applying the supply-driven NIEMO (National Interstate Economic Model). *Journal of Homeland Security and Emergency Management* 5(1): 1-20.
As homeland security policy makers seek to funnel scarce resources to the most vulnerable areas, geographic impact studies have become ever more crucial since the events of September 11, 2001. In the sense that the Los Angeles and Long Beach ports are among the largest in the world, service interruptions there would have nationwide economic impacts. Because foreign and domestic imports are in greater volumes than exports, the interruption of imports should be examined with a supply-side MRIO-type model. Hence, a new supply-side National Interstate Economic Model (NIEMO) yields extra information with important political implications in addition to the previously estimated demand-side results because both simulations show that terrorist attacks in one state have significant economic impacts in other states. Especially in the U.S. Senate where political power is evenly distributed

among the states, the supply-side and demand-side results could help garner nationwide support for prevention measures in specific places, often distant from the states where the measures are taken.

Picard, Pierre. 2008. Natural disaster insurance and the equity-efficiency trade-off. ***The Journal of Risk and Insurance*** **75(1): 17-38.**
This article investigates the role of private insurance in the prevention and mitigation of natural disasters. It characterizes the equity-efficiency tradeoff faced by the policymakers under imperfect information about individual prevention costs. It is shown that a competitive insurance market with actuarial rate making and compensatory tax-subsidy transfers is likely to dominate regulated uniform insurance pricing rules or state-funded assistance schemes. The model illustrates how targeted tax cuts on insurance contracts can improve the incentives to prevention while compensating individuals with high prevention costs. The article highlights the complementarily between individual incentives through tax cuts and collective incentives through grants to the local jurisdictions where risk management plans are enforced.

Regnier, Philippe, Bruno Neri, Stefania Scuteri, and Stefano Miniati. 2008. From emergency relief to livelihood recovery: Lessons learned from post-tsunami experiences in Indonesia and India. ***Disaster Prevention and Management*** **17(3): 410-429.**
This paper investigates post-disaster livelihood recovery through economic rehabilitation, with the illustration of post-tsunami promotion of microentrepreneurship activities generating employment and income among the affected populations. The paper examines two field case studies in Aceh (Indonesia) and Tamil Nadu (India), where a well-established European non-governmental organization carried out economic relief and microentrepreneurship rehabilitation in 2005-2007. Despite unlimited trust in rapid reconstruction capacity, post-tsunami livelihood recovery has been chaotic and uncoordinated. Contrary to humanitarian agencies in charge of emergency relief, only a few development agencies and NGOs were able to deliver a rapid rehabilitation of microeconomic activities existing locally before the disaster. There are values but also obvious limits to comparing the micro-level experiences of a major European NGO in two different locations such as Aceh and Tamil Nadu, and to deducing macro- and meso-level lessons to be learned. There are difficulties in benchmarking the division of labor but necessary coordination among development agencies and their humanitarian counterparts in the field of post-disaster sustainable economic rehabilitation. Post-disaster economic security and livelihood recovery are at the forefront of current international policy research in humanitarian and development cooperation circles. Documented case studies and lessons to be learned are still scarce for feeding possible best practices.

Sawada, Yasuyuki, and Satoshi Shimizutani. 2008. How do people cope with natural disasters? Evidence from the Great Hanshin-Awaji (Kobe) earthquake in 1995. ***Journal of Money, Credit and Banking*** **40(2-3): 463-488.**
This paper investigates the coping strategies employed by victims of the Great Hanshin-Awaji (Kobe) earthquake in 1995. Using a unique household data set, the article shows that households that held a large amount of collateralizable assets before the catastrophe and were free from a binding borrowing constraint were able to maintain their consumption levels by borrowing. In contrast, households subject to a binding borrowing constraint before the disaster were unable to borrow to cope with the losses inflicted by the earthquake. On the other hand, both types of households relied on private transfers, depending on the extent of the damage.

Sterner, Thomas, and U. Martin Persson. 2008. An even Sterner Review: Introducing relative prices into the discounting debate. R*eview of Environmental Economics and Policy* **2(1): 61-76.**
One of the key criticisms of the Stern Review has been its use of a relatively low discount rate (which could lead to overestimation of the future benefits of short-term actions). The article's authors do not object to the discounting assumptions adopted in the Stern Review and argue that the Stern Review's substantive conclusions can be justified even without using a low discount rate. In particular, the authors state that non market damages from climate change are underestimated, and that future scarcity caused by both climate change and the changing composition of the economy will lead to changes in relative prices that will increase estimated damages.

Tran, Phong, Fausto Marincioni, Massimo Sarti, and Le Van An. 2008. Flood risk management in Central Viet Nam: Challenges and potentials. ***Natural Hazards*** **46(1): 119-138.**
This article explores the impacts of floods on the economy, environment, and society and tries to clarify the

rural community's coping mechanism to flood disasters in Central Viet Nam. It focuses on the social aspects of flood risk perception that shapes the responses to floods. The research findings revealed that flooding is an essential element for a coastal population, whose livelihood depend on productive functions of cyclical floods. The findings also revealed that floods, causing losses and damages, often inhibited economic development. The surveyed communities appeared to have evolved coping mechanisms to reduce the negative impacts of the floods, yet these coping mechanisms are under pressure due to environmental degradation. Integrated flood risk management is considered as a suitable paradigm for coping with flood disasters.

Wang, Yongguang, Zijiang Zhou, Qiang Zhang, and Chaoying Huang. 2008. Main meteorological disasters and their impacts on the economic and societal developments in China. International *Journal of Risk Assessment and Management* 8(4): 384-394.
The main meteorological disasters and their impacts on society in China are summarized. China has meteorological disasters that take many different types, affect large area, have a high frequency, and cause severe damages. Since the 1980s, climate in China seems to become more variable and extreme meteorological events have occurred more frequently, which is most likely a consequence of the global warming. Agriculture is the sector that has been most seriously affected by meteorological disasters. Over the last ten years, there are 350 million people affected by various disasters and 200 billion RMB economic losses each year.

Weyant, John P. 2008. A critique of the Stern Review's mitigation cost analyses and integrated assessment. *Review of Environmental Economics and Policy* 2(1): 77-93.
Although the Stern Review makes many significant contributions, the framework it adopted to formulate policy recommendations is difficult to understand and is not well matched to the problem being addressed. In particular, the author concludes that the Stern Review's recommendation for large emissions reductions in the short run is not justified by the analysis. In addition to citing problems with the Stern Review's relatively high climate damage projections, relatively low GHG mitigation cost projections, and very low discount rate assumptions, he argues that the Stern Review formulates the climate policy problem as a "one shot" benefit-cost analysis, rather than as a problem of sequential decision-making.

Landslides and Avalanches

Copien, C., C. Frank, and M. Becht. 2008. Natural hazards in the Bavarian Alps: A historical approach to risk assessment. *Natural Hazards* 45(2): 173-181.
The Bavarian Alps region is strongly affected by various natural hazards, mainly hydrological events (floods, debris flows), geomorphic/geological events (landslides, rock falls), and avalanches. Extraordinary floods, like in 2002 or in the summer of 2005 in south Bavaria, have again posed the question of the possible extent and frequency of recurrence of catastrophic events. To put risk assessment on a broader basis, historical data about all kinds of past natural hazards were detected in the archives of local authorities and administrative offices for water management. More than 10,000 sources (written accounts, maps, and photographs) were collated in a database. The majority of this information reaches back to the middle of the 19th century. In addition, many documents referring to events dating back even as far as the Middle Ages were found. The Historische Analyse von NaturGefahren (HANG, historical analysis of natural hazards) project at the University of Eichstaett mainly focuses on a small-scale examination of the data. Initial results of the data analysis show that most catastrophic events in the Bavarian Alps only affect parts of the area, but not the whole region. Therefore it is necessary to assess the risk potential on a local scale like valleys, the catchment areas of mountain streams, or even single streams. First, the presented data is aimed to help engineers in future planning of hazard-protection measures. Second, the information can form a vital component to enhance our knowledge of hydrological and geomorphic/geological dynamics in the Alps.

Gomes, Roberto A. T., Renato F. Guimaraes, Osmar A. Carvalho, Nelson F. Fernandes, Euripedes A. Vargas, and Eder S. Martins. 2008. Identification of the affected areas by mass movement through a physically based model of landslide hazard combined with an empirical model of debris flow. *Natural Hazards* 45(2): 197-209.
In tropical areas, mass movements are common phenomena, especially during periods of heavy rainfall, which frequently take place in the summer season. These phenomena have caused loss of life and serious damage to infrastructure and properties. The most prominent of these phenomena are landslides that can produce debris flows. Thus, this article aims at determining affected areas using a model to predict landslide prone areas (SHALSTAB) combined with an em-

pirical model designed to define the debris flow travel distance and area of deposition. The methodology of this work consists of the following steps: (a) elaboration of a digital elevation model (DEM), (b) application of the deterministic SHALSTAB model to locate the landslide prone areas, (c) identification of the debris flow travel distance and area of deposition, and (d) mapping of the affected areas (landslides and debris flows). This work was developed in an area in which many mass movements occurred after intense rainfall during the summer season (February 1996) in the state of Rio de Janeiro, southeast Brazil. All of the scars produced by that event were mapped, allowing for validation of the applied models. The model results show that the mapped landslide locations can adequately be simulated by the model.

Gupta, Vikram, and M. P. Sah. 2008. Impact of the Trans-Himalayan Landslide Lake Outburst Flood (LLOF) in the Satluj catchment, Himachal Pradesh, India. ***Natural Hazards*** **45(3): 379-390.**
Landslide Lake Outburst Floods (LLOFs) are common in the Himalayan river basins. These are caused by breaching of lakes created by landslides. The active and paleo-landslide mapping along the Satluj and Spiti Rivers indicate that these rivers were blocked and breached at many places during the Quaternary period. In the present article, the authors document LLOFs during 2000 and 2005 caused by the breaching of landslide lakes created in the Trans-Himalayan region along the Satluj River and Paree Chu (stream), respectively, both in the Tibetan region of China and its impact on the channel and infrastructure in the Kinnaur district of Himachal Pradesh, India. It has been observed that the loss of life and property due to these LLOFs is directly related to the disposition of the Quaternary materials and the different morphological zones observed in the area.

Gutierrez, Francisco, Jesus Guerrero, and Pedro Lucha. 2008. Quantitative sinkhole hazard assessment: A case study from the Ebro Valley evaporite alluvial karst (NE Spain). ***Natural Hazards*** **45(2): 211-233.**
Quantitative sinkhole hazard assessments in karst areas allow calculation of the potential sinkhole risk and the performance of cost-benefit analyses. These estimations are of practical interest for planning, engineering, and insurance purposes. The sinkhole hazard assessments should include two components: the probability of occurrence of sinkholes (sinkholes/km2 year) and the severity of the sinkholes, which mainly refers to the subsidence mechanisms (progressive passive bending or catastrophic collapse) and the size of the sinkholes at the time of formation; a critical engineering design parameter. This requires the compilation of an exhaustive database on recent sinkholes, including information on the: (1) location, (2) chronology (precise date or age range), (3) size, and (4) subsidence mechanisms and rate. This work presents a hazard assessment from an alluvial evaporate karst area (0.81 km2) located in the periphery of the city of Zaragoza (Ebro River valley, NE Spain). Five sinkholes and four locations with features attributable to karstic subsidence where identified in an initial investigation phase providing a preliminary probability of occurrence of 0.14 sinkholes/km2 year (11.34 percent in annual probability). A trenching program conducted in a subsequent investigation phase allowed us to rule out the four probable sinkholes, reducing the probability of occurrence to 0.079 sinkholes/km2 year (6.4 percent in annual probability). The information on the severity indicates that collapse sinkholes 10–15 m in diameter may occur in the area. A detailed study of the deposits and deformational structures exposed by trenching in one of the sinkholes allowed us to infer a modern collapse sinkhole approximately 12 m in diameter and with a vertical throw of 8 m. This collapse structure is superimposed on a subsidence sinkhole around 80 m across that records at least 1.7 m of synsedimentary subsidence. Trenching, in combination with dating techniques, is proposed as a useful methodology to elucidate the origin of depressions with uncertain diagnosis and to gather practical information with predictive utility about particular sinkholes in alluvial karst settings: precise location, subsidence mechanisms and magnitude, and timing and rate of the subsidence episodes.

Machane, D., Y. Bouhadad, G. Cheikhlounis, J. L. Chatelain, E. H. Oubaiche, K. Abbes, B. Guillier, and R. Bensalem. 2008. Examples of geomorphologic and geological hazards in Algeria. ***Natural Hazards*** **45(2): 295-308.**
The authors present three geomorphologic and geological phenomena that have occurred in Algeria in recent years: (i) the Bab El Oued mudflow on November 11, 2001, which claimed several hundred lives, (ii) a soil collapse induced by sand liquefaction triggered by the Boumerdes earthquake on May 21, 2003, and (iii) landslides that are threatening Constantine city, for which a hazard map is presented using a qualitative approach. The authors briefly describe and analyze these natural disasters, and in the first two cases propose the application of geophysical techniques such as ambient noise recordings and electrical imagery to help evaluate their

extent and potential threat. Finally a landslide hazard map of Constantine is proposed.

Ho, Ming-Chou, Daigee Shaw, Shuyeu Lin, and Yao-Chu Chiu. 2008. How do disaster characteristics influence risk perception? *Risk Analysis* 28(3): 635-643.
The main purpose of this study is to examine how risk perception is influenced by the type of disaster (flood or landslide) and victim characteristics. The data reported here are based on the National Risk Perception Survey (NRPS) that was administered for the victims and the general public in Taiwan in 2004. In that year, many towns in Taiwan were seriously affected by floods and landslides, resulting in huge economic losses and fatalities. The primary findings are: (1) the victims and the general public are concerned about the different potential hazards that might affect their residential area; (2) the negative associations between the sense of controllability and the perceived impact is high for landslide victims, but not for flood victims; and (3) disaster type, gender, and previously experienced disasters are good predictors of victims' attitudes toward natural disasters.

Theilen-Willige, Barbara. 2008. Tsunami hazard assessment in the Northern Aegean Sea. S*cience of Tsunami Hazards* 27(1): 1-16.
Emergency planning for the assessment of tsunami hazard inundation and of secondary effects of erosion and landslides requires mapping that can help identify coastal areas that are potentially vulnerable. The present study reviews tsunami susceptibility mapping for coastal areas of Turkey and Greece in the Aegean Sea. Potential locations vulnerable to tsunamis were identified from LANDSAT ETM imageries, Shuttle Radar Topography Mission (SRTM, 2000) data and QuickBird imageries and from a GIS integrated spatial database. LANDSAT ETM and Digital Elevation Model (DEM) data derived by the SRTM-Mission were investigated to help detect traces of past flooding events. LANDSAT ETM imageries, merged with digitally processed and enhanced SRTM data, clearly indicate the areas that may be prone to flooding if catastrophic tsunami events or storm surges occur.

Wei, Fangqiang, Kaiheng Hu, Peng Cui, and Qun Guan. 2008. A decision support system for debris-flow hazard mitigation in towns based on numerical simulation: A case study at Dongchuan, Yunnan Province. *International Journal of Risk Assessment and Management* 8(4): 373-383.
The hazard mitigation decision support system is an efficient method to avoid severe human damage by debris flow. Using modern technology, the multi-functional synthetical mitigation decision support system integrates debris flow monitoring, information transmission, disaster forecast and alarm, disaster estimate, evacuation and rescue plan to provide support for making mitigation strategic decision in all aspects before and after the disaster. The system was successfully utilized in debris flow hazard mitigation in the Dongchuan suburb in Yunnan Province. According to the data of monitoring and predicting, the system can simulate the movement of debris flow, and define the range and hazard zone of debris flow disaster. The result can be used to conduct disaster estimation, and prepare evacuation and rescue plan, which increases the degree of disaster mitigation.

Public Health, Mental Health, and Emergency Medicine

Abramson, David, Tasha Stehling-Ariza, Richard Garfield, and Irwin Redlener. 2008. Prevalence and predictors of mental health distress post-Katrina: Findings from the Gulf Coast Child and Family Health Study. *Disaster Medicine and Public Health Preparedness* 2(2): 77-86.
Catastrophic disasters often are associated with massive structural, economic, and population devastation; less understood are the long-term mental health consequences. This study measures the prevalence and predictors of mental health distress and disability of hurricane survivors over an extended period of recovery in a post-disaster setting. A representative sample of 1,077 displaced or greatly affected households was drawn in 2006 using a stratified cluster sampling of federally subsidized emergency housing settings in Louisiana and Mississippi, and of Mississippi census tracts designated as having experienced major damage from Hurricane Katrina in 2005. Two rounds of data collection were conducted: a baseline face-to-face interview at six to 12 months post-Katrina and a telephone follow-up at 20 to 23 months after the disaster. Mental health disability was measured using the Medical Outcome Study Short Form 12, version 2 mental component summary score. Bivariate and multivariate analyses were conducted examining socioeconomic, demographic, situational, and attitudinal factors associated with mental health distress and disability. More than half of the cohort at both baseline and follow-up reported significant mental health distress. Self-reported poor health and safety concerns were persistently

associated with poorer mental health. Nearly two years after the disaster, the greatest predictors of poor mental health included situational characteristics such as greater numbers of children in household and attitudinal characteristics such as fatalistic sentiments and poor self-efficacy. Informal social support networks were associated significantly with better mental health status. Housing and economic circumstances were not independently associated with poorer mental health. Mental health distress and disability are pervasive issues among the US Gulf Coast adults and children who experienced long-term displacement or other serious effects as a result of Hurricanes Katrina and Rita. As time progresses post-disaster, social and psychological factors may play greater roles in accelerating or impeding recovery among affected populations. Efforts to expand disaster recovery and preparedness policies to include long-term social re-engagement efforts post-disaster should be considered as a means of reducing mental health sequelae.

Andersson, K. G., T. Mikkelsen, P. Astrup, S. Thykier-Nielsen, L. H. Jacobsen, L. Schou-Jensen, S. C. Hoe, and S. P. Nielsen. 2008. Estimation of health hazards resulting from a radiological terrorist attack in a city. Radiation Protection Dosimetry. ePub.

In recent years, the concern for protection of urban populations against terror attacks involving radiological, biological or chemical substances has attracted increasing attention. It sets new demands to decision support and consequence assessment tools, where the focus has traditionally been on accidental exposure. The aim of the present study was to illustrate issues that need to be considered in evaluating the radiological consequences of a 'dirty bomb' explosion. This is done through a worked example of simplified calculations of relative dose contributions for a specific 'dirty bomb' scenario leading to atmospheric dispersion of 90Sr contamination over a city area. Also, the requirements of atmospheric dispersion models for such scenarios are discussed.

Ashkenazi, Itamar, Boris Kessel, Oded Olsha, Tawfik Khashan, Meir Oren, Jacob Haspel, and Ricardo Alfici. 2008. Defining the problem, main objective, and strategies of medical management in mass-casualty incidents caused by terrorist events. *Prehospital and Disaster Medicine* 23(1): 82-89.

Based on the experience of managing less than 20 events during the last decade, the authors' understanding of a mass-casualty incident is that it is an event in which there may be many victims, but only a few that actually suffer from life-threatening injuries. To make an impact on survival, one must identify those who are severely wounded as quickly as possible and offer those patients optimal care. Experienced trauma physicians are the most important resource available to achieve this objective, and they should be allocated to the treatment of seriously injured victims instead of more traditional management such as triage and incident manager.

Avery, George H., Mark Lawley, Sandra Garrett, Barrett Caldwell, Marshall P. Durr, Dulcy Abraham, Feng Lin, Po-Ching C. DeLaurentis, Maria L. Peralta, Renata A. Kopach-Conrad, Lalaine M. Ignacio, Rebecca Sandino, and Deanna J. Staples. 2008. Planning for pandemic influenza: Lessons from the experiences of thirteen Indiana counties. *Journal of Homeland Security and Emergency Management* 5(1): 1-26.

Significant concerns exist over the ability of the healthcare and public health systems to meet the surge demands that would result from an event such as an influenza pandemic. Current guidance for public health planners is largely based on expert opinion and may lack connection to the problems of street-level public health practice. To identify the problems of local planners and prepare a state-level planning template for increasing health care surge capacity that accounted for these issues, a study was conducted of local pandemic planning efforts in 13 counties, finding that cognitive biases, coordination problems, institutional structures in the healthcare system, and resource shortfalls are significant barriers to preparing and implementing a surge capacity plan. In addition, local planners identify patient demand management through triage and education efforts as a viable means of ensuring adequate capacity, in contrast to guidance proposing an increased supply of care as a primary tool.

Ballow, Shana, Solomon Behar, Ilene Claudius, Kathleen Stevenson, Robert Neches, and Jeffrey S. Upperman. 2008. Hospital-based disaster preparedness for pediatric patients: How to design a realistic set of drill victims. *American Journal of Disaster Medicine* 3(3): 171-180.

The purpose of this report is to describe an innovative idea for hospital pediatric victim disaster planning. This is a descriptive manuscript outlining an innovative approach to exercise planning. In this report, the authors describe a model set of patients for pediatric

disaster simulation. The results were an epidemiologically based set of mock victims. The authors believe that by enhancing pediatric disaster simulation exercises, hospital personnel and decision makers will be better prepared for an actual disaster event involving pediatric victims.

Barnes, Michael D., Carl L. Hanson, Len M. B. Novilla, Aaron T. Meacham, Emily McIntyre, and Brittany C. Erickson. 2008. Analysis of media agenda setting during and after Hurricane Katrina: Implications for emergency preparedness, disaster response, and disaster policy. ***American Journal of Public Health*** **98(4): 604-610.**

Media agenda setting refers to the deliberate coverage of topics or events with the goal of influencing public opinion and public policy. The authors conducted a quantitative content analysis of four prominent newspapers to examine how the media gathered and distributed news to shape public policy priorities during Hurricane Katrina. The media framed most Hurricane Katrina stories by emphasizing government response and less often addressing individuals' and communities' level of preparedness or responsibility. Hence, more articles covered response and recovery than mitigation and preparation. The newspapers studied focused significantly more on government response than on key public health roles in disaster management. The article discusses specific implications for public health professionals, policymakers, and mass media so that, in the future, coordination can be enhanced among these entities before, during, and after disasters occur.

Bills, Corey B., Nancy A. S. Levy, Vansh Sharma, Dennis S. Charney, Robin Herbert, Jacqueline Moline, and Craig L. Katz. 2008. Mental health of workers and volunteers responding to events of 9/11: Review of the literature. ***Mount Sinai Journal of Medicine*** **75(2): 115-127.**

Disaster workers responding to the events of September 11th were exposed to traumatic events. No study has systematically investigated the diverse mental health status and needs of the heterogeneous population of disaster workers responding to the events of September 11th. Using PubMed and Medline and the search terms of ''September 11, 2001'' or ''September 11'' or ''9/11''or ''WTC'' or ''World Trade Center'', the authors reviewed all articles that examined the mental health outcomes of workers at one of the three September 11th crash sites or the Fresh Kills landfill in New York City. In total, 25 articles met study inclusion criteria, often using different methodologies. The articles described varying degrees of mental health symptomatology, risk factors for adverse mental health outcomes, and utilization of mental health services. The mental health needs of workers exposed to the events of September 11th ranged from little to no care to pharmacotherapy. A range of risk factors, including exposures at the WTC site and occupational activities, impacted on these needs but the role of specific mental health interventions was less clear. These findings suggest the need for a future program for disaster workers consisting of an accessible mental health treatment service supported by comprehensive postdisaster surveillance and emphasis on pre-disaster mental wellness. A number of areas for further consideration and study were identified, including the need for a more diverse exploration of involved responder populations as well as investigation of potential mental health outcomes beyond post-traumatic stress disorder (PTSD).

Brandeau, Margaret L., Gregory S. Zaric, Johannes Freiesleben, Frances L. Edwards, and Dena M. Bravata. 2008. An ounce of preventing is worth a pound of cure: Improving communication to reduce mortality during bioterrorism responses. ***American Journal of Disaster Medicine*** **3(2): 65-78.**

The objective of this paper is to identify communication needs and evaluate the effectiveness of alternative communication strategies for bioterrorism responses. The authors provide a framework for evaluating communication needs during a bioterrorism response. Then, using a simulation model of a hypothetical response to anthrax bioterrorism in a large metropolitan area, the costs and benefits of alternative strategies for communication during a response are evaluated. Expected mortality increases significantly with increases in the time for attack detection and announcement; decreases in the rate at which exposed individuals seek and receive prophylaxis; increases in the number of unexposed people seeking prophylaxis; and increases in workload imbalances at dispensing centers. Thus, the timeliness, accuracy, and precision of communications about the mechanisms of exposure and instructions for obtaining prophylaxis and treatment are critical. Investment in strategies that improve adherence to prophylaxis is likely to be highly cost effective, even if the improvement in adherence is modest, and even if such strategies reduce the prophylaxis dispensing rate. Communication during the response to a bioterrorism attack must involve the right information delivered at the appropriate time in an effective manner from trusted sources. Because the response system for bioterrorism communication is only fully operationalized

once an attack has occurred, tabletop planning and simulation exercises, and other up-front investments in the design of an effective communication strategy, are critical for effective response planning.

Carpenter, Michealle, James G. Hodge, and Raymond P. Pepe. 2008. Deploying and using volunteer health practitioners in response to emergencies: Proposed uniform state legislation provides liability protections and workers' compensation coverage. ***American Journal of Disaster Medicine*** **3(1): 17-23.**

To respond effectively to natural disasters and other public health emergencies, government resources must be augmented with the resources of volunteer organizations. Governmental actors are prepared to utilize volunteer health practitioners (VHPs) to meet patient surge capacity and provide essential public health services. However, difficult legal challenges arise regarding licensure, the scope of practice of volunteers, the relationship of volunteers to local healthcare delivery systems, disciplinary enforcement, the extent of exposure to civil liability, and how to provide compensation for volunteers injured or killed during disaster response activities. The Uniform Emergency Volunteer Health Practitioner Act (UEVHPA) seeks to address these problems and provide a better legal environment that facilitates VHPs efforts. This article discusses two important provisions of the UEVHPA, Section 11 which provides immunity against claims for negligence, under certain circumstances, for volunteers and organizations engaged in the deployment and use of volunteers, and Section 12 which provides workers' compensation benefits to VHPs when other sources of coverage are not available. Disaster relief organizations and healthcare provider organizations have consistently identified uncertainty and a lack of uniformity with respect to these issues as a major source of concern to volunteer practitioners and as a potential deterrent to their effective recruitment and utilization. Uniform state enactment of the UEVHPA would resolve many inconsistencies and gaps in the regulation and protection of VHPs across states.

Carresi, Alejandro Lopez. 2008. The 2004 Madrid train bombings: An analysis of pre-hospital management. ***Disasters*** **32(1): 41-65.**

The terrorist train bombings in Madrid, Spain, on March 11, 2004 triggered a swift and massive medical response. This paper analyses the pre-hospital response to the attacks to gain insight into current trends in disaster management among Madrid's Emergency Medical Services (EMSs). To this end, the existing emergency planning framework is described, the basic structures of the different EMSs are presented, and the attacks are briefly depicted before consideration is given to pre-hospital management. Finally, an explanation of the main underlying misconceptions in emergency planning and management in Madrid is provided to aid understanding of the origins of some of the problems detected during the response. These are attributable mainly to inappropriate planning rather than to mistakes in field-level decisionmaking. By contrast, many of the successes are attributable to individual initiatives by frontline medics who compensated for the lack of clear command by senior managers by making adaptive and flexible decisions.

Cherniack, E. Paul. 2008. The impact of natural disasters on the elderly. ***American Journal of Disaster Medicine*** **3(3): 133-139.**

The purpose of this article is to review and draw conclusions about the impact of natural disasters on the elderly from the published medical literature. Articles were obtained by searching the PubMed database and Google search engines using terms such as "disaster," "elderly," "hurricane," "tornado," "earthquake," and "flood." More articles were obtained from the reference lists of those obtained in the initial search. Forty-five journal articles were reviewed. Many, but not all, studies have found that older individuals are more likely to suffer adverse physical consequences. This is not surprising considering the elderly are more likely to be in worse health before disasters and less able to seek assistance afterward. The lack of agreement between studies is not surprising either, considering heterogeneity in disasters, populations, and survey methods. This heterogeneity also precludes determination as to whether older individuals have a worse or more favorable psychological outcome than younger individuals. Several investigations, however, have noted that individuals may be more resilient to some of the psychological manifestations of disasters with more frequent exposure, often including the elderly. Many suggestions have been proposed to address the potential needs of older individuals such as involving existing organizations and those with existing geriatric expertise to design disaster plans, develop education, communication systems, and warnings for people with sensory impairment, create new methods for identifying, tracking, and following older individuals, and make special arrangements to provide disaster-related aid. However, there are only anecdotal reports of the success of the application of such methods.

Chokshi, Nikuni K., Solomon Behar, Alan L. Nagar, Fred Dorey, and Jeffrey S. Upperman. 2008. Disaster management among pediatric surgeons: Preparedness, training and involvement. ***American Journal of Disaster Medicine*** **3(1): 5-14.**

Contemporary events in the United States (e.g. September 2001, school shootings), Europe (e.g. Madrid train bombings), and the Middle East have raised awareness of mass casualty events and the need for a capable disaster response. Recent natural disasters have highlighted the poor preparation and infrastructure in place to respond to mass casualty events. In response, public health policy makers and emergency planners developed plans and prepared emergency response systems. Emergency response providers include first responders, a subset of emergency professionals, including firemen, law enforcement, paramedics, who respond to the incident scene and first receivers, a set of healthcare workers who receive the disaster victims at hospital facilities. The role of pediatric surgeons in mass casualty emergency response plans remains undefined. The authors hypothesize that pediatric surgeons' training and experience will predict their willingness and ability to be activated first receivers. The objective of our study was to determine the baseline experience, preparedness, willingness, and availability of pediatric surgeons to participate as activated first receivers. After institutional review board approval, the authors conducted an anonymous online survey of members of the American Pediatric Surgical Association in 2007. The authors explored four domains in this survey: (1) demographics, (2) disaster experience and perceived preparedness, (3) attitudes regarding responsibility and willingness to participate in a disaster response, and (4) availability to participate in a disaster response. The authors performed univariate and bivariate analyses to determine significance. Finally, the authors conducted a logistic regression to determine whether experience or preparedness factors affected the respondent's availability or willingness to respond to a disaster as a first receiver. Results: The authors sent 725 invitations and received 265 (36.6 percent) completed surveys. Overall, the authors found that 77 percent of the respondents felt "definitely" responsible for helping out during a disaster but only 24 percent of respondents felt "definitely" prepared to respond to a disaster. Most felt they needed additional training, with 74 percent stating that they definitely or probably needed to do more training. Among experiential factors, the authors found that attendance at a national conference was associated with the highest sense of preparedness. The authors determined that subjects with actual disaster experience were about four times more likely to feel prepared than those with no disaster experience ($p < 0.001$). The authors also demonstrated that individuals with a defined leadership position in a disaster response plan are twice as likely to feel prepared ($p = 0.002$) and nearly five times more willing to respond to a disaster than those without a leadership role. The authors found other factors that predicted willingness including the following: a contractual agreement to respond (OR 2.3); combat experience (OR 2.1); and prior disaster experience (OR 2.0). Finally, the authors found that no experiential variables or training types were associated with an increased availability to respond to a disaster. A minority of pediatric surgeons feel prepared, and most feel they require more training. Current training methods may be ineffectual in building a prepared and willing pool of first receivers. Disaster planners must plan for healthcare worker related issues, such as transportation and communication. Further work and emphasis is needed to bolster participation in disaster preparedness training.

Christian, Michael D., Asha V. Devereaux, Jeffrey R. Dichter, James A. Geiling, and Lewis Rubinson. 2008. Definitive care for the critically ill during a disaster: Current capabilities and limitations. ***Chest Journal*** **133(5): 8S-17S.**

In the twentieth century, rarely have mass casualty events yielded hundreds or thousands of critically ill patients requiring definitive critical care. However, future catastrophic natural disasters, epidemics or pandemics, nuclear device detonations, or large chemical exposures may change usual disaster epidemiology and require a large critical care response. This article reviews the existing state of emergency preparedness for mass critical illness and presents an analysis of limitations to support the suggestions of the Task Force on Mass Casualty Critical Care, which are presented in subsequent articles. Baseline shortages of specialized resources such as critical care staff, medical supplies, and treatment spaces are likely to limit the number of critically ill victims who can receive life-sustaining interventions. The deficiency in critical care surge capacity is exacerbated by lack of a sufficient framework to integrate critical care within the overall institutional response and coordination of critical care across local institutions and broader geographic areas.

Clarke, Simon F. J., Rob P. Chilcott, James C. Wilson, David J. Baker, and Anthony Hallett. 2008.

Decontamination of multiple casualties who are chemically contaminated: A challenge for acute hospitals. ***Prehospital and Disaster Medicine*** **23(2): 175-181.**

Patients who have been contaminated by chemical compounds present a number of difficulties to emergency departments, in particular, the risk of secondary contamination of healthcare staff and facilities. The Department of Health in the United Kingdom has provided equipment to decontaminate chemically contaminated casualties who present at emergency departments. The capacity of this equipment is limited, and although both the ambulance and fire services have equipment to cope with mass casualties at the scene of a chemical incident, there is still the possibility that acute hospitals will be overwhelmed by large numbers of self-presenting patients. The risks and potential consequences of this gap in resilience are discussed and a number of possible practical solutions are proposed.

Collander, Brett, Brad Green, Yuri Millo, Christine Shamloo, Joyce Donnellan, and Craig DeAtley. 2008. Development of an "all-hazards" hospital disaster preparedness training course utilizing multi-modality teaching. ***Prehospital and Disaster Medicine*** **23(1): 63-67.**

The objectives of this study were to develop and evaluate an "all-hazards" hospital disaster preparedness training course that utilizes a combination of classroom lectures, skill sessions, and disaster exercises to teach the principles of hospital disaster preparedness to hospital-based employees. Participants attended a two-day, 16-hour course, entitled Hospital Disaster Life Support (HDLS). The course was designed to address seven core competencies of disaster training for healthcare workers. Specific disaster situations addressed during HDLS included: 1) biological; 2) conventional; 3) radiological; and 4) chemical mass-casualty incidents. The primary goal of HDLS was not only to teach patient care for a disaster, but more importantly, to teach hospital personnel how to manage the disaster itself. Knowledge gained from the HDLS course was assessed by pre- and post-test evaluations. Additionally, participants completed a course evaluation survey at the conclusion of the HDLS to assess their attitudes about the course. Participants included 11 physicians, 40 nurses, 23 administrators/directors, and 10 other personnel. The average score on the pre-test was 69.1 for all positions, and the post-test score was 89.5, an improvement of 20.4 points. Participants felt HDLS was educational, relevant and organized. Identifying an effective means of teaching hospital disaster preparedness to hospital-based employees is an important task. However, the optimal strategy for implementing such education still is under debate. The HDLS course was designed to utilize multiple teaching modalities to train hospital-based employees on the principles of disaster preparedness. Participants of HDLS showed an increase in knowledge gained and reported high satisfaction from their experiences at HDLS. These results suggest that HDLS is an effective way to train hospital-based employees in the area of disaster preparedness.

Cox, Robin S., Bonita C. Long, Megan I. Jones, and Risa J. Handler. 2008. Sequestering of suffering: Critical discourse analysis of natural disaster media coverage. ***Journal of Health Psychology*** **13(4): 469-480.**

This article is a critical discourse analysis of the local print-news media coverage of the recovery process in two rural communities following a devastating forest fire. Two hundred and fifty fire-related articles from the North Thompson Star Journal (2003) were analyzed. Results revealed a neoliberal discursive framing of recovery, emphasizing the economic material aspects of the process and a reliance on experts. A sequestering of suffering discourse promoted psychological functionalism and focused attention on a return to normalcy through the compartmentalization of distress. The dominant 'voice' was male, authoritative, and institutionalized. Implications for disaster recovery and potential health consequences are discussed.

Cretikos, Michelle A., Keith Eastwood, Craig Dalton, Tony Merritt, Frank Tuyl, Linda Winn, and David N. Durrheim. 2008. Household disaster preparedness and information sources: Rapid cluster survey after a storm in New South Wales, Australia. ***BMC Public Health*** **8(195): 1-22.**

It is well understood that the effectiveness of public information strategies can determine the success of a disaster response. The level of community preparedness is also known to be important in determining the impact of a disaster. However, very little is known about levels of household disaster preparedness or about information sources used by households before and during disasters. The authors investigated these issues immediately after a storm-related natural disaster in New South Wales, Australia, in order to better understand the most effective methods of communicating public health messages during a disaster, and to improve preparedness for future disasters. Rapid cluster survey of 320 randomly selected households

in Newcastle and Lake Macquarie, New South Wales, Australia. 227 households (71 percent) responded to the survey. By the day before the storm, 48 percent (95 percentCI 40-57 percent) of households were aware of a storm warning, principally through television (67 percent; 58-75 percent) and radio (57 percent; 49-66 percent) announcements. Storm preparations were made by 42 percent (28-56 percent) of these households. Storm information sources included: radio (78 percent; 68-88 percent); family, friends, colleagues and neighbors (50 percent; 40-60 percent); and television (41 percent; 30-52 percent). Radio was considered more useful than television (62 percent; 51-73 percent vs. 29 percent; 18-40 percent), even in households where electricity supply was uninterrupted (52 percent; 31-73 percent vs. 41 percent; 20-63 percent). Only 23 percent (16-30 percent) of households were aware that the local government-operated radio network has a designated communication role during disasters. A battery-operated household radio and appropriate batteries were available in 42 percent (34-50 percent) of households, while only 23 percent (16-29 percent) had all of: a torch, battery-operated radio, appropriate batteries, mobile phone, emergency contact list and first aid equipment. Local broadcast media networks, particularly radio networks, are important and useful sources of information for communities affected by disasters. Radio proved particularly valuable in providing information to communities affected by electricity interruptions. However, most surveyed households were not adequately prepared for a disaster. To ensure effective communication of health advice during disasters, health services should promote the role of radio networks during a disaster, together with household disaster preparedness in general. Formal arrangements between media networks and emergency service organizations are needed to facilitate communication during a disaster.

Dass-Brailsford, Priscilla. 2008. After the Storm: Recognition, recovery, and reconstruction. ***Professional Psychology: Research and Practice*** **39(1): 24-30.**

On August 29, 2005, when Hurricane Katrina made landfall near the Louisiana/Mississippi border, it exposed a large number of people to extraordinary loss and suffering. The enormous swath of physical devastation wreaked across the marshes of Louisiana's Plaquemines Parish to the urban communities of New Orleans and the coastal landscape of Mississippi and Alabama caused a notable change to the demographics of the Gulf Region, making it the most expensive natural disaster in U.S. history. This article describes a disaster responder's experiences of working with displaced survivors of Hurricane Katrina, providing crisis and mental health support in the acute phase of the disaster. This is followed by a discussion of the importance of a multicultural approach to helping survivors of a natural disaster; several guidelines to improve multicultural competence are proposed. In particular, the importance of attending to survivors' racial, socioeconomic, language, and religious differences is discussed.

Dayton, Christopher, Jamil Ibrahim, Michael Augenbraun, Steven Brooks, Kiaran Mody, Donald Holford, Patricia Roblin, and Bonnie Arquilla. 2008. Integrated plan to augment surge capacity. ***Prehospital and Disaster Medicine*** **23(2): 113-119.**

Surge capacity is defined as a healthcare system's ability to rapidly expand beyond normal services to meet the increased demand for appropriate space, qualified personnel, medical care, and public health in the event of bioterrorism, disaster, or other large-scale public health emergencies. There are many individuals and agencies, including policy makers, planners, administrators, and staff at the federal, state, and local level, involved in the process of planning for and executing policy in respect to a surge in the medical requirements of a population. They are responsible to ensure there is sufficient surge capacity within their own jurisdiction. The federal government has required New York State to create a system of hospital bed surge capacity that provides for 500 adult and pediatric patients per one million population, which has been estimated to be an increase of 15-20 percent in bed availability. In response, the New York City Department of Health and Mental Hygiene (NYC DOH) has requested that area hospitals take an inventory of available beds and set a goal to provide for a 20 percent surge capacity to be available during a mass-casualty event of other conditions calling for increased inpatient bed availability. In 2003, under the auspices of the NYC DOH, the New York Institute of all Hazard Preparedness (NYIHP) was formed from four unaffiliated, healthcare facilities in Central Brooklyn to address this and other goals. The NYIHP hospitals have developed a surge capacity plan to provide necessary space and utilities. As these plans have been applied, a bed surge capacity of approximately 25 percent was identified and created for Central Brooklyn to provide for the increased demand on the medical care system that may accompany a disaster. Though the process of developing an inte-

grated plan that would engage a public health incident, the facilities of NYIHP demonstrate that a model of cooperation may be applied to an inherently fractioned medical system.

Devereaux, Asha, Michael D. Christian, Jeffrey R. Dichter, James A. Geiling, and Lewis Rubinson. 2008. Summary of suggestions from the Task Force for Mass Critical Care Summit, January 26-27, 2007. *Chest Journal* 133(5): 1S-7S.

U.S. and Canadian experts have developed a "comprehensive framework to optimize and manage critical care resources during times of pandemic outbreaks or other mass critical care disasters," according to a news release summarizing the report. In January, 2007, representatives of a wide variety of fields -- bioethics, critical care, emergency medical services, infectious diseases, hospital medicine, law, military medicine, nursing pharmacy, state, local and federal government planning and response -- met in San Diego to address delivering critical care to patients during disasters and have insufficient critical care resources to provide timely, usual care for a surge of critically ill and injured victims. Said Asha Devereaux, M.D., of the Task Force for Critical Care, "If a mass casualty critical care event occurred tomorrow, many people with clinical conditions that are survivable under usual health-care system circumstances may have to forego life-sustaining interventions due to deficiencies in supply, staffing or space." The task force recommended a number of actions to deal with this eventuality, including that a hospital plan to have the ability to provide critical care for at least triple their usual intensive care unit capacity, and to sustain this surge for at least 10 days without external assistance.

Devereaux, Asha V., Jeffrey R. Dichter, Michael D. Christian, Nancy N. Dubler, Christian E. Sandrock, John L. Hick, Tia Powell, James A. Geiling, Dennis E. Amundson, Tom E. Baudendistel, Dana A. Braner, Mike A. Klein, Kenneth A. Berkowitz, J. Randall Curtis, and Lewis Rubinson. 2008. Definitive care for the critically ill during a disaster: A framework for allocation of scarce resources in mass critical care. *Chest Journal* 133(5): 51S-66S.

Anticipated circumstances during the next severe influenza pandemic highlight the insufficiency of staff and equipment to meet the needs of all critically ill victims. It is plausible that an entire country could face simultaneous limitations, resulting in severe shortages of critical care resources to the point where patients could no longer receive all of the care that would usually be required and expected. There may even be such resource shortfalls that some patients would not be able to access even the most basic of life-sustaining interventions. Rationing of critical care in this circumstance would be difficult, yet may be unavoidable. Without planning, the provision of care would assuredly be chaotic, inequitable, and unfair. The Task Force for Mass Critical Care Working Group met in Chicago in January 2007 to proactively suggest guidance for allocating scarce critical care resources. The task force suggested that in order to allocate critical care resources when systems are overwhelmed (1) an equitable triage process utilizing the Sequential Organ Failure Assessment scoring system; (2) the concept of triage by a senior clinician(s) without direct clinical obligation, and a support system to implement and manage the triage process; (3) legal and ethical constructs underpinning the allocation of scarce resources; and (4) a mechanism for rapid revision of the triage process as further disaster experiences, research, planning, and modeling come to light.

DiMaggio, Charles, Sandro Galea, and David Abramson. 2008. Analyzing post disaster surveillance data: The effect of the statistical method. *Disaster Medicine and Public Health Preparedness* 2(2): 119-126.

Data from existing administrative databases and ongoing surveys or surveillance methods may prove indispensable after mass traumas as a way of providing information that may be useful to emergency planners and practitioners. The analytic approach, however, may affect exposure prevalence estimates and measures of association. The authors compare Bayesian hierarchical modeling methods to standard survey analytic techniques for survey data collected in the aftermath of a terrorist attack. Estimates for the prevalence of exposure to the terrorist attacks of September 11, 2001, varied by the method chosen. Bayesian hierarchical modeling returned the lowest estimate for exposure prevalence with a credible interval spanning nearly three times the range of the confidence intervals (CIs) associated with both unadjusted and survey procedures. Bayesian hierarchical modeling also returned a smaller point estimate for measures of association, although in this instance the credible interval was tighter than that obtained through survey procedures. Bayesian approaches allow a consideration of preexisting assumptions about survey data, and may offer potential advantages, particularly in the uncertain environment of post-terrorism and disaster settings.

Additional comparative analyses of existing data are necessary to guide our ability to use these techniques in future incidents.

Draper, Heather, Sue Wilson, Jonathan Ives, Christine Gratus, Sheila Greenfield, Jayne Perry, Judith Petts, and Tom Sorell. 2008. Healthcare workers' attitudes towards working during pandemic influenza: A multi method study. ***BMC Public Health*** **8(192): 1-7.**
Healthcare workers (HCWs) will be key players in any response to pandemic influenza, and will be in the front line of exposure to infection. Responding effectively to a pandemic relies on the majority of medical, nursing, laboratory and hotel services staff continuing to work normally. Planning assumes that during a pandemic normal healthcare service levels will be provided, although it anticipates that as caseloads increase only essential care will be provided. The ability of the NHS to provide expected service levels is entirely dependent upon HCWs continuing to work as normal. This study is designed as a two-phase multi-method study, incorporating focus groups and a questionnaire survey. In phase one, qualitative methods will be used to collect the views of a purposive sample of HCWs, to determine the range of factors associated with their responses to the prospect of working through pandemic influenza. In phase two, the findings from the focus groups, combined with the available literature, will be used to inform the design of a survey to determine the generalizability of these factors, enabling the estimation of the likely proportion of HCWs affected by each factor, and how likely it is that they would be willing and/or able to continue to work during an influenza pandemic. There are potentially greater than normal health risks for some healthcare workers working during a pandemic, and these workers may be concerned about infecting family members/ friends. HCWs will be as liable as other workers to care for sick family members and friends. It is vital to have information about how motivated HCWs will be to continue to work during such a crisis, and what factors might influence their decision to work/not to work. Through the identification and subsequent management of these factors it may be possible to implement strategies that will alleviate the concerns and fears of HCWs and remove potential barriers to working.

Faust, Douglas S., F. William Black, Joel P. Abrahams, Melinda S. Warner, and B. Jayne Bellando. 2008. After the storm: Katrina's impact on psychological practice in New Orleans. ***Professional Psychology: Research and Practice*** **39(1): 1-6.**
The impact of Hurricane Katrina on four senior New Orleans based psychologists, both professionally and personally, is described. The authors are pediatric, adult, and family therapists and neuropsychologists; by employment, they are medical center academics, independent practitioners, administrators, and staff/ consulting psychologists at medical and psychiatric hospitals. Their diverse experiences following Katrina are similar to the experiences of many individuals in the professional community of the Gulf Coast. In the face of the storm, they departed New Orleans and afterward returned at varying intervals. The homes of all of the four New Orleans authors were damaged or destroyed. All of their practice locations were closed for varying periods, and two were closed permanently. Of the four who returned to New Orleans, only two remained 18 months after the storm; the others had relocated to other states. This article reflects on their collective experience as mental health professionals living in New Orleans after Katrina and lessons learned from that experience.

Fernandez, Jill B., David L. Glotzer, Marc M. Triola, and Walter J. Psoter. 2008. A unique role for dental school faculty: Telephone triage training and integration into a health departments' emergency response planning. ***American Journal of Disaster Medicine*** **3(3): 141-146.**
Dental professionals with proper training and integration into existing protocols for mobilization can be one additional resource during catastrophic events. A pilot project on training of dental school faculty in telephone triage in the event of an avian flu pandemic is described. A partnership was established with a grant from the Department of Justice/Department of Homeland Security, between the New York City Department of Health and Mental Hygiene, and New York University to initiate a pilot program to increase the manpower resources available to the health agency should an overwhelming public health event be present in the New York City area. Eight faculty from New York University College of Dentistry were selected to receive telephone triage training consisting of 15 hours of formal presentations. This training was specifically designed to give participants a background in "outbreak investigations," and included a mock influenza outbreak. Also, a "phone triaging" training during a surge event was practiced. The training resulted in enabling alternative healthcare providers as capable personnel and one alternative source for a surge manpower pool. This was the innovative use of dental school faculty to bolster critically understaffed and overwhelmed areas in the NYCDOHMH infrastruc-

ture, such as call centers and for telephone triage, in their disaster scenarios, particularly in their response to avian flu. The established public health systems and medical community must understand the need to preplan for medical surge events and accept that a potential source of additional manpower could be the dental profession or other nontraditional healthcare personnel.

Freyberg, Christopher W., Bonnie Arquilla, Baruch S. Fertel, Michael G. Tunik, Cooper. Arthur, Dennis Heon, Stephan A. Kohlhoff, Katherine I. Uraneck, and George L. Foltin. 2008. Disaster preparedness: Hospital decontamination and the pediatric patient —Guidelines for hospitals and emergency planners. ***Prehospital and Disaster Medicine*** **23(2): 166-173.**
In recent years, attention has been given to disaster preparedness for first responders and first receivers (hospitals). One such focus involves the decontamination of individuals who have fallen victim to a chemical agent from an attack or an accident involving hazardous materials. Children often are overlooked in disaster planning. Children are vulnerable and have specific medical and psychological requirements. There is a need to develop specific protocols to address pediatric patients who require decontamination at the entrance of hospital emergency departments. Currently, there are no published resources that meet this need. An expert panel convened by the New York City Department of Health and Mental Hygiene developed policies and procedures for the decontamination of pediatric patients. The panel was comprised of experts from a variety of medical and psychosocial areas. Using an iterative process, the panel created guidelines that were approved by the stakeholders and are presented in this paper. These guidelines must be utilized, studied, and modified to increase the likelihood that they will work during an emergency situation.

Gautschi, Oliver P., Dieter Cadosch, Gunesh Rajan, and Rene Zellweger. 2008. Earthquakes and trauma: Review of triage and injury-specific, immediate care. ***Prehospital and Disaster Medicine*** **23(2): 195-201.**
Earthquakes present a major threat to mankind. Increasing knowledge about geophysical interactions, progressing architectural technology, and improved disaster management algorithms have rendered modern populations less susceptible to earthquakes. Nevertheless, the mass casualties resulting from earthquakes in Great Kanto (Japan), Ancash (Peru), Tangshan (China), Guatemala, Armenia, and Izmit (Turkey) or the recent earthquakes in Bhuj (India), Bam (Iran), Sumatra (Indonesia) and Kashmir (Pakistan) indicate the devastating effect earthquakes can have on both individual and population health. Appropriate preparation and implementation of crisis management algorithms are of utmost importance to ensure a large-scale medical-aid response is readily available following a devastating event. In particular, efficient triage is vital to optimize the use of limited medical resources and to effectively mobilize these resources to maximize patient survival. However, the main priorities of disaster rescue teams are the rescue and provision of emergency care for physical trauma. Furthermore, the establishment of transport evacuation corridors, a feature often neglected, is essential in order to provide the casualties with a chance for survival. The optimal management of victims under such settings is discussed, addressing injuries of the body and psyche by means of simple diagnostic and therapeutic procedures globally applicable and available.

Gee, Christopher J., Jeremy Bonkowske, and Shree K. Kurup. 2008. Visual disability in selected acts of terror, warfare, and natural disasters of the last 25 years: A concise narrative review. ***American Journal of Disaster Medicine*** **3(1): 25-30.**
This paper gives a review of ocular injury related to mass disaster over the past 25 years, including injury type, treatment, and final visual outcome. The design was a retrospective review. The main outcome measures were: injury types, treatment, and final visual acuity. Acts of terror and war result in significant and increasingly more common ocular injury. Natural disasters were much less likely to cause lasting or permanent injury. Final visual acuity was rarely reported. Primary prevention is superior to treatment in acts of war and terror. Ocular injury is rarely reported by first response to natural disaster.

Gstraunthaler, Thomas. 2008. Planning for judgement day: Restrictions of government planning for avian influenza. ***Disaster Prevention and Management*** **17(2): 199-211.**
The purpose of this paper is to examine the organization and execution of the planning process of the Department for Environment, Food and Rural Affairs (DEFRA). The focus is placed on the different stakeholders involved and their role in the decision-making process. The research involves content analysis of the available paperwork and interviews with leading personnel of DEFRA. The organization of the planning process ensures strong involvement of the industry. As the financial resources of DEFRA are limited, parts of

the costs of the process are passed on to the industry, which allow it to play a stronger role. By delegating major tasks to other organizations DEFRA lacks control of the execution of its decisions. The research is limited by the view of the interviewed persons. As it is a pre-impact study, people could act in a different manner than originally stated if an outbreak should occur. Through identifying the motivations of participating actors, it was demonstrated that this system is prone to the same failures as already shown in the bovine spongiform encephalopathy (BSE) crisis. It is discussed if the role of government planning is really necessary or if the whole task could be done by the industry. The paper is a pre-impact study and will contribute to the debate about the system in general.

Horton, D. Kevin, Maureen Orr, Theodora Tsongas, Richard Leiker, and Vikas Kapil. 2008. Secondary contamination of medical personnel, equipment, and facilities resulting from hazardous materials events, 2003-2006. ***Disaster Medicine and Public Health Preparedness*** **2(2): 104-113.**

When not managed properly, a hazardous material event can quickly extend beyond the boundaries of the initial release, creating the potential for secondary contamination of medical personnel, equipment, and facilities. Secondary contamination generally occurs when primary victims are not decontaminated or are inadequately decontaminated before receiving medical attention. This article examines the secondary contamination events reported to the Agency for Toxic Substances and Disease Registry (ATSDR) and offers suggestions for preventing such events. Data from the ATSDR Hazardous Substances Emergency Events Surveillance system were used to conduct a retrospective analysis of hazardous material events occurring in 17 states during 2003 through 2006 involving secondary contamination of medical personnel, equipment, and facilities. Fifteen (0.05 percent) Hazardous Substances Emergency Events Surveillance events were identified in which secondary contamination occurred. At least 17 medical personnel were injured as a result of secondary contamination while they were treating contaminated victims. Of the medical personnel injured, 12 were emergency medical technicians and five were hospital personnel. Respiratory irritation was the most common injury sustained. Adequate preplanning and drills, proper decontamination procedures, good field-to-hospital communication, appropriate use of personal protective equipment, and effective training can help prevent injuries of medical personnel and contamination of transport vehicles and medical facilities.

Jenkins, Jennifer Lee, Melissa L. McCarthy, Lauren M. Sauer, Gary B. Green, Stephanie Stuart, Tamara L. Thomas, and Edbert B. Hsu. 2008. Mass-casualty triage: Time for an evidence-based approach. ***Prehospital and Disaster Medicine*** **23(1): 3-8.**

Mass-casualty triage has developed from a wartime necessity to a civilian tool to ensure that constrained medical resources are directed at achieving the greatest good for the most number of people. Several primary and secondary triage tools have been developed, including Simple Treatment and Rapid Transport (START), JumpSTART, Care Flight Triage, Triage Sieve, Sacco Triage Method, Secondary Assessment of Victim Endpoint (SAVE), and Pediatric Triage Tape. Evidence to support the use of one triage algorithm over another is limited, and the development of effective triage protocols is an important research priority. The most widely recognized mass-casualty triage algorithms in use today are not evidence-based, and no studies directly address these issues in the mass-casualty setting. Furthermore, no studies have evaluated existing mass-casualty triage algorithms regarding ease of use, reliability, and validity when biological, chemical or radiological agents are introduced. Currently, the lack of a standardized mass-casualty triage system that is well validated, reliable, and uniformly accepted, remains an important gap. Future research directed at triage is recognized as a necessity, and the development of practical, universal, triage algorithm that incorporates requirements for decontamination or special precautions for infectious agents would facilitate a more organized mass-casualty medical response.

Karairmak, Ozlem, and Gul Aydin. 2008. Reducing earthquake-related fears in victim and nonvictim children. ***The Journal of Genetic Psychology*** **169(2): 177-185.**

In this study, the authors investigated the fears of earthquake victim and non-victim elementary school students and the effectiveness of an activity-based cognitive fear reduction (ABCF) procedure developed by the authors. To measure fear, the authors collected data from 266 participants using a modified version of the Fear Survey Schedule for Children (FSSC; W. Yule, O. Udwin, &K. Murdoch, 1990). Results demonstrated that earthquake victim children were more fearful on two subtests of the FSSC than were non-victim children and that girls had significantly stronger fears on all subscales than did boys. The ABCF procedure was not

an effective approach for reducing the fears of earthquake victims. However, the control group did demonstrate a significant reduction in fears. The authors suggest that the activity designed for this group may have been an intervention in itself. The authors discuss this finding and offer suggestions for researchers and therapists.

Kelman, Ilan. 2008. Lessons relearned from Katrina? American Journal of *Disaster Medicine* 3(2): 61-62.

Kessler, R. C., S. Galea, M. J. Gruber, N. A. Sampson, R. J. Ursano, and S. Wessely. 2008. Trends in mental illness and suicidality after Hurricane Katrina. *Molecular Psychiatry* 13(4): 374-384.

A representative sample of 815 pre-hurricane residents of the areas affected by Hurricane Katrina was interviewed 58 months after the hurricane and again 1 year later as the Hurricane Katrina Community Advisory Group (CAG). The follow-up survey was carried out to study patterns-correlates of recovery from hurricane-related post-traumatic stress disorder (PTSD), broader anxiety-mood disorders and suicidality. The Trauma Screening Questionnaire screening scale of PTSD and the K6 screening scale of anxiety-mood disorders were used to generate DSM-IV prevalence estimates. Contrary to results in other disaster studies, where post-disaster mental disorder typically decreases with time, prevalence increased significantly in the CAG for PTSD (20.9 percent vs. 14.9 percent at baseline), serious mental illness (SMI; 14.0 percent vs. 10.9 percent), suicidal ideation (6.4 percent vs. 2.8percent) and suicide plans (2.5 percent vs. 1.0 percent). The increases in PTSD-SMI were confined to respondents not from the New Orleans Metropolitan Area, while the increases in suicidal ideation-plans occurred both in the New Orleans sub-sample and in the remainder of the sample. Unresolved hurricane-related stresses accounted for large proportions of the inter-temporal increases in SMI (89.2 percent), PTSD (31.9 percent) and suicidality (61.6 percent). Differential hurricane-related stress did not explain the significantly higher increases among respondents from areas other than New Orleans, though, as this stress was both higher initially and decreased less among respondents from the New Orleans Metropolitan Area than from other areas affected by the hurricane. Outcomes were only weakly related to socio-demographic variables, meaning that high prevalence of hurricane-related mental illness remains widely distributed in the population nearly 2 years after the hurricane.

Kieser, Jules, Jacob de Feijter, and Raymond TeMoananui. 2008. Automated dental aging for child victims of disasters. *American Journal of Disaster Medicine* 3(2): 109-119.

In disasters, one of the major challenges is the identification of the dead. This is complicated in cases where young victims and, sometimes, young survivors are involved. Often, there are no dental treatment records that can be usefully employed and, hence, identification has to be relied heavily on aging. Developing teeth are generally considered to be the most reliable indicators of maturation and, by extension, of chronological age at death. This is because teeth are more durable, their degree of development can be observed directly from the living or deceased individual, and tooth formation is relatively unaffected by disease, malnutrition, or endocrine disorders. Unfortunately, the calculation of dental maturation and its conversion to a useful indicator of chronological age is a time-consuming process, which can be frustrating in the face of an overwhelming demand after a disaster such as the Thai Tsunami or Hurricane Katrina. The authors report on the development of a novel, automated "point and click" graphical user interface that can be used to calculate the age of a known individual from a simple dental radiograph. The authors apply the method to three ethnic populations living in New Zealand: children of European, Maori, and Pacific Island descent.

Koh, Howard K., Loris J. Elqura, Christine M. Judge, John P. Jacob, Amy E. Williams, M. Suzanne Crowther, Richard A. Serino, and John M. Auerbach. 2008. Implementing the Cities Readiness Initiative: Lessons learned from Boston. *Disaster Medicine and Public Health Preparedness* 2(1): 40-49.

The federally funded Cities Readiness Initiative (CRI) requires seamless federal, state, and local public health coordination to provide antibiotics to an entire city population within 48 hours of an aerosolized release of anthrax. This article documents practical lessons learned from the development and implementation of the Boston CRI plan. Key themes center on heightened emphasis on security, a new mass protection model of dispensing, neighborhood-centric clinic site selection, online training of Medical Reserve Corps volunteers, and the testing of operations through drills and exercises. Sharing such lessons can build national preparedness.

Laditka, Sarah B., James N. Laditka, Carol B. Cornman, Courtney B. Davis, and Maggi J. Chanlee. 2008. Disaster preparedness for vulnerable persons receiving in-home, long-term care in South Carolina. ***Prehospital and Disaster Medicine*** **23(2): 133-142.**

The purpose of this study was to examine how agencies in South Carolina that provide in-home health care and personal care services help older and/or disabled clients to prepare for disasters. The study also examines how agencies safeguard clients' records, train staff, and how they could improve their preparedness. Federal regulations require preparedness for agencies providing in-home health care. No analogous regulations were found for in-home personal care. The degree of preparedness varied substantially among personal care agencies. Most personnel care agencies were categorized as "less" prepared or "moderately" prepared. The findings for agencies in both categories generally suggest lack of preparedness in: 1) identifying clients at high risk and assisting them in planning; 2) providing written materials and/or recommendations; 3) protecting records; 4) educating staff and clients; and 5) coordinating disaster planning and response across agencies. Home health agencies were better prepared than were personal care agencies. However, some health administrators commented that they were unsure how well their plans would work during a disaster, given the lack of training. The majority of home health agency administrators spoke of a need for better coordination and/or more preparedness training. Agencies providing personal care and home health services would benefit from developing stringer linkages with their local preparedness systems. The findings support incorporating disaster planning in the certification requirements for home health agencies, and developing additional educational resources for administrators and staff of personal care agencies an their clients.

Landrigan, Philip J., Joel Forman, Maida Galvez, Brooke Newman, Stephanie M. Engel, and Claude Chemtob. 2008. Impact of September 11 World Trade Center disaster on children and pregnant women. ***Mount Sinai Journal of Medicine*** **75(2): 129-134.**

Children are uniquely sensitive to toxic exposures in the environment. This sensitivity reflects children's disproportionately heavy exposures coupled with the biological vulnerability that is a consequence of their passage through the complex transitions of early development. To assess effects on children's health associated with the attacks on the World Trade Center (WTC) of September 11, 2001, research teams at the Mount Sinai School of Medicine and other academic health centers in New York City launched a series of clinical and epidemiologic studies. Mount Sinai investigators undertook a prospective analysis of pregnancy outcomes in 182 women who were pregnant on September 11, 2001, and who had been either inside or within 0.5 miles of the WTC at the time of the attacks; they found a doubling in incidence of intrauterine growth retardation (IUGR) among infants born to exposed mothers as compared to infants born to unexposed women in northern Manhattan. A Columbia research team examined pregnancy outcomes in 329 women who lived, worked or gave birth in lower Manhattan in the nine months after September 11; they found that these women gave birth to infants with significantly lower birth weight and shorter length than women living at greater distances from Ground Zero. NYU investigators documented increased numbers of new asthma cases and aggravations of preexisting asthma in children living in lower Manhattan. Mount Sinai mental health researchers documented a significant increase in mental health problems in children who directly witnessed the attacks and subsequent traumatic events; these problems were most severe in children with a past history of psychological trauma. The New York City Department of Health and Mental Hygiene established a WTC Registry that has enrolled over 70,000 persons of all ages in lower Manhattan and will follow the health of these populations to document on a continuing basis the health consequences of September 11.

Lazaratou, Helen, Thomas Paparrigopoulos, Gerassimos Galanos, Constantinos Psarros, Dimitris Dikeos, and Constantin Soldatos. 2008. The psychological impact of a catastrophic earthquake: A retrospective study 50 years after the event. ***The Journal of Nervous and Mental Disease*** **196(4): 340-344.**

The aim of this study was to retrospectively assess the impact of a catastrophic earthquake in a sample of 121 survivors, 50 years after the event. Mean age +/- SD of the responders was 72.2 +/- 6.1 years. The majority of the victims (78%) acknowledged a strong overall impact of the earthquake on their lives, and almost all of them had intense recollection of the event at its anniversary. The most frequent symptom during the 6 months after the earthquake was persistent remembering or "reliving" of the event; women had considerably more often recurrent dreams of the earthquake and distress than did men. Women and young adults at the time of the earthquake appear to be the most vulner-

able groups regarding the psychological effects of the event.

Luke, Thomas C., and Jean-Paul Rodrigue. 2008. Protecting public health and global freight transportation systems during an influenza pandemic. ***American Journal of Disaster Medicine*** **3(2): 99-107.**
The H5N1 influenza threat is resulting in global preparations for the next influenza pandemic. Pandemic influenza planners are prioritizing scarce vaccine, antivirals, and public health support for different segments of society. The freight, bulk goods, and energy transportation network comprise the maritime, rail, air, and trucking industries. It relies on small numbers of specialized workers who cannot be rapidly replaced if lost due to death, illness, or voluntary absenteeism. Because transportation networks link economies, provide critical infrastructures with working material, and supply citizens with necessary commodities, disrupted transportation systems can lead to cascading failures in social and economic systems. However, some pandemic influenza plans have assigned transportation workers a low priority for public health support, vaccine, and antivirals. The science of transportation geography demonstrates that transportation networks and workers are concentrated at, or funnel through, a small number of chokepoints and corridors. Chokepoints should be used to rapidly and efficiently vaccinate and provide prophylaxis to the transportation worker cohort and to implement transmission prevention measures and thereby protect the ability to move goods. Nations, states, the transportation industry and unions, businesses, and other stakeholders must plan, resource, and exercise, and then conduct a transportation health assurance and security campaign for an influenza pandemic.

Lust, Elaine, and Kenneth P. Hermsen. 2008. Preparing for the realities of a disaster deployment: Tips, hints, and suggestions for healthcare professionals. ***Journal of Emergency Management*** **6(2): 25-30.**
The sharing of common deployment realities learned during medical disaster deployments is intended to assist other healthcare professionals who serve on local, state, regional, or federal disaster response teams. The tips, hints, and suggestions communicated in this article are categorized into four main areas: personal realities, disaster scene realities, practice change realities, and disaster management realities. By sharing disaster realities from "boots on the ground" experience, the authors hope to soften the learning curve that can accompany a medical disaster deployment for other healthcare professionals.

Madrid, Paula A., and Roy Grant. 2008. Meeting mental health needs following a natural disaster: Lessons from Hurricane Katrina. ***Professional Psychology: Research and Practice*** **39(1): 86-92.**
Hurricane Katrina had a devastating impact on hundreds of thousands of Louisiana and Mississippi families. Housing was destroyed, jobs were lost, and family members were separated, sometimes in different states and without communication. Post-disaster stress reactions were common, with vulnerable individuals most affected. Mental health services were not adequate to meet immediate needs, and post-disaster mental health issues often emerge over time. This article describes the mental health needs of dislocated and evacuee children and families and the steps that were taken to develop mental health programs that would be sustainable over time to meet this new level of need.

McLeish, Alison C., and Kevin S. Del Ben. 2008. Symptoms of depression and posttraumatic stress disorder in an outpatient population before and after Hurricane Katrina. ***Depression and Anxiety*** **25(5): 416-421.**
The aim of the present investigation was to evaluate symptoms of depression and posttraumatic stress disorder (PTSD) in an outpatient psychiatric population before and after Hurricane Katrina. The sample consisted of 156 patients (110 females; Mage=41.2 years, SD=10.9) at an outpatient psychiatric clinic who completed measures of psychological symptoms as part of their regular clinical care in the month before (n=76; 49 percent) and the one month after (n=80; 51%) Hurricane Katrina made landfall. Partially consistent with prediction, depression scores were significantly higher in the month following the hurricane, but PTSD scores were not significantly different. Depressive symptoms after the hurricane were predicted by watching television coverage of the looting that occurred in New Orleans and by the amount of time the participant was without electricity. Symptoms of PTSD after the hurricane were predicted by the participants' use of general television viewing as a coping strategy, the amount of time they spent watching television coverage of the looting in New Orleans, and the use of prayer as a coping behavior. Of these variables, only prayer was associated with a decrease in PTSD symptoms. Findings are discussed in relation to the need for collaborative efforts between clinically oriented and research oriented institutions to

study the impact of large-scale disasters on a variety of populations.

McNeill Ransom, Montece, Richard A. Goodman, and Anthony D. Moulton. 2008. Addressing gaps in health care sector legal preparedness for public health emergencies. ***Disaster Medicine and Public Health Preparedness*** **2(1): 50-56.**
Health care providers and their legal counsel play pivotal roles in preparing for and responding to public health emergencies. Lawyers representing hospitals, health systems, and other health care provider components are being called upon to answer complex legal questions regarding public health preparedness issues that most providers have not previously faced. Many of these issues are legal issues with which public health officials should be familiar, and that can serve as a starting point for cross-sector legal preparedness planning involving both the public health and health care communities. This article examines legal issues that health care providers face in preparing for public health emergencies, and steps that providers, their legal counsel, and others can take to address those issues and to strengthen community preparedness.

Miller, Andrew C., and Bonnie Arquilla. 2008. Chronic diseases and natural hazards: Impact of disasters on diabetic, renal and cardiac patients. ***Prehospital and Disaster Medicine*** **23(2): 185-194.**
Inadequately controlled chronic diseases may present a threat to life and well-being during the emergency response phase of disasters. Chronic disease exacerbations (CDE) account for one of the largest patient populations during disasters, and patients are at increased risk for adverse outcomes. The objective of this study was to assess the burden of chronic renal failure, diabetes, and cardiovascular disease during disasters due to natural hazards, identify impediments to care, and propose solutions to improve the disaster preparation and management of CDE. By recognizing and addressing impediments to the care of chronic disease exacerbations after natural disasters, the quality, delivery, and effectiveness of the care provided to diabetic patients during relief efforts can be improved.

Moline, Jaqueline M., Robert Herbert, Stephen Levin, Diane Stein, Benjamin Luft, Iris G. Udasin, and Philip J. Landrigan. 2008. WTC medical monitoring and treatment program: Comprehensive health care response in aftermath of Disaster. ***Mount Sinai Journal of Medicine*** **75(2): 67-75.**
The attack on the World Trade Center (WTC) on September 11th, 2001 exposed thousands of individuals to an unprecedented mix of chemicals, combustion products and micronized building materials. Clinicians at the Mount Sinai Irving Selikoff Center for Occupational and Environmental Medicine, in partnership with affected stakeholder organizations, developed a medical screening program to evaluate the health status of workers and volunteers who spent time at the WTC site and thus sustained exposure in the aftermath of September 11th. Standardized questionnaires were adapted for use in this unique population and all clinicians underwent training to ensure comparability. The WTC Worker and Volunteer Medical Screening Program (MSP) received federal funding in April 2002 and examinations began in July 2002. The MSP and the follow up medical monitoring program has successfully recruited nearly 22,000 responders, and serves as a model for the rapid development of a medical screening program to assess the health of populations exposed to environmental hazards as a result of natural and man-made disasters. The MSP constitutes a successful screening program for WTC responders. The authors discuss the challenges that confronted the program; the absence of a prior model for the rapid development of a program to evaluate results from mixed chemical exposures; little documentation of the size of the exposed population or of who might have been exposed; and uncertainty about both the nature and potential severity of immediate and long-term health effects.

Nelson, Larry P. 2008. A resiliency profile of Hurricane Katrina adolescents: A psychosocial study of disaster. ***Canadian Journal of School Psychology*** **23(1): 57-69.**
Information about the psychological status of children following a natural disaster is rare. Therefore, the purpose of this investigation is to create a psychosocial profile of relocated Hurricane Katrina youth (N = 83, ages 13 to 17) and integrate the findings into a growing body of literature on the psychological effects of disaster. Data were collected using the Resiliency Scales for Children and Adolescents. Findings indicate the population had overall below-average resiliency resources. The greatest of these resources are reflected in their ability to maintain a positive attitude, ask for and receive help, and solve problems. Other resiliency strengths emerged in the form of feeling calm and comfortable with people. Findings also indicate the population as showing above-average vulnerability and sensitivity to psychosomatic reactions, including high levels of impairment by and recovery from emotional upset.

Suggestions for intervention are aimed at meaningful social support activities that emphasize the rebuilding of community via outdoor adventure education and service learning.

Palumbo, John P., James I. Meek, Darcy M. Fazio, Susan B. Turner, James L. Hadler, and Andre N. Sofair. 2008. Unexplained deaths in Connecticut, 2002-2003: Failure to consider Category A bioterrorism agents in differential diagnosis. ***Disaster Medicine and Public Health Preparedness*** **2(2): 87-94.**

Recognition of bioterrorism-related infections by hospital and emergency department clinicians may be the first line of defense in a bioterrorist attack. The authors identified unexplained infectious deaths consistent with the clinical presentation of anthrax, tularemia, smallpox, and botulism using Connecticut death certificates and hospital chart information. Minimum work-up criteria were established to assess the completeness of diagnostic testing. Of 4,558 unexplained infectious deaths, 133 were consistent with anthrax (2.9 percent) and 6 (0.13 percent) with tularemia. None were consistent with smallpox or botulism. No deaths had anthrax or tularemia listed in the differential diagnosis or had disease-specific serology performed. Minimum work-up criteria were met for only 53 percent of cases. Except for anthrax, few unexplained deaths in Connecticut could possibly be the result of the bioterrorism agents studied. In 47 percent of deaths from illnesses that could be anthrax, the diagnosis would likely have been missed. As of 2004, Connecticut physicians were not well prepared to intentionally or incidentally diagnose initial cases of anthrax or tularemia. More effective clinician education and surveillance strategies are needed to minimize the potential to miss initial cases in a bioterrorism attack.

Peltz, Rami, Avisar-Shohat Galit, Miri Ventura-Gabay, and Yaron Bar-Dayan. 2008. Differences in sources of information used by the population between the affected area and the general population during the first phase of a bird flu outbreak. ***Prehospital and Disaster Medicine*** **23(1): 56-62.**

In March 2006, a few cases of bird flu were discovered in approximately 10 rural settlements in Israel. As a result, approximately one million birds were destroyed within a three kilometer radius of the settlements. The Israeli population was instructed to take preventive measures against the spread of the infection. The objective of this study was to compare the frequency of use of different sources of information by the population in the affected area with the general population during the first phase of a bird flu outbreak in Israel. A telephone survey among the two randomly selected representative samples of adults was concluded. One sample involved 500 adult Israeli residents; the other sample involved 103 adult residents from the affected area during the first phase of the outbreak. The use of different sources of information by the population concerning the disease was assessed. Television was a significantly more common source of information in Israel as a whole, whereas friends and local authorities were significantly more common sources of information in the affected area. The frequency of use of the sources of information by the population during the early phase of a bird flu outbreak is different in the affected area compared with the general population in the same country. Authorities must pay attention to this phenomenon and use the correct sources of information in each area in order to achieve better exposure of the population to the recommended behaviors during an outbreak.

Phelps, Scot. 2008. The performance-level model of hospital decontamination preparedness. ***American Journal of Disaster Medicine*** **3(3): 157-163.**

Described is a multilevel model of decontamination capacity for hospitals. Acute care hospitals with decontamination responsibilities. This multilevel model of defining decontamination capacity would allow more realistic assessment of current capacity, allow for fluctuating service levels depending on time of day, incorporate realistic ramp-up and ramp-down of decontamination services, allow for a defined fall-back decontamination model should decontamination processes fail, allow hospitals to define long-term decontamination service level goals, and allow better understanding of when and why to focus on low-risk/low-resource patients rather than high-risk/high-resource patients. This multiple-level model would allow for more realistic and effective hospital-based decontamination service models and should become part of the national decontamination paradigm.

Prezant, David J., Stephen Levin, Kerry J. Kelly, and Thomas K. Aldrich. 2008. Upper and lower respiratory diseases after occupational and environmental disaster. ***Mount Sinai Journal of Medicine*** **75(2): 89-100.**

Respiratory consequences from occupational and environmental disasters are the result of inhalation exposures to chemicals, particulate matter (dusts and fibers) and/or the incomplete products of combustion that are often liberated during disasters such as fires, building collapses, explosions and volcanoes. Unfortunately,

experience has shown that environmental controls and effective respiratory protection are often unavailable during the first days to week after a large-scale disaster. The English literature was reviewed using the keywords disaster and any of the following: respiratory disease, pulmonary, asthma, bronchitis, sinusitis, pulmonary fibrosis, or sarcoidosis. Respiratory health consequences after aerosolized exposures to high-concentrations of particulates and chemicals can be grouped into 4 major categories: 1) upper respiratory disease (chronic rhinosinusitis and reactive upper airways dysfunction syndrome), 2) lower respiratory diseases (reactive [lower] airways dysfunction syndrome, irritant-induced asthma, and chronic obstructive airways diseases), 3) parenchymal or interstitial lung diseases (sarcoidosis, pulmonary fibrosis, and bronchiolitis obliterans, and 4) cancers of the lung and pleura. This review describes several respiratory consequences of occupational and environmental disasters and uses the World Trade Center disaster to illustrate in detail the consequences of chronic upper and lower respiratory inflammation.

Rabito, Felicia A., Shahed Iqbal, Michael P. Kierman, and Ginger L. Chew. 2008. Children's respiratory health and mold levels in New Orleans after Katrina: A preliminary look. *Journal of Allergy and Clinical Immunology* 21(3): 622-625.
When the federal levee system broke after Hurricane Katrina, 80 percent of New Orleans, approximately 134,000 homes, flooded. As repopulation and revitalization activities continue, exposure to mold and other respiratory irritants has emerged as a major health concern; however, there has been no study examining children's respiratory health and indoor mold levels in the post-Katrina environment. The Children's Respiratory Health Study was designed as a preliminary examination of indoor air levels of mold, children's lung function, and common indices of respiratory health in a select sample of children returning to live in New Orleans immediately after Hurricane Katrina. Children were recruited from a private primary school in the Garden District of New Orleans. Respiratory health questionnaire and spirometric data were collected on children seven to 14 years of age, and mold air sampling was conducted at baseline and again after two months. There was an overall decrease in mold levels and respiratory symptoms over the study period, and indoor mold levels were low despite reported hurricane damage.

Reissman, Dori B., and John Howard. 2008. Responder safety and health: Preparing for future disasters. *Mount Sinai Journal of Medicine* 75(2): 135-141.
This article reviews lessons learned about managing the safety and health of workers who were involved in disaster response, recovery, and cleanup after the 2001 World Trade Center (WTC) disaster. The first two sections review ongoing responder health burdens and the tragic toll of this disaster from a worker safety and health perspective. The remaining sections address changes in federal infrastructure, response planning, and resources for protection of response and recovery personnel. Proper preparation includes pre-event and ''just-in-time'' disaster-worker training on likely hazards, organizational assets for hazard monitoring, and hands-on instruction in the use of assigned protective equipment. Good planning includes pre-deployment medical review to ensure ''fitness for duty'' and considers the following: (1) personal risk factors, (2) hazards likely to be associated with particular field locations, and (3) risks involved with assigned tasks (e.g. workload and pace, work/rest cycles, available resources, and team/supervisory dynamics). Planning also should address worker health surveillance, medical monitoring, and availability of medical care (including mental health services). Disaster safety managers should anticipate likely hazards within planning scenarios and prepare asset inventories to facilitate making timely safety decisions. Disaster safety management begins immediately and provides ongoing real-time guidance to incident leadership at all levels of government. Robust standards must be met to reliably protect workers/responders. An integrated and measurable multiagency safety management function must be built into the incident command system before an incident occurs. This function delineates roles and responsibilities for rapid exposure assessments, ensuring cross-agency consistency in data interpretation, and timely, effective communication of information and control strategies. The ability to perform this safety management function should be tested and evaluated in exercise simulations and drills at multiple levels. Joint planning and exercising of the safety management plan and its function are effective ways to build interagency relationships and to be more systemic in managing logistics for safety equipment and converging personnel. Planning must include mechanisms to enable safety decisions to be implemented such as effective and rapid scene control (site access), personnel tracking, and safety enforcement. Worker safety and health preparedness and leadership are essential for protecting workers and pro-

moting resiliency among personnel involved in disaster response, recovery, and cleanup.

Rezaeian, Mohsen. 2008. Epidemiology of suicide after natural disasters: A review on the literature and a methodological framework for future studies. ***American Journal of Disaster Medicine*** **3(1): 52-56.**
On one hand, there is an association between exposure to natural disasters and becoming mentally distressed, and on the other hand, there is also a relation between being mentally distressed and committing suicide; therefore, it is possible that one finds a relation between exposure to natural disasters and committing suicide. This review, therefore, will not only seek such relations in the literature but also try to highlight the most important methodological issues of finding such connection.

Richter, Roxane, and Thomas Flowers. 2008. Gendered dimensions of disaster care: Critical distinctions in female psychosocial needs, triage, pain assessment, and care. ***American Journal of Disaster Medicine*** **3(1): 31-37.**
This research highlights and identifies some critical distinctions in female disaster care including the following: socially constructed gender risk factors; gender and posttraumatic stress; women and pain (presentation and sensitivity); and post-disaster support and services, especially in the arenas of obstetrics and gynecology (breastfeeding, menstruation, contraception, rape, and sexually transmitted disease). The research also includes a brief, anonymous survey of 50 adult female Hurricane Katrina evacuees which queried women on their usage of post-disaster health and counseling services. The literature review shows a pattern of gender differentiation in all areas of the disaster processing preparedness, response, physical and psychological impact, risk perception and exposure, recovery, and reconstruction. Some research highlights include: six disaster gender risk factors affecting vulnerability, impact and exposure; heightened risks and differing clinical manifestations of posttraumatic stress disorder and pain presentation; "pregnancy status" triage screening; as well gender-sensitive supplies and services (private breastfeeding and obstetrics and gynecology exam areas, birth control, feminine hygiene, and prenatal nutrition advocacy). The results of the small voluntary survey are presented that supports the contention that many gender-sensitive services were needed in post hurricane Katrina clinical settings, but were inadequate or nonexistent. This research not only identified issues, but emphasized feasible interventions, which could significantly reduce pain, suffering, and long-term post-disaster care costs. The research's most important conclusions are the current dearth of gender-disaggregated disaster data, as well as the tremendous need for disaster healthcare planners and providers to take a more cognizant and proactive approach to gender-specific care in triage, psychosocial needs assessment, medical care, and advocacy.

Robinson, William T., Debbie Wendell, DeAnn Gruber, Joseph Foxhood, Beth Scalco, and Amy Zapata. 2008. Estimating the return of persons living with HIV/AIDS to New Orleans: Methods for conducting disease surveillance in the wake of a natural disaster. ***American Journal of Public Health*** **98(4): 666-668.**
Hurricane Katrina disrupted HIV/AIDS surveillance by invalidating the New Orleans surveillance and population data on persons living with HIV/AIDS. This article describes two methods population return and HIV surveillance data to estimate the return of the infected population to New Orleans. It is estimated that 58 percent to 64 percent of 7,068 persons living with HIV/AIDS returned by summer 2006. Although developed for HIV planning, these methods could be used with other disease surveillance programs.

Rowley, Elizabeth A., Byron L. Crape, and Gilbert M. Burnham. 2008. Violence-related mortality and morbidity of humanitarian workers. ***American Journal of Disaster Medicine*** **3(1): 39-45.**
The objectives of this paper are to: (1) to determine the rate of violence related deaths, medical evacuations, and hospitalizations occurring to national and expatriate staff of participating humanitarian organizations; (2) to describe the distribution of all-cause and cause specific mortality and morbidity of humanitarian workers with regard to possible risk factors. Surveillance study of field-based humanitarian workers; data were regularly collected from headquarters of participating organizations via e-mail and telephone between September 2002 and December 2005. The participants were eighteen humanitarian organizations reported on any death, medical evacuation, or hospitalization of any national or expatriate staff, for any cause, in any field location during the study period. The main outcome measures were risk of violence related events was calculated as the number of deaths, medical evacuations, and hospitalizations during the study period divided by the total number of field staff for organizations that had staff in those countries where events

occurred to the staff of any participating organization. Distribution descriptions are presented as simple proportions. Risk of violence-related deaths, medical evacuations, and hospitalizations was six per 10,000 aid worker person-years. Fifty percent of intentional violence cases were lethal. Intentional violence accounted for 55 percent of all deaths reported, followed by coincidental illness (27 percent) and accidents (15 percent). Aid worker deaths in this group were more frequently caused by intentional violence than either accidents or coincidental illness. The rate of six intentional violence events per 10,000 person-years can be used as a baseline by which to track changes in risk over time.

Rubinson, Lewis, John L. Hick, J. Randall Curtis, Richard D. Branson, Suzi Burns, Michael D. Christian, Asha V. Devereaux, Jeffrey R. Dichter, Daniel Talmor, Brian Erstad, Justine Medina, and James A. Geiling. 2008. Definitive care for the critically ill during a disaster: Medical resources for surge capacity: From a task force for mass critical care summit meeting, January. *Chest Journal* 133(5): 32S-50S.

Mass numbers of critically ill disaster victims will stress the abilities of health-care systems to maintain usual critical care services for all in need. To enhance the number of patients who can receive life-sustaining interventions, the Task Force on Mass Critical Care (hereafter termed the Task Force) has suggested a framework for providing limited, essential critical care, termed emergency mass critical care (EMCC). This article suggests medical equipment, concepts to expand treatment spaces, and staffing models for EMCC. Consensus suggestions for EMCC were derived from published clinical practice guidelines and medical resource utilization data for the everyday critical care conditions that are anticipated to predominate during mass critical care events. When necessary, expert opinion was used. The Task Force makes the following suggestions: (1) one mechanical ventilator that meets specific characteristics, as well as a set of consumable and durable medical equipment, should be provided for each EMCC patient; (2) EMCC should be provided in hospitals or similarly equipped structures; after ICUs, post-anesthesia care units, and emergency departments all reach capacity, hospital locations should be repurposed for EMCC in the following order: (A) step-down units and large procedure suites, (B) telemetry units, and (C) hospital wards; and (3) hospitals can extend the provision of critical care using non-critical care personnel via a deliberate model of delegation to match staff competencies with patient needs. By using the Task Force suggestions for adequate supplies of medical equipment, appropriate treatment space, and trained staff, communities may better prepare to deliver augmented essential critical care in response to disasters.

Rubinson, Lewis, John L. Hick, Dan G. Hanfling, Asha V. Devereaux, Jeffrey R. Dichter, Michael D. Christian, Daniel Talmor, Justine Medina, Randall Curtis, and James A. Geiling. 2008. Definitive care for the critically ill during a disaster: A framework for optimizing critical care surge capacity: From a Task force for mass critical care summit meeting, January. *Chest Journal* 133(5): 18S-31S.

Plausible disasters may yield hundreds or thousands of critically ill victims. However, most countries, including those with widely available critical care services, lack sufficient specialized staff, medical equipment, and ICU space to provide timely, usual critical care for a large influx of additional patients. Shifting critical care disaster preparedness efforts to augment limited, essential critical care (emergency mass critical care [EMCC]), rather than to marginally increase unrestricted, individual-focused critical care may provide many additional people with access to life-sustaining interventions. In 2007, in response to the increasing concern over a severe influenza pandemic, the Task Force on Mass Critical Care (hereafter called the Task Force) convened to suggest the essential critical care therapeutics and interventions for EMCC. The Task Force recommends that EMCC should include the following: (1) mechanical ventilation, (2) IV fluid resuscitation, (3) vasopressor administration, (4) medication administration for specific disease states (e.g. antimicrobials and antidotes), (5) sedation and analgesia, and (6) select practices to reduce adverse consequences of critical illness and critical care delivery. Also, all hospitals with ICUs should prepare to deliver EMCC for a daily critical care census at three times their usual ICU capacity for up to 10 days. By using the Task Force suggestions for EMCC, communities may better prepare to deliver augmented critical care in response to disasters. In light of current mass critical care data limitations, the Task Force suggestions were developed to guide preparedness but are not intended as strict policy mandates. Additional research is required to evaluate EMCC and revise the strategy as warranted.

Ruwanpura, Rohan, Kiribathgalage Sunil Kumara, Hermamal Jayawardane, and Lalantha B. L. de

Alwis. 2008. Suicidal bomb explosions in Sri Lanka. ***American Journal of Disaster Medicine*** **3(1): 47-51.**
Injuries due to explosive devices are often seen in Sri Lanka. The involvement of suicide bombers is the peculiar feature of these bomb explosions. Analysis of injuries observed in the suicide bombers showed distinctive injury patterns consisting of detachment of the head and limbs, severe disruption of the trunk, burns at the transected tissue margins, presence of cyanide capsule in the neck, and absence of the shrapnel injuries. These findings are helpful in recognition of the perpetrator for the subsequent legal proceedings and also important in organization of preventive measures. In this context, suicide bomber could be defined as an individual carrying high explosive device, attached to his/her body and must be recognized as a separate medicolegal entity.

Savitz, David A., Rachael T. Oxman, Kristina B. Metzger, Sylvan Wallenstein, Diane Stein, Jaqueline M. Moline, and Robin Herbert. 2008. Epidemiologic research on man-made disasters: Strategies and implications of cohort definition for World Trade Center Worker and Volunteer Surveillance Program. ***Mount Sinai Journal of Medicine*** **75(2): 77-87.**
Studies of long-term health consequences of disasters face unique methodological challenges. The authors focused on studies of the health of cleanup and recovery workers, who are often poorly enumerated at the outset and difficult to follow over time. Comparison of the experience at the World Trade Center and Three Mile Island, provided useful contrasts. Each event had methodological advantages and disadvantages that depended on the nature of the disaster and the availability of records on area residents, and the emergency-response and cleanup protocol. The World Trade Center Worker Monitoring Program has well-defined eligibility criteria but lacks information on the universe of eligible workers to characterize response proportions or the potential for distortion of reported health effects. Nonparticipation may result from lack of interest, lack of awareness of the program, availability of another source of medical care, medical conditions precluding participation, inability to take time off from work, moving out of the area, death, or shift from initially ineligible to eligible status. Some of these considerations suggest selective participation by the sickest individuals, whereas others favor participation by the healthiest. The greatest concern with the validity of inferences regarding elevated health risks relative to external populations is the potential for selective enrollment among those who are affected. If there were a large pool of nonparticipating workers and those who suffered ill health were most motivated to enroll, the rates of disease among participants would be substantially higher than among all those eligible for the program. Future disaster follow-up studies would benefit substantially by having access to accurate estimates of the number of workers and information on the individuals who contributed to the cleanup and recovery effort.

Schulenberg, Stefan E., Kirsten A. Dellinger, Angela J. Koestler, Ann Marie K. Kinnell, David A. Swanson, Mark V. Van Boening, and Richard G. Forgette. 2008. Psychologists and Hurricane Katrina: Natural disaster response through training, public education, and research. ***Training and Education in Professional Psychology*** **2(2): 83-88.**
The purpose of this article was to describe a model of clinical/disaster psychology and illustrate how one psychologist applied training in the aftermath of Hurricane Katrina. The primary focus of the article relates to training graduate students of clinical psychology and assisting evacuees, public education and dissemination, and research. Psychologists may find themselves in similar positions when disasters occur in the future, and the linkage of research and theory with anecdotal accounts may provide mental health professionals with ideas regarding avenues of training to pursue and the various roles that may be served in times of disaster. Recommendations are offered to training programs with regard to infusing tenets of clinical/disaster psychology into their curriculum.

Schwartz, Rachel D. 2008. The impact of correctional institutions on public health during a pandemic or emerging infection disaster. ***American Journal of Disaster Medicine*** **3(3): 165-70.**
With the growing threat of a naturally occurring or man-made global pandemic, many public, private, federal, state, and local institutions have begun to develop some form of preparedness and response plans. Among those in the front lines of preparedness are hospitals and medical professionals who will be among the first responders in the event of such a disaster. At the other end of the spectrum of preparedness is the corrections community who have been working in a relative vacuum, in part because of lack of funding, but also because they have been largely left out of state, federal local planning processes. This isolation and lack of support is compounded by negative public perceptions of correctional facilities and their inmates, and a

failure to understand the serious impact a jail or prison facility would have on public health in the event of a disaster. This article examines the unique issues faced by correctional facilities responding to disease disasters and emphasizes the importance of assisting them to develop workable and effective preparedness and response plans that will prevent them from becoming disease repositories spreading illness and infection throughout our communities. To succeed in such planning, it is crucial that the public health and medical community be involved in correctional disaster planning and that they should integrate correctional disaster response with their own. Failure to do so endangers the health of the entire nation.

Sharma, Andrea J., Edward C. Weiss, Stacy L. Young, Kevin Stephens, Raoult Ratard, Susanne Straif-Bourgeois, Theresa M. Sokol, Peter Vranken, and Carol H. Rubin. 2008. Chronic disease and related conditions at emergency treatment facilities in the New Orleans area after Hurricane Katrina. ***Disaster Medicine and Public Health Preparedness*** **2(1): 27-32.**
Disaster preparations usually focus on preventing injury and infectious disease. However, people with chronic disease and related conditions (CDRCs), including obstetric/gynecological conditions, may be vulnerable to disruptions caused by disasters. The authors used surveillance data collected after Hurricane Katrina to characterize the burden of visits for CDRCs at emergency treatment facilities (e.g., hospitals, disaster medical assistance teams, military aid stations). In 6 parishes in and around New Orleans, health care providers at 29 emergency treatment facilities completed a standardized questionnaire for injury and illness surveillance from September 8 through October 22, 2005. Of 21,673 health care visits, 58.0 percent were for illness (24.3 percent CDRCs, 75.7 percent non-CDRCs), 29.1 percent for injury, 7.2 percent for medication refills, and 5.7 percent for routine or follow-up care. The proportion of visits for CDRCs increased with age. Among men presenting with CDRCs, the most common illnesses were cardiovascular disease (36.8 percent), chronic lower-respiratory disease (12.3 percent), and diabetes/glucose abnormalities (7.7 percent). Among women presenting with CDRCs, the most common were cardiovascular disease (29.2 percent), obstetric/gynecological conditions (18.2 percent), and chronic lower-respiratory disease (12.0 percent). Subsequent hospitalization occurred among 28.7 percent of people presenting with CDRCs versus 10.9 percent of those with non-CDRCs and 3.8 percent of those with injury. Our data illustrate the importance of including CDRCs as a part of emergency response planning.

Shooshtary, Mitra Hakim, Laily Panaghi, and Jafar Attari Moghadam. 2008. Outcome of cognitive behavioral therapy in adolescents after natural disaster. ***Journal of Adolescent Health*** **42(5): 466-472.**
The authors evaluated the effectiveness of cognitive behavioral therapy (CBT) among adolescents exposed to the 2004 earthquake in Bam, Iran. Four months after the earthquake, 135 adolescents as a case group and 33 adolescents as a comparison group were evaluated with the Impact of Event Scale Revised (IES-R). Two therapists were trained in CBT in 3-day classes according to a manual provided by mental health services. After conducting CBT in the case group, both groups were evaluated again with IES-R. The severity of posttraumatic stress symptoms significantly decreased among the subjects given CBT in the case group. The improvement in posttraumatic stress symptoms was attributable to improvement in each of three-symptom categories (intrusion, avoidance, and arousal) and in the total score of posttraumatic stress disorder ($p < .05$). The findings demonstrate the efficacy of CBT in alleviating posttraumatic stress symptoms among adolescents after a catastrophic disaster.

Stella, Julian, Anna Davis, Paul Jennings, and Bruce Bartley. 2008. Introduction of a prehospital critical incident monitoring system: Pilot project results. ***Prehospital and Disaster Medicine*** **23(2): 154-160.**
Hospital medical incident monitoring improves preventable morbidity and mortality rates. Error management systems have been adopted widely in this setting. Data relating to incident monitoring in the prehospital setting is limited. This is a prospective, descriptive study of the pilot phase of the implementation of an incident monitoring process in a regional prehospital setting, with a focus on trauma care. Paramedics and emergency department staff submitted anonymous incident reports, and a chart review was performed on patients who met major trauma criteria. Selected trauma cases were analyzed by a structured interview/debriefing process to elucidate undocumented incidents. A project committee coded and logged all incidents and developed recommendations. The pilot project demonstrates successful implementation of an incident monitoring system within a regional, prehospital environment. The combination of incident detecting techniques has a high yield with potential to capture different error types. The large proportion of

incidents in the "near miss" category allows analysis of incidents without patient harm. The majority of incidents were system related and many were mitigated by circumstance. The model used is appropriate for ongoing incident monitoring in this setting.

Stevens, Garry, Simon Byrne, Beverley Raphael, and Richard Ollerton. 2008. Disaster medical assistance teams: What psychosocial support is needed? ***Prehospital and Disaster Medicine*** **23(2): 202-207.**
The objective of this preliminary study was to evaluate the perceptions of internationally deployed Disaster Medical Assistance Team (DMAT) personnel regarding the psychosocial support needs of these teams. The DMAT questionnaire was sent to 34 members of the Australian medical teams involved in deployments to the 2004 Southeast Asian tsunami and the 2006 Java earthquake. Twenty personnel (59 percent) completed this survey, which reviewed key deployment stressors, specific support strategies, and the support needs of team members, their families, and team leaders. A key aspect of the survey was to determine whether the perceived psychosocial needs would be supported best within the existing provisions and structures, or if they would be enhanced by further provisions, including the deployment of mental health specialties. There was strong support for brief reviews of stress management strategies as part of the pre-deployment briefing, and access to written stress management information for both team members and their families. However, more comprehensive provisions, including pre-deployment, stress management training programs for personnel and intra-deployment family support programs, received lower levels of support. The availability of mental health-related training for the team leader role and access to consultation with mental health specialties was supported, but this did not extend to the actual deployment of mental health specialists. In this preliminary study, clear trends toward the maintenance of current mental health support provisions and the role of the DMAT leader were evident. A follow-study will examine the relationship between team leader, psychosocial support strategies and team functioning.

Subbarao, Italo, James M. Lyznicki, Edbert B. Hsu, Kristine M. Gebbie, David Markenson, Barbara Barzansky, John H. Armstrong, Emmanuel G. Cassimatis, Philip L. Coule, Cham E. Dallas, Richard V. King, Lewis Rubinson, Richard Sattin, Raymond E. Swieton, Scott Lillibridge, Frederick M. Schwartz Richard B. Burkle, and James L. James. 2008. A consensus-based educational framework and competency set for the discipline of disaster medicine and public health preparedness. ***Disaster Medicine and Public Health Preparedness*** **2(1): 57-68.**
Various organizations and universities have developed competencies for health professionals and other emergency responders. Little effort has been devoted to the integration of these competencies across health specialties and professions. The American Medical Association Center for Public Health Preparedness and Disaster Response convened an expert working group (EWG) to review extant competencies and achieve consensus on an educational framework and competency set from which educators could devise learning objectives and curricula tailored to fit the needs of all health professionals in a disaster. The EWG conducted a systematic review of peer-reviewed and non-peer-reviewed published literature. In addition, after-action reports from Hurricane Katrina and relevant publications recommended by EWG members and other subject matter experts were reviewed for congruencies and gaps. Consensus was ensured through a 3-stage Delphi process. The EWG process developed a new educational framework for disaster medicine and public health preparedness based on consensus identification of 7 core learning domains, 19 core competencies, and 73 specific competencies targeted at 3 broad health personnel categories. The competencies can be applied to a wide range of health professionals who are expected to perform at different levels (informed worker/student, practitioner, leader) according to experience, professional role, level of education, or job function. Although these competencies strongly reflect lessons learned following the health system response to Hurricane Katrina, it must be understood that preparedness is a process, and that these competencies must be reviewed continually and refined over time.

Tabery, James, and Charles W. Mackett. 2008. Ethics of triage in the event of an influenza pandemic. ***Disaster Medicine and Public Health Preparedness*** **2(2): 114-118.**
The prospect of a severe influenza pandemic poses a daunting public health threat to hospitals and the public they serve. An influenza pandemic will put hospitals under extreme stress; only so many beds, ventilators, nurses, and physicians will be available, and it is likely that more patients will require medical attention than can be completely treated. Triage is the process of sorting patients in a time of crisis to determine who receives what level of medical attention. How will hospitals sort patients to determine priority for treatment? What criteria will be used? Who will develop these criteria? This article formulates an answer to these

questions by constructing a conceptual framework for anticipating and responding to the ethical issues raised by triage in the event of a severe influenza pandemic

Tapsell, S. M., and S. M. Tunstall. 2008. "I wish I'd never heard of Banbury:" The relationship between "place" and the health impacts from flooding. ***Health & Place*** **14(2): 133-154.**

This paper focuses upon a small qualitative study of two communities in England that were flooded over the Easter weekend in 1998. It reports on the only known longitudinal study of flood-affected respondents in the UK with the same participants over a four-and-a-half-year period. It examines how 'place,' both as a physical location within the floodplain and in terms of social places, may impact upon the health of those affected. It also demonstrates how floods may influence people's relationship with and perception of place, further impacting upon health outcomes. Illustrations in the form of narratives are provided by those who were flooded. Findings demonstrate that even relatively small, localized flood events may seriously disrupt people's lives and have a significant impact upon their physical but particularly their mental health and well-being.

Ten Eyck, Raymond P. 2008. Ability of regional hospitals to meet projected avian flu pandemic surge capacity requirements. ***Prehospital and Disaster Medicine*** **23(2): 103-112.**

Hospital surge capacity is a crucial part of community disaster preparedness planning, which focuses on the requirements for additional beds, equipment, personnel, and special capabilities. The scope and urgency of these requirements must be balanced with a practical approach addressing cost and space concerns. Renewed concerns for infectious disease threats, particularly from a potential avian flu pandemic perspective, have emphasized the need to be prepared for a prolonged surge that could last six to eight weeks. The hypothesis is that the surge capacity that realistically would be generated by the cumulative Greater Dayton Area Hospital Association (GDAHA) plan is sufficient to meet the demands of an avian influenza pandemic as predicted by the Centers for Disease Control and Prevention (CDC) models. Using a standardized data form, surge response plans for each hospital in GDAHA were assessed. The cumulative results were compared to the demand projected for an avian influenza pandemic using the CDC's FluAid and FluSurge models. The cumulative GDAHA capacity is sufficient to meet the projected demand for bed space, intensive care unit beds, ventilators, morgue space, and initial person protective equipment (PPE) use. Many facilities lack a complete set of written surge policies, including screening plans to segregate contaminated patients and staff prior to entering the hospital. The GDAHA hospitals should test their regional distributors' ability to resupply PPE for multiple facilities simultaneously. Facilities should retrofit current air exchange systems to increase the number of potential negative pressure rooms and include such designs in all furniture construction. Each hospital should have a complete set of policies to address the special considerations for a prolonged surge. Additional capacity is required to meet the predicted demands of a threat similar to the 1918 pandemic.

Varela, Emily, Vasiliki Koustouki, Constantinos H. Davos, and Kiriakidou Eleni. 2008. Psychological consequences among adults following the 1999 earthquake in Athens, Greece. ***Disasters*** **32(2): 280-291.**

One year after the September 7, 1999 earthquake in Athens, Greece, the authors investigated the psychological consequences among 305 individuals (71 per cent female) residing in the settlements of Ano Liosia Municipality. Adaptability was difficult (63 per cent) due to limited space (50 per cent). Insecurity feelings were predictive of difficult adaptability (÷2=29.8, p<0.0001) and were common (63 per cent) among married subjects, independent of age (÷2=5.0, odds ratio). Eighty per cent expressed stress feelings, mainly nervousness/tension (60 per cent). Adaptability (÷2=5.3, OR: 0.5, 95 per cent CI: 0.270.9), age (÷2=6.5, OR: 1.03, 95 per cent CI: 1.011.06), and female gender (÷2=4.7, OR: 0.48, 95 per cent CI: 0.250.90) were independent predictors of stress feelings. The majority (55 per cent) developed sleep disorders, chiefly insomnia (60 per cent). Adaptability problems were the only predictor of sleep disorders (÷2=6.4, OR: 0.5, 95 per cent CI: 0.330.87). Psychiatric medication use increased after the earthquake.

von Schreeb, Johan, Louis Riddez, Hans Samnegard, and Hans Rosling. 2008. Foreign field hospitals in the recent sudden-onset disasters in Iran, Haiti, Indonesia, and Pakistan. ***Prehospital and Disaster Medicine*** **23(2): 144-151.**

Foreign field hospitals (FFHs) may provide care for the injured and substitute for destroyed hospitals in the aftermath of sudden-onset disasters. In the aftermath of sudden-onset disasters, FFHs have been focused on providing emergency trauma care for the initial 48 hours following the sudden-onset disasters, while they

tend to be operational much later. The aim of this study was to assess the timing, activities, and capacities of the FFHs deployed after four recent sudden-onset disasters, and also to assess their adherence to the essential criteria for FFH deployment of the World Health Organization (WHO). Secondary information on the sudden-onset disasters in Bam, Iran in 2003, Haiti in 2004, Aceh, Indonesia in 2004, and Kashmir, Pakistan in 2005, including the number of FFHs deployed, their date of arrival, country of origin, length of stay, activities, and costs was retrieved by searching the Internet. Additional information was collected on-site in Iran, Indonesia, and Pakistan through direct observation and key informant interviews. Basic information was found for 43 FFHs in the four disasters. None of the 43 FFHs met the first WHO/PanAmerican Health Organization (PAHO) essential requirement if the aim is to provide emergency trauma care, while 15 percent followed the essential requirement if follow-up trauma and medical care is the aim of deployment. A striking finding was the lack of detailed information on FFH activities. None of the 43 FFHs arrived early enough to provide emergency medical trauma care. The deployment of FFHs following sudden-onset disasters should be better adapted to the main needs and the context and more oriented toward substituting for pre-existing hospitals, rather than on providing immediate trauma care.

West, Christine, Bruce Bernard, Charles Mueller, Margaret Kitt, Richard Driscoll, and Sangwoo Tak. 2008. Mental health outcomes in police personnel after Hurricane Katrina. ***Journal of Occupational and Environmental Medicine*** **50(6): 689-695.**

The authors examined symptoms of depression and posttraumatic stress disorder (PTSD) among New Orleans Police Department (NOPD) personnel who provided law enforcement and relief services to affected communities following Hurricane Katrina. They conducted a cross-sectional survey of mental health outcomes related to personal and work-related exposures of police personnel eight weeks after the Hurricane. Of the 912 police personnel who completed the questionnaire, 227 (26 percent) reported symptoms consistent with depression and 170 (19 percent) reported symptoms consistent with PTSD. Risk factors associated with PTSD include recovery of bodies, crowd control, assault, and injury to a family member. Depressive symptoms were associated with rare family contact, uninhabitable home, isolation from the NOPD, assault, and injury to a family member. Police personnel reported symptoms of PTSD and depression associated with work-related and personal factors following Hurricane Katrina.

Williams, Geoff. 2008. Disaster medicine: A history. ***American Journal of Disaster Medicine*** **3(3): 125-130.**

Zane, Richard D., Paul Biddinger, Lynsley Ide, Sally Phillips, Donna Hurd, Louisa Buatti, Hilary Eustace, Matthew Amsden, Darcy Carr, and Andrea Hassol. 2008. Use of "shuttered" hospitals to expand surge capacity. ***Prehospital and Disaster Medicine*** **23(2): 121-127.**

With limited available hospital beds in most urban areas there are few options when trying to relocate patients already in the hospital to make room for incoming patients from a mass-casualty incident (MCI) or epidemic. This study investigates the possibility and process for utilizing shuttered hospitals to accept medically stable, ambulatory patients transferred from a territory medical facility. Two recently closed acute care hospitals were evaluated critically to determine if they could be made ready to accept patients within 3-7 days of a MCI. This surge facility would be able to support 200-300 patients/beds. Two generic scenarios were used for planning: 1) a patient surge requiring transfer of ambulatory, medically-stable inpatients to another facility in an effort to increase capacity at existing hospitals; and 2) a bio-event or epidemic where a shuttered hospital could be used as an isolation facility. Both recently closed hospitals had significant, but different challenges to reopening, although with careful planning and resource allocation it would be possible to reopen them within 3-7 days. Planning was the most conclusive recommendation. It does not appear possible to reopen shuttered hospitals with major structural deterioration or a complete lack of current mission. Staffing would represent the most challenging issue as a surge facility would represent an incremental additional need for existing and scare human resources.

Risk and Decision Making

Bana e Costa, Carlos, Carlos S. Oliveira, and Victor Vieira. 2008. Prioritization of bridges and tunnels in earthquake risk mitigation using multicriteria decision analysis: Application to Lisbon. ***Omega: The International Journal of Management Science*** **36(3): 442-450.**

This paper presents the development of a multicriteria value model enabling the prioritization of bridges and tunnels according to their structural vulnerability and strategic importance for the formulation and

implementation of civil protection policies, both for retrofitting and emergency management in the face of seismic events. An interactive structuring process was developed with a group of key players to define the evaluation criteria and the MACBETH approach was extensively used (i) to facilitate the assessment from the group of the judgmental information necessary to build value functions and (ii) to establish relative weights for the criteria. The model was subsequently explored to prioritize the bridges and tunnels of a zone in Lisbon with high seismic hazard.

Belluck, David A. 2008. Lost science: Effects on environmental risk policy, litigation and due diligence. ***International Journal of Risk Assessment & Management*** **8(3): 287-317.**

Credible environmental decisions can only emanate from reliable and complete information analyses within a rigorous analytical framework comprised of the scientific method, scientific evaluation process and scientific thinking. If this framework is abandoned, the result may be a situation termed as 'lost science'. Lost science occurs when relevant, published information is overlooked, omitted or not considered, or when an analysis fails to meet minimum scientific investigative standards as set forth in the scientific method, scientific evaluation process and scientific thinking. What are the scientific and policy implications of lost science? Findings based on flawed scientific methods are likely to be poor predictors of how the physical and natural environment will actually function. If such an error occurs within a rigorous scientific process, flawed findings are likely to be identified and rectified through peer review. Although the credibility of individuals involved may suffer, no real harm is done. If the scientific process is also deficient, however, flawed findings may not be corrected. Strict adherence to the scientific method, scientific evaluation process and scientific thinking when developing standards for pollution control or environmentally acceptable reclamation endpoints help to avoid problems of lost science and ensure against such failures.

Bergmans, Anne. 2008. Meaningful communication among experts and affected citizens on risk: Challenge or impossibility? ***Journal of Risk Research*** **11(1-2): 175-193.**

Experience to date demonstrates that it remains challenging to engage experts and concerned citizens in a meaningful and mutually comprehensive dialogue on complex and technical risk-bearing projects. In search of an explanation we found Niklas Luhmann's interpretation of modern society very useful. Luhmann describes modern society as the aggregate of more or less self-sufficient functional subsystems becoming more and more isolated from each other in a spiral of progressive specialization. With each system developing its own expectations, language, rationality and ways of observing and interpreting reality, communication between systems becomes progressively problematic; according to Luhmann, even impossible. Contrary to Luhmann, however, the authors consider communicating human beings (and not communication in itself) the constituting elements of society. From that perspective we see a connection with Ulrich Beck's thesis on modern society as an individualized risk society and his call for 'reflexive science and decision making'. The authors will use Beck's negotiation model to build communicative bridges between (Luhmann's) social (sub) systems, in particular, by engaging as many concerned parties as possible. Further, it is argued that the Belgian experience with the siting of a radioactive waste repository demonstrates that the creation of an environment in which experts and citizens can enter into dialogue as individuals, rather than as representatives of interests or (scientific) disciplines, can help bridge differences in the rationality and jargon of systems, and result in finding common ground.

Blennow, Kristina. 2008. Risk management in Swedish forestry: Policy formation and fulfillment of goals. ***Journal of Risk Research*** **11(1-2): 237-254.**

The formation of a risk management policy in Swedish forestry and its consequences for fulfillment of goals was analyzed. The risk of wind damage was used as a model where an apparent gap between stated accepted risk and extent of risk-reducing measures taken among south Swedish non-industrial private forest owners was used as a starting point. The results of an enquiry, and personal experiences from the debate after an extensive wind damage event in January 2005, were used and complemented study of literature. It was concluded that risks have not been particularly actively managed in the Swedish forestry culture. This was explained by notions of seeing (i) risks such as wind damage as a natural hazard rather than a technological risk that can be modulated, and (ii) forestry as an enterprise free of valuation in which value aspects of risk were neglected. A narrow agenda in Swedish forest research influenced the risk management policy, where forest consultants played an important role as a link between science and practice and between the public and the private. Neither the legislator nor the forestry consultants declared how they weighted risk which reduced

the fulfillment of goals. At the national level relaxation of regulations after 1993 has not yet resulted in markedly diversified privately owned forests and spreading of risk as intended, and the management of the risk of wind damage before January 2005 was in many cases not adapted to the risk the individual forest owner was prepared to take. The results were discussed with respect to possibilities for improved fulfillment of goals in Swedish forestry by facilitating more active risk management.

Boholm, Asa. 2008. The public meeting as a theatre of dissent: Risk and hazard in land use and environmental planning. ***Journal of Risk Research*** **11(1-2): 119-140.**
Land-use and environmental planning typically involves diverse actors such as representatives of government authorities and administrations, special interest organizations, scientific experts, lawyers, stakeholders and concerned citizens. During the course of the planning process, communication is not limited to written documents. The Swedish Environmental Code also calls for public meetings and consultation efforts with stakeholders. Considering that public meetings have a prominent role in environmental planning, there is surprisingly little research on the form, content and development over time of face-to-face communication and social interaction taking place. This article addresses communication and interaction at public meetings concerning a facility siting project of considerable longevity--the building of a railway tunnel through the Hallandss in southern Sweden. Using data from participant observation of local public consultation meetings regarding the Hallandss railway tunnel through a period of several years, this paper analyses and discusses communication about environmental risk. The theoretical foundation derives from pragmatic communication theory, Niklas Luhmann's distinction between risk and hazard, and social anthropological theory on agency and conflict generation in communication.

Bostrom, Ann. 2008. Lead is like mercury: Risk comparisons, analogies and mental models. ***Journal of Risk Research*** **11(1-2): 99-117.**
This paper reviews evidence for the use of analogies and comparisons to understand risks and conflation of different risks, from mental model studies of lead paint hazard, global climate change and smallpox disease and vaccine. For each study participants use analogies with other risks explicitly, and often draw inferences based on their experiences or knowledge of those other risks. In the case of lead paint, study participants judged options for testing and mitigating lead paint by analogy with risks as diverse as radon and mercury, with corresponding differences in their assessments of proposed strategies. Mental models of smallpox disease and vaccine are often explicitly based on analogies with chickenpox, which is much more familiar to study participants. Many studies of climate change have demonstrated conflation of stratospheric ozone depletion with global warming from the greenhouse effect. Some study participants adopt other frames, such as weather, which affects their inferences in predictable ways. These findings are discussed in light of theories on the role of analogy and metaphor in thinking and inference. Taking into account the prevalence, structure and pitfalls of comparisons and analogies should help risk communication designers better realize their potential.

Bostrom, Ann, Luc Anselin, and Jeremy Farris. 2008. Visualizing seismic risk and uncertainty: A review of related research. ***Annals of the New York Academy of Sciences*** **1128(1): 29-40.**
Government agencies and other authorities often communicate earthquake risks using maps derived from geographic information systems. Yet, little is known about the effects of these maps on risk perceptions. While mental models research and other approaches are available to inform risk communication text design, similar empirically derived guidance is lacking for visual risk communications, such as maps, which are likely to trump text in their impact and appeal. This paper reviews the empirical research that might inform such guidance. Research on graphs, spatial and visual perception, and map design suggests that graphics increase risk avoidance over numerical risk representations, and countable visuals, like dots, can increase the accuracy of perceived risks, but not always. Cartographic design features, such as color, animation, interactivity, and depth cues, are all candidates to represent risk and uncertainty and to influence risk perception. While there are robust known effects of color (e.g., red=danger), with some cultural variability, animation can increase the salience of otherwise obscure features but is not uniformly effective. Depth cues, dimensionality, and the extent to which a representation depicts versus symbolizes a scene will influence the viewer's perspective and perception, depending on the viewer's familiarity with the scene; their effects on risk perception remain unclear. The translation and representation of technical information about risk and uncertainty is critical to risk communication effectiveness. The review suggests a handful of candidate criteria for evaluating the effects of risk visualizations,

short of changes in behavior: accuracy, accessibility, retention, and perceived risk and usefulness.

Burningham, Kate, Jane Fielding, and Diana Thrush. 2008. "It'll never happen to me:" Understanding public awareness of local flood risk. *Disasters* 32(2): 216-238.

Following the severe flood events of 1998 and 2000, the United Kingdom's Environment Agency prioritized the need to increase public flood risk awareness. Drawing on data collected during research undertaken for the Environment Agency, this paper contributes to understanding of one aspect of flood awareness: people's recognition that their property is in an area that is potentially at risk of flooding. Quantitative analyses indicate that class is the most influential factor in predicting flood risk awareness, followed by flood experience and length of time in residence. There are also significant area differences. The authors' qualitative work explores how those defined as 'at risk' account for their lack of awareness or concern about their risk status. The authors conclude that the problem is often not simply a lack of awareness, but rather, assessments of local risk based on experience that underestimate the impact of rare or extreme events. The authors underline the importance of engaging with local perspectives on risk and making local people part of 'awareness-raising' processes.

Carey, Janet M., and Mark A. Burgman. 2008. Linguistic uncertainty in qualitative risk analysis and how to minimize it. *Annals of the New York Academy of Sciences* 1128(1): 13-17.

Most risk assessments assume uncertainty may be decomposed into variability and incertitude. Language is often overlooked as a source of uncertainty, but linguistic uncertainty may be pervasive in workshops, committees, and other face-to-face language-based settings where it can result in misunderstanding and arbitrary disagreement. This article presents examples of linguistic uncertainty drawn from qualitative risk analysis undertaken in stakeholder workshops and describes how the uncertainties were treated. The authors used a process of iterative reassessment of likelihoods and consequences, interspersed with facilitated discussion, to assist in the reduction of language-based uncertainty. The effects of this process were evident as changes in the level of agreement among groups of assessors in the ranking of hazards.

Cretikos, Michelle A., Keith Eastwood, Craig Dalton, Tony Merritt, Frank Tuyl, Linda Winn, and David N. Durrheim. 2008. Household disaster preparedness and information sources: Rapid cluster survey after a storm in New South Wales, Australia. *BMC Public Health* 8(195): 1-22.

It is well understood that the effectiveness of public information strategies can determine the success of a disaster response. The level of community preparedness is also known to be important in determining the impact of a disaster. However, very little is known about levels of household disaster preparedness or about information sources used by households before and during disasters. The authors investigated these issues immediately after a storm-related natural disaster in New South Wales, Australia, in order to better understand the most effective methods of communicating public health messages during a disaster, and to improve preparedness for future disasters. Rapid cluster survey of 320 randomly selected households in Newcastle and Lake Macquarie, New South Wales, Australia. 227 households (71 percent) responded to the survey. By the day before the storm, 48 percent (95 percentCI 40-57 percent) of households were aware of a storm warning, principally through television (67 percent; 58-75 percent) and radio (57 percent; 49-66 percent) announcements. Storm preparations were made by 42 percent (28-56 percent) of these households. Storm information sources included: radio (78 percent; 68-88 percent); family, friends, colleagues and neighbors (50 percent; 40-60 percent); and television (41 percent; 30-52 percent). Radio was considered more useful than television (62 percent; 51-73 percent vs. 29 percent; 18-40 percent), even in households where electricity supply was uninterrupted (52 percent; 31-73 percent vs. 41 percent; 20-63 percent). Only 23 percent (16-30 percent) of households were aware that the local government-operated radio network has a designated communication role during disasters. A battery-operated household radio and appropriate batteries were available in 42 percent (34-50 percent) of households, while only 23 percent (16-29 percent) had all of: a torch, battery-operated radio, appropriate batteries, mobile phone, emergency contact list and first aid equipment. Local broadcast media networks, particularly radio networks, are important and useful sources of information for communities affected by disasters. Radio proved particularly valuable in providing information to communities affected by electricity interruptions. However, most surveyed households were not adequately prepared for a disaster. To ensure effective communication of health advice during disasters, health services should promote the role of radio networks during a disaster, together with household disaster prepared-

ness in general. Formal arrangements between media networks and emergency service organizations are needed to facilitate communication during a disaster.

Dayton, Christopher, Jamil Ibrahim, Michael Augenbraun, Steven Brooks, Kiaran Mody, Donald Holford, Patricia Roblin, and Bonnie Arquilla. 2008. Integrated plan to augment surge capacity. ***Prehospital and Disaster Medicine*** **23(2): 113-119.**
Surge capacity is defined as a healthcare system's ability to rapidly expand beyond normal services to meet the increased demand for appropriate space, qualified personnel, medical care, and public health in the event of bioterrorism, disaster, or other large-scale public health emergencies. There are many individuals and agencies, including policy makers, planners, administrators, and staff at the federal, state, and local level, involved in the process of planning for and executing policy in respect to a surge in the medical requirements of a population. They are responsible to ensure there is sufficient surge capacity within their own jurisdiction. The federal government has required New York State to create a system of hospital bed surge capacity that provides for 500 adult and pediatric patients per one million population, which has been estimated to be an increase of 15-20 percent in bed availability. In response, the New York City Department of Health and Mental Hygiene (NYC DOH) has requested that area hospitals take an inventory of available beds and set a goal to provide for a 20 percent surge capacity to be available during a mass-casualty event of other conditions calling for increased inpatient bed availability. In 2003, under the auspices of the NYC DOH, the New York Institute of all Hazard Preparedness (NYIHP) was formed from four unaffiliated, healthcare facilities in Central Brooklyn to address this and other goals. The NYIHP hospitals have developed a surge capacity plan to provide necessary space and utilities. As these plans have been applied, a bed surge capacity of approximately 25 percent was identified and created for Central Brooklyn to provide for the increased demand on the medical care system that may accompany a disaster. Though the process of developing an integrated plan that would engage a public health incident, the facilities of NYIHP demonstrate that a model of cooperation may be applied to an inherently fractioned medical system.

Dove, Michael R. 2008. Perception of volcanic eruption as agent of change on Merapi volcano, Central Java. ***Journal of Volcanology and Geothermal Research*** **172(3-4): 329-337.**
Events like volcanic eruptions challenge equilibrium models of nature. This is a study of the perceptions of eruptions as agents of change, taking Mt. Merapi in Central Java as a case study. Villagers living on Merapi have developed a system of religious belief, and a system of agro-ecological practices, that 'domesticates' the volcanic hazard. The villagers view eruptions as agents of change, often change for the good. The Indonesian government, on the other hand, technologizes and exoticizes the volcanic hazard, and conceptually and materially separates it from the realm of civil society. The state focuses its attention exclusively on intermittent moments of heightened volcanic activity, whereas the villagers focus their attention on the much longer interim periods when there is little or no such activity. This case study shows that not just the perception of risk, but the very concept of risk itself can vary. The cultural production of such concepts co-evolves with natural patterns of perturbation.

Driedger, S. Michelle. 2008. Creating shared realities through communication: Exploring the agenda-building role of the media and its sources in the E. coli contamination of a Canadian public drinking water supply. ***Journal of Risk Research*** **11(1-2): 23-40.**
The media's role as an agenda-setter has been documented in the literature. Less attention has been given to the role of the media as an agenda-builder. The role of news agencies in constructing and shaping news stories serve to mediate risk messages to the public by virtue of what elements of a story they report, the types of sources they use in reporting the different 'sides', and how they package a story. The media are not the only ones who seek to set and build agendas. The sources, upon which the news media rely, can and do similarly engage in agenda-building activities. They do so by appropriating the very 'media-ted' process to use the mass media as a delivery vehicle for their own communication claims through their own packaged 'take' on the story. Drawing on a national print and televised media analysis of the Walkerton, Ontario, Canada drinking water contamination event, this study explores the agenda-building role of the media and of Walkerton residents and citizen group members (Concerned Walkerton Citizens) quoted in media stories. The implications of this for risk communication will be discussed.

Finkel, Adam M. 2008. Perceiving others' perceptions of risk: Still a task for Sisyphus. ***Annals of the New York Academy of Sciences*** **1128(1): 121-137.**

The recent literature providing insights from neuroscience and evolutionary biology into how individuals perceive risky choice situations represents a "second wave" of findings that recapitulates as well as challenges the risk perception research begun in the 1980s, which relied on psychometric survey research. Gleaning insights from the first wave of research that could improve the communication and control of environmental risks has yielded disappointing results. This is a result, in part, of the eagerness of scholars and pundits to posit a chasm between the "rational" and "objective" perceptions of experts, on the one hand, and a lay public that is seen as lurching between "paranoia and neglect" and as insensitive to the magnitude of risks. Interpretations of the psychometric research have suffered from inattention to uncertainty and inter-individual variability in risk, to expert biases, and to important aspects of risky choice that were not explored in the first wave of research. Initial signs indicate that neuroscience and evolutionary biology research may fall prey to similar misinterpretations. This article summarizes some of the most intriguing findings of the "second wave" of risk perception research and advances four themes that may help make the new findings less divisive and more useful for improving risk communication and risk management. Continued research into risk perception should perhaps be embedded in a more general theory of public choice in the face of uncertain and variable costs and benefits and with a respect for distributive justice as an important goal in risk management.

Gaillard, Jean-Christophe, and Christopher J. L. Dibben. 2008. Volcanic risk perception and beyond. ***Journal of Volcanology and Geothermal Research*** **172(3-4): 163-169.**

Gstraunthaler, Thomas. 2008. Planning for judgement day: Restrictions of government planning for avian influenza. ***Disaster Prevention and Management*** **17(2): 199-211.**

The purpose of this paper is to examine the organization and execution of the planning process of the Department for Environment, Food and Rural Affairs (DEFRA). The focus is placed on the different stakeholders involved and their role in the decision-making process. The research involves content analysis of the available paperwork and interviews with leading personnel of DEFRA. The organization of the planning process ensures strong involvement of the industry. As the financial resources of DEFRA are limited, parts of the costs of the process are passed on to the industry, which allow it to play a stronger role. By delegating major tasks to other organizations DEFRA lacks control of the execution of its decisions. The research is limited by the view of the interviewed persons. As it is a pre-impact study, people could act in a different manner than originally stated if an outbreak should occur. Through identifying the motivations of participating actors, it was demonstrated that this system is prone to the same failures as already shown in the bovine spongiform encephalopathy (BSE) crisis. It is discussed if the role of government planning is really necessary or if the whole task could be done by the industry. The paper is a pre-impact study and will contribute to the debate about the system in general.

Ho, Ming-Chou, Daigee Shaw, Shuyeu Lin, and Yao-Chu Chiu. 2008. How do disaster characteristics influence risk perception? ***Risk Analysis*** **28(3): 635-643.**

The main purpose of this study is to examine how risk perception is influenced by the type of disaster (flood or landslide) and victim characteristics. The data reported here are based on the National Risk Perception Survey (NRPS) that was administered for the victims and the general public in Taiwan in 2004. In that year, many towns in Taiwan were seriously affected by floods and landslides, resulting in huge economic losses and fatalities. The primary findings are: (1) the victims and the general public are concerned about the different potential hazards that might affect their residential area; (2) the negative associations between the sense of controllability and the perceived impact is high for landslide victims, but not for flood victims; and (3) disaster type, gender, and previously experienced disasters are good predictors of victims' attitudes toward natural disasters.

Jiqing, Li, Ji Changming, Zhang Yushan, and Wang Liping. 2008. Matter-element model of integrated risk assessment for flood control systems. ***International Journal of Risk Assessment and Management*** **8(4): 342-352.**

The matter-element model of integrated risk assessment for flood control systems is established with matter-element analysis theory and correlative function of extension set, on the basis of classification of flood situations and risk indexes of typical flood control works. By this model, quantitative indexes of integrated risk assessment can be derived for flood control systems on a basin or regional scale. A case study proves its practicality, rationality and effectiveness.

Kellenberg, Derek K., and Ahmed Mushfiq Mobarak. 2008. Does rising income increase or decrease damage risk from natural disasters? *Journal of Urban Economics* 63(3): 788-802.

Recent empirical literature has found a negative relationship between income per capita and measures of risk from natural disaster, supportive of logic that higher incomes allow countries to mitigate disaster risk. The article argues that behavioral changes at the micro level in response to increasing income (such as location choice and extent of costly abatement activity) may lead to a non-linear relationship between aggregate incomes and disaster damages, where the risks increase with income before they decrease. In a country-year panel data set, the authors show that disaster risk associated with flooding, landslides and windstorms increases with income up to GDP per capita levels of $5,044, $3,360, and $4,688 per year respectively and decrease thereafter. Such non-linear impacts are absent for other disaster types such as extreme temperature events and earthquakes where the links between human behavioral choices and exposure to risk are not as strong. From a policy perspective, this suggests that for the least developed countries, the dual goals of disaster risk prevention and economic development cannot be assumed to be complementary for all forms of natural disaster. In addition to allocating resources to manage disaster risk, the poorest nations may have to be more proactive in enacting policies that alter the behavioral choices of citizens that impact a country's exposure to natural disaster risk.

Kurz-Milcke, Elke, Gerd Gigerenzer, and Laura Martingnon. 2008. Transparency in risk communication: Graphical and analog tools. *Annals of the New York Academy of Sciences* 1128(1): 18-28.

Why is it that the public can read and write but only a few understand statistical information? Why are elementary distinctions, such as that between absolute and relative risks, not better known? In the absence of statistical literacy, key democratic ideals, such as informed consent and shared decision making in health care, will remain science fiction. In this chapter, the authors deal with tools for transparency in risk communication. The focus is on graphical and analog representations of risk. Analog representations use a separate icon or sign for each individual in a population. Like numerical representations, some graphical forms are transparent, whereas others indiscernibly mislead the reader. They review cases of (1) tree diagrams for representing natural versus relative frequency, (2) decision trees for the representation of fast and frugal decision-making, (3) bar graphs for representing absolute versus relative risk, (4) population diagrams for the analog representation of risk, and (5) a format of representation that employs colored tinker cubes for the encoding of information about individuals in a population. Graphs have long enjoyed the status of being "worth a thousand words" and hence of being more readily accessible to human understanding than longwinded symbolic representations. This is both true and false. Graphical tools can be just as well employed for transparent and nontransparent risk communications.

Laidlaw, Prue, Dirk H. R. Spennemann, and Catherine Allan. 2008. Protecting cultural assets from bushfires: A question of comprehensive planning. *Disasters* 32(1): 66-81.

Cultural heritage sites form an nonrenewable asset that is threatened by natural disasters. Given the high bushfire risk, mandatory Bush Fire Risk Management Plans have been drawn up throughout New South Wales, Australia. The authors compared their mandatory provisions for the protection of heritage assets with an 'Ideal Heritage Disaster Plan', containing a series of nonnegotiable elements. The examined plans fell well short of the ideal. Preparedness plans generally lacked a discussion of suppression techniques (for historic heritage), prevention, prescribed drills, and communication procedures. None of the response plans or recovery plans contained any of the required core elements, such as rapid suppression techniques and stabilization procedures. Where aspects were covered, they were addressed in an inadequate level of detail. The overall quality of the cultural heritage components of the plans is judged to be poor. Suggestions are made on how to improve the situation if heritage assets are to have future following bushfire events.

Lavigne, Franck, Benjamon De Coster, Nancy Juvin, Francois Flohic, Jean-Christophe Gaillard, Pauline Texier, Julie Morin, and Junun Sartohadi. 2008. People's behavior in the face of volcanic hazards: Perspectives from Japanese communities, Indonesia. *Journal of Volcanology and Geothermal Research* 172(3-4): 273-287.

This paper is concerned with the way in which the Indonesian people living on the slopes or near active volcanoes behave in the face of volcanic threats. It explores the role of three factors in the shaping of this behavior, e.g. risk perception, cultural beliefs and socio-economic constraints. The paper is mainly based on field data collected during the last 5 years on four volcanoes in Central Java, namely Sumbing, Sindoro, Dieng, and Merapi. The common assumption that hazard knowledge, risk perception and people's behavior

are closely related and conditional on volcanic activity is debatable in the Indonesian context. Factors that play a role in hazard knowledge -- e.g. basic knowledge of volcanic processes, personal experience of volcanic crisis, time lapsed since the last volcanic eruption, etc. -- differ from those that influence risk perception. Indeed, local people often underestimate the scientifically or statistically estimated risk. This poor risk perception is characterized by an approximate personal representation of the volcanic processes, an excess of trust in concrete countermeasures, the presence of a physical-visual obstructions, or cultural beliefs related to former eruptions. In addition, the commonly acknowledged factors that influence hazard knowledge and/or risk perception may be at odds with the nonhazard-related factors that prompt or force people to live in or to exploit areas at risk. These factors may be either socio-cultural e.g., attachment to place, cultural beliefs, etc. or social and socio-economical e.g., standard of living, strength of people's livelihoods, or well-being. These factors are fundamental in explaining the short-term behavior in the face of a developing threat during a volcanic crisis.

Li, Jing-Yi, Jian-Ming Zhang, Ji-Jun Li, Qi Zhou, and Xi-Bao Xu. 2008. Assessment of public risk perception in Northwestern China. ***International Journal of Risk Assessment and Management*** **8(4): 353-361.**
Based on analyzing the public risk perception in Northwestern China, following conclusions are obtained: there is strong correlation between individual characteristic and risk perception; female risk perception is stronger than male; from strong to weak, the order of age characteristics is 20–30, 0–20, 40–50, 30–40, 50–60 and over 60; the order of educational characteristics is senior high school, college, illiterate, junior high school, primary school; the order of occupation characteristics is student, farmer, teacher, worker and functionary; the order of habitation characteristics is city, countryside, towns, and metropolis.

Lofstedt, Ragnar E. 2008. What environmental and technological risk communication research and health risk research can learn from each other. ***Journal of Risk Research*** **11(1-2): 141-167.**
The study of risk perception and communication has emerged in several disciplines and fields, and there has not been strong convergence between them, especially in Europe and specifically in Britain. The lack of connection between, for example, the fields of health risk and environmental and technological risk, and still more with respect to fears of crime or old age or poverty or privacy violation, has meant that theories have not been shown to be adequate, and practical prescriptions for conflict containment and communication have not been made robust. This article examines the roots of the fragmentation, examining the particular case of the relationship between health and environmental/technological risk studies, considering why the flow of ideas and methods has been so limited, and much of it in a rather surprising direction. The paper concludes by offering some principles that could inform a strategy for more integrated research on risk perception and communication.

Mairal, Gaspar. 2008. Narratives of risk. ***Journal of Risk Research*** **11(1-2): 41-54.**
Risk is a probabilistic notion which has been used by scientists since the sixteenth century. It is not a perception but a calculation or a narration. This paper proposes an historical perspective to show how risk jumped from mathematical calculation to the narrative. A book by Daniel Defoe, A Journal of the Plague Year, which was published in 1720, is the best example of an early narrative of risk. Together with the example of Defoe's book, some ethnographic episodes from Spain are described and analyzed: the protest against the Almaraz nuclear power station, the sinking of the Prestige and the subsequent oil slick, the flooding of a campsite in Biescas where 86 people died. This paper suggests an exploration into the narratives of evil, harm and suffering to classify them in terms of uncertainty, risk, fear, panic and terror. The Diaries of Viktor Klemperer (1996) are used as the narrative material to be interpreted in order to identify different kinds of narrative. Also the literature written by some of the Holocaust survivors, Primo Levi for example, becomes a very relevant source to understand how the identity of victims comes from a narrative challenge: to tell the truth.

Menoni, Scira, and Giulia Pesaro. 2008. Is relocation a good answer to prevent risk? Criteria to help decision makers choose candidates for relocation in areas exposed to high hydrogeological hazards. ***Disaster Prevention and Management*** **17(1): 33-53.**
The purpose of this paper is to illustrate the results of a research mandated by the regional government of Lombardia, Italy. The results identify the criteria used to decide in what situations the relocation from areas subject to high levels of hydrogeological hazards is a viable preventive strategy. In the first part, the state-of-the-art regarding voluntary relocation from hazardous areas supported by governmental funding and incentives is described, showing that very few examples are

available for reference. Therefore, lessons learned from involuntary relocation have been considered regarding specific strategies that must be designed to address societal needs. In the second part of the article, the criteria developed to help decision makers decide when and if relocation may be considered a preventive option are described in detail. Finally, it shows what results have been obtained by applying the criteria to the case of the Lombardia region. Four sets of criteria were proposed, shaped according to different geographical scales and to different demands, recognizing that relocation is a rather extreme solution that must be carefully evaluated and proposed to interested parties and citizens. Those criteria have been applied to assess some specific cases in the Lombardia region, and to identify potential candidates for relocation in the whole region, by querying a complex database that was prepared integrating layers representing hydrogeological hazards on one side, and exposed settlements on the other. Until now, most of the laws to prevent risks have imposed limitations to building and development in hazardous areas, while rarely focusing on existing settlements. The experience described in this article concerns a region that has decided to design a specific law to promote preventive relocation in the most critical situations, where structural measures have failed a number of times, and losses are frequent and large. The criteria proposed in this paper provide a method and a tool for deciding in what cases and circumstances relocation can be considered a viable preventive option to lessen the risk in particularly critical zones, exposed to high hydrogeological hazards. In doing so, it shows that relocation can be considered not as an "emergency" and episodic measure, but rather as a part of a more comprehensive policy, in which candidates for relocation can be determined on a regional scale respecting basic social, political and economic conditions.

Mercer, Jessica, Ilan Kelman, Kate Lloyd, and Sandie Suchet-Pearson. 2008. Reflections on use of participatory research for disaster risk reduction. ***Area*** **40(2): 172-183.**

Participatory research approaches are increasingly popular with academic researchers and development organizations working to facilitate change in collaboration with local communities. This paper contributes to recent debates over the use of participatory approaches by examining the use of participatory research within disaster risk reduction. Drawing on research in Papua New Guinea in which participatory techniques were used with indigenous communities to determine strategies for dealing with environmental hazards, the value of such techniques is critiqued. Finally the significance of participatory research methodology is discussed as is its possible contribution to disaster risk reduction policy.

Morin, Julie, Benjamin De Coster, Raphael Paris, Franck Lavigne, Francois Flohic, and Damien Le Floch. 2008. Tsunami-resilient communities' development in Indonesia through educative actions: Lessons from the 26 December 2004 tsunami. ***Disaster Prevention and Management*** **17(3): 430-446.**

Following the December 26, 2004 tsunami, Planet Risk NGO took part in the international research program TSUNARISK and ATIP-CNRS Jeune Chercheur. The aim of this paper is to encourage the development of tsunami-resilient communities essentially through educative actions. The tsunami risk in Indonesia was assessed by researchers. Planet Risk then used scientific findings and advice for building adapted prevention actions among Javanese populations. Many people could have survived if they had received a basic knowledge of tsunamis. The Indonesian public as well as local authorities must be educated to face tsunami risk. To be efficient, this education must be adapted to local cultural and geographical characteristics. Collaboration between researchers and practitioners is a good means of reaching such an objective. The paper is the result of a two-year successful collaboration between interdisciplinary scientific teams and an NGO team. It demonstrates that an efficient prevention scheme can be implemented through this kind of collaboration. To the authors' knowledge it is the first time that such tsunami education programs have been led in Indonesia.

Nel, Philip, and Marjolein Righarts. 2008. Natural disasters and the risk of violent civil conflict. ***International Studies Quarterly*** **52(1): 159-185.**

Does the occurrence of a natural disaster such as an earthquake, volcanic eruption, tsunami, flood, hurricane, epidemic, heat wave, and/or plague increase the risk of violent civil conflict in a society? This study uses available data for 187 political units for the period 1950-2000 to systematically explore this question, which has received remarkably little attention in the voluminous literature on civil war. The authors find that natural disasters significantly increase the risk of violent civil conflict both in the short and medium term, specifically in low- and middle-income countries that have intermediate to high levels of inequality, mixed political regimes, and sluggish economic growth. Rapid-onset disasters related to geology and climate pose the highest overall risk, but different dynamics apply to minor as compared to major conflicts. The findings are robust in terms of the use of different dependent and indepen-

dent variables, and a variety of model specifications. Given the likelihood that rapid climate change will increase the incidence of some types of natural disasters, more attention should be given to mitigating the social and political risks posed by these cataclysmic events.

Nja, Ove, and Eivind L. Rake. 2008. An essay on research methodology: An alternative approach to incident command research through participatory action research. ***Journal of Contingencies and Crisis Management*** **16(2): 91-100.**

Current incident command research faces several challenges. The incident commander's behavior and related assessments in the crisis response are context bound, and our understanding of these factors requires close awareness of the context. Reconstruction of the on-scene behavior encompassing situation awareness and cognitive reasoning is difficult. There is a need to develop better understanding of decision-making in crisis settings and methods for rigorous observation and knowledge elicitation. In order to understand the importance and actual influence of incident commanding, the researchers need to assess the response in real time, not only based on studying logs etc. afterwards. Participatory action research provides ideas in which the researcher, besides being an observer, would be involved in the rescue work. This raises ethical questions, but there is a need for naturalistic decision-making research to evolve beyond descriptive models.

Paton, Douglas, Bruce E. Houghton, Chris E. Gregg, Duane A. Gill, Liesel A. Ritchie, David McIvor, Penny Larin, Steven Meinhold, J. Horan, and David M. Johnston. 2008. Managing tsunami risk in coastal communties: Identifying predictors of preparedness. ***The Australian Journal of Emergency Management*** **23(1): 4-9.**

This paper discusses the testing of a model predicting tsunami preparedness. Using data collected from a community identified as facing a high risk from locally-generated tsunami, the model illustrates how people's beliefs about the efficacy of mitigation interact with social context factors (community participation, collective efficacy, empowerment, trust) to influence levels of tsunami preparedness. The implications of the findings for tsunami hazard education programs are discussed.

Paton, Douglas, Chris E. Gregg, Bruce F. Houghton, Roy Lachman, Janet Lachman, David M. Johnston, and Supin Wongbusarakum. 2008. The impact of the 2004 tsunami on coastal Thai communities: Assessing adaptive capacity. ***Disasters*** **32(1): 106-119.**

The suddenness and scale of the December 26, 2004 tsunami and the challenges posed to affected communities highlighted the benefits of their members having a capacity to confront and adapt to the consequences of such a disaster. Research into adaptive capacity or resilience has been conducted almost exclusively with Western populations. This paper describes an exploratory study of the potential of a measure of collective efficacy developed for Western populations to predict the capacity of members of a collective society, Thai citizens affected by the 2004 tsunami, to confront effectively the recovery demands associated with this disaster. Following a demonstration that this measure could predict adaptive capacity, the role of religious affiliation, ethnicity and place of residence in sustaining collective efficacy is discussed. The implications of the findings for future research on, and intervention to develop, adaptive capacity among Thai citizens in particular and collectivist societies in general are discussed.

Paton, Douglas, Leigh Smith, Michele Daly, and David Johnston. 2008. Risk perception and volcanic hazard mitigation: Individual and social perspectives. ***Journal of Volcanology and Geothermal Research*** **172(3-4): 179-188.**

This paper discusses how people's interpretation of their experience of volcanic hazards and public volcanic hazard education programs influences their risk perception and whether or not they adopt measures that can mitigate their risk. Drawing on four studies of volcanic risk perception and preparedness, the paper first examines why experiencing volcanic hazards need not necessarily motivate people to prepare for future volcanic crises. This work introduces how effective risk communication requires communities and civic agencies to play complementary roles in the risk management process. Next, the findings of a study evaluating the effectiveness of a public volcanic hazard education program introduce the important role that social interaction amongst community members plays in risk management. Building on the conclusions of these studies, a model that depicts preparing as a social process is developed and tested. The model predicts that it is the quality of the relationships between people, communities and civic agencies that determines whether people adopt measures that can reduce their risk from volcanic hazard consequences. The implications of the model for conceptualizing and delivering volcanic hazard public education programs in ways that accommodate these relationships are discussed.

Perry, Ronald W., and Michael K. Lindell. 2008. Volcanic risk perception and adjustment in a multi-hazard

environment. ***Journal of Volcanology and Geothermal Research*** **172(3-4): 170-178.**

Hazard risk perceptions and protective behaviors are examined for wildfires, earthquakes and volcanic activity. Data were gathered in two northern California (USA) communities that are exposed to all three hazard types. It was found that resident risk perceptions approximated the risks calculated by experts. Personal risks associated with fires were significantly lower than property risks associated with the same threat. The discrepancy between person and property risks for earthquakes and volcanic activity was much smaller. In general, it was found that the number of protective adjustments undertaken for each hazard was small (averaging about half of the possible number measured). When combined in a regression analysis, risk perception was not a statistically significant predictor of number of adjustments for any of the three hazards. Resident's sense of responsibility for self-protection and experience with property damage were significant predictors of adjustment for all three hazards. Information seeking behavior was significantly related to protective actions for earthquakes and volcanic activity, but not for fire hazards. In general, an insufficient number of residents reported experience with personal injury or harm to make meaningful assessments of the effect of this variable on adjustments.

Peters, Ellen. 2008. Numeracy and the perception and communication of risk. ***Annals of the New York Academy of Sciences*** **1128(1): 1-7.**

This paper presents a small but important piece of the risk communication/perception puzzle, namely how individuals who differ in number ability comprehend and use numeric information about risks differently. Highly numerate individuals appear to pay more attention to numbers, better comprehend them, translate them into meaningful information, and ultimately use them in decisions. Decisions of the less numerate are informed less by numbers and more by other non-numeric sources of information, such as their emotions, mood states, and trust or distrust in science, the government, and experts. Careful attention to information presentation, however, allows the less numerate to understand and use numbers more effectively in decisions. As a result, the challenge is not merely to communicate accurate information to the public but to understand how to present that information so that it is used in risky decisions.

Proudly, Mae. 2008. Fire, families and decisions. ***The Australian Journal of Emergency Management*** **23(1): 37-43.**

Scant attention is paid to women and their roles in the emergency management landscape. This is particularly relevant in the field of community bushfire preparedness and mitigation. The culture of emergency management remains a very masculine field with the command and control system continuing to dominate and influence the roles and processes of emergency events. Within this context, research into gaining a deeper understanding of families and the role of women in bushfire has been neglected. Acknowledging and understanding how families and women make decisions in critical times must help shape future bushfire education programs. This includes the modification, application and implementation of the 'prepare, stay and defend, or leave early' policy. The family and a woman's role within the family are where crucial decisions are made in advance of and during a bushfire. The family unit, in its various forms, is an important and frequently overlooked field of bushfire research. This paper explores how family dynamics inform critical decisions and suggests that there is significant value in listening to the narratives of families and couples who have experienced a major bushfire. A people-centered focus, not a predetermined system or a theory, is needed. In order to reduce or eliminate last minute decisions to evacuate at the height of a bushfire, there must be recognition and understanding of how family dynamics and women's role within the family influence behavior during a crisis.

Roca, Elisabet, Gonzalo Gamboa, and J. David Tabara. 2008. Assessing the multidimensionality of coastal erosion risks: Public participation and multicriteria analysis in a Mediterranean coastal system. ***Risk Analysis*** **28(2): 399-412.**

The complex and multidimensional nature of coastal erosion risks makes it necessary to move away from single-perspective assessment and management methods that have conventionally predominated in coastal management. This article explores the suitability of participatory multicriteria analysis (MCA) for improving the integration of diverse expertise and values and enhancing the social-ecological robustness of the processes that lead to the definition of relevant policy options to deal with those risks. We test this approach in the Mediterranean coastal locality of Lido de Sète in France. Results show that the more adaptive alternatives such as "retreating the shoreline" were preferred by our selected stakeholders to those corresponding to "protecting the shoreline" and the business as usual proposals traditionally put forward by experts and policymakers on these matters. Participative MCA contributed to represent coastal multidimensionality,

elicit and integrate different views and preferences, facilitated knowledge exchange, and allowed highlighting existing uncertainties.

Sanfey, Alan G., and Luke J. Chang. 2008. Multiple systems in decision making. ***Annals of the New York Academy of Sciences*** **1128(1): 53-62.**
Neuroeconomics seeks to gain a greater understanding of decision making by combining theoretical and methodological principles from the fields of psychology, economics, and neuroscience. Initial studies using this multidisciplinary approach have found evidence suggesting that the brain may be employing multiple levels of processing when making decisions and this notion is consistent with dual-processing theories that have received extensive theoretical consideration in the field of cognitive psychology, with these theories arguing for the dissociation between automatic and controlled components of processing. While behavioral studies provide compelling support for the distinction between automatic and controlled processing in judgment and decisionmaking, less is known if these components have a corresponding neural substrate, with some researchers arguing that there is no evidence suggesting a distinct neural basis. This chapter will discuss the behavioral evidence supporting the dissociation between automatic and controlled processing in decision making and review recent literature suggesting potential neural systems that may underlie these processes.

Shiwaku, Koichi, and Rajib Shaw. 2008. Proactive co-learning: A new paradigm in disaster education. ***Disaster Prevention and Management*** **17(2): 183-198.**
The aims of this paper are to point out the effectiveness of the education at Maiko, Japan and show the direction of effective school disaster education. A survey questionnaire was distributed in 12 schools (1,065 students) from different parts of Japan, including that of Maiko, to try to understand the linkage between disaster education and students' awareness. The results showed higher risk perception and risk reduction actions by the students in Maiko, as compared to other schools. Maiko focuses on mitigation and preparedness, teaches about the social environment, and makes students think of the importance of implementation. This learning process is found to be effective in reducing the gap between intention and action. The study points out the crucial points of disaster education based on the teachings at Maiko and shows that the disaster education should be adapted to the local situation. The study findings are of importance for teachers or education departments designing curriculum for disaster education.

Siegrist, Michael, and Heinz Gutscher. 2008. Natural hazards and motivation for mitigation behavior: People cannot predict the affect evoked by a severe flood. ***Risk Analysis*** **28(3): 771-778.**
Past research indicates that personal flood experience is an important factor in motivating mitigation behavior. It is not fully clear, however, why such experience is so important. This study tested the hypothesis that people without flooding experience underestimate the negative affect evoked by such an event. People who were affected by a severe recent flood disaster were compared with people who were not affected, but who also lived in flood-prone areas. Face-to-face interviews with open and closed questions were conducted (n = 201). Results suggest that people without flood experience envisaged the consequences of a flood differently from people who had actually experienced severe losses due to a flood. People who were not affected strongly underestimated the negative affect associated with a flood. Based on the results it can be concluded that risk communication must not focus solely on technical aspects; in order to trigger motivation for mitigation behavior, successful communication must also help people to envisage the negative emotional consequences of natural disasters.

Skinner, Jonathan. 2008. The text and the tale: Differences between scientific reports and scientists' reporting on the eruption of Mount Chance, Montserrat. ***Journal of Risk Research*** **11(1-2): 255-267.**
This article looks at the difference between scientists' written reports and their oral accounts, explanations and stories. The subject of these discourses is the eruption of Mount Chance on Montserrat, a British Overseas Territory in the Eastern Caribbean, and its continued monitoring and reporting. Scientific notions of risk and uncertainty which feature in these texts and tales will subsequently be examined and critiqued. Further to this, this article will end by pointing out that, ironically, the latter - the tale - can in some cases be a more effective and approximate mode of communication with the public than the former - the text.

Slavin, David, W. Troy Tucker, and Scott Ferson. 2008. A frequency/consequence-based technique for visualizing and communicating uncertainty and perception of risk. ***Annals of the New York Academy of Sciences*** **1128(1): 63-77.**
This article presents an approach under development for communicating uncertainty regarding risk. The ap-

proach relies on a risk imaging technology that decomposes risk into two basic elements: (i) the frequency of each kind of harm associated with a hazard and (ii) the adversity of each of those harms. Because different kinds of harm are often measured along incompatible dimensions, adversity is quantified on an ordinal scale. Frequency is quantified on a ratio scale. Sampling error, measurement error, and bias all contribute to uncertainty about frequency. Differences in opinion, measurement error, and choice of dimensions lead to uncertainty about adversity. In this article risk is imaged as an area circumscribed by uncertainty bounds around all of the harms. This area is called the risk profile of a hazard. Different individuals and groups respond to uncertainty and risk differently, and the risk profile can be further focused to visualize particular risk perceptions. These alternate risk visualizations may be contrasted and compared across management choices or across different risk perceivers to facilitate communication and decision making. To illustrate the method, the authors image published clinical trial data.

Solana, M. C., C. R. J. Kilburn, and G. Rolandi. 2008. Communicating eruption and hazard forecasts on Vesuvius, Southern Italy. ***Journal of Volcanology and Geothermal Research*** **172(3-4): 308-314.**
Emergency response plans have been formalized for only one third of the 32 volcanoes that have erupted in the past 500 years in Europe and its dependent territories. As local and tourist populations increase around the remaining 67 percent, the need for an appropriate emergency plan becomes more urgent. A cornerstone of such a plan is to ensure that local decision makers are aware of the volcanic hazards that may be faced by their communities. Hence, instead of applying existing plans from another volcano, it is pertinent first to evaluate the impact that these plans have had on local decision makers. This paper reports results from a preliminary evaluation of interviews with decision makers at Vesuvius, in Southern Italy, for which an emergency response plan has been available since 1995. The volcano last erupted in 1944, so that none of the monitoring scientists or civil authorities has direct experience of responding to Vesuvius in eruption. The results of the surveys suggest that, although the civil authorities on the volcano are aware that Vesuvius poses a hazard, their understanding of how to respond during an emergency is incomplete. They also indicate opportunities for increasing such understanding during future revisions of the emergency plan, provided they are done before a crisis arises.

Stirling, Andy. 2008. Science, precaution, and the politics of technological risk: Converging implications in evolutionary and social scientific perspectives. ***Annals of the New York Academy of Sciences*** **1128(1): 95-110.**
This paper examines apparent tensions between "science-based," "precautionary," and "participatory" approaches to decisionmaking on risk. Partly by reference to insights currently emerging in evolutionary studies, the present paper looks for ways to reconcile some of the contradictions. First, it argues that technological evolution is a much more plural and open-ended process than is conventionally supposed. Risk politics is thus implicitly as much about social choice of technological pathways as narrow issues of safety. Second, it is shown how conventional "science-based" risk assessment techniques address only limited aspects of incomplete knowledge in complex, dynamic, evolutionary processes. Together, these understandings open the door to more sophisticated, comprehensive, rational, and robust decision-making processes. Despite their own limitations, it is found that precautionary and participatory approaches help to address these needs. A concrete framework is outlined through which the synergies can be more effectively harnessed. By this means, we can hope simultaneously to improve scientific rigor and democratic legitimacy in risk governance.

Stoffle, Richard, and Jessica Minnis. 2008. Resilience at risk: Epistemological and social construction barriers to risk communication. ***Journal of Risk Research*** **11(1-2): 55-68.**
This paper is about the persistent failure of social scientists to bring into the Environmental Impact Assessment (EIA) process socially constructed environmental concerns held by potentially impacted communities. The failure to communicate perceived risks results from a two-communities divide based on both epistemological differences and obfuscation due to vernacular communication. The analysis provides robust modeling variables that can bridge this social-environmental divide. The case involves data collected from members of traditional communities regarding their perceptions of the potential impacts of proposed Marine Protected Areas (MPAs). The study is situated in the Bahamas where the government has approved setting aside 30 No-take MPAs to protect their sea. This analysis is based on 572 interviews conducted during eight field trips with members of six traditional settlements in the Exuma Islands and Cays in the central Bahamas. Confidence in the findings is high because the sample involves 34 percent of the census population of these settlements and the findings have repeat-

edly been returned for review and approval by the members of these settlements.

Strydom, Piet. 2008. Risk communication: World creation through collective learning under complex contingent conditions. *Journal of Risk Research* 11(1-2): 5-22.
Risk communication, in the full sense of the word, is a discursive event in which speakers advance claims in the face of other responding participants before a general public. The presence of the public leads the participants to evaluate what happens in moral terms, with the result that their claims obtain an unavoidable normative quality and the discursive event takes the form of a public controversy which puts pressure on the participants to coordinate their disagreements. Proceeding from the assumption of socially distributed and shared cognition, the core argument of this paper is that risk communication, in the final analysis, is a cooperative learning process in and through which a communication community constructively arrives at a diagnostic interpretation of its common situation, the challenge it faces, and possible ways of dealing with it. Since such learning is possible only under conditions of relatively high complexity and contingency, however, its characteristic non-linear dynamic development makes uncertainty both many-sided and unavoidable. Often, however, such a collective achievement is put beyond reach, not simply because of complexity, contingency, and uncertainty, but rather because the agents or groups involved follow one or other of a number of strategies which effectively block learning. Were the social sciences to contribute to the enhancement of risk communication (e.g., by facilitating value- and will-formation in the face of concrete problems), they should study the multi-leveled process of risk communication in the different communicative-discursive contexts within which it takes place with a view to clarifying the learning processes and potentials they harbor. Crucial here are the normative standards appealed to and the degree of legitimacy they allow. Not merely the management of uncertainty depends on this, but also the very world brought into being through risk communication.

Thierry, Pierre, Laurent Stieltjes, Emmanuel Kouokam, Pierre Ngueya, and Paul M. Salley. 2008. Multi-hazard risk mapping and assessment on an active volcano: The GRINP project at Mount Cameroon. *Natural Hazards* 45(3): 429-456.
The purpose of this paper is to help improve the safety of its population faced with natural disasters, the Cameroon Government, with the support of the French Government, initiated a program of geological risk analysis and mapping on Mount Cameroon. This active volcano is subject to a variety of hazards: volcanic eruptions, slope instability and earthquakes. Approximately 450,000 people live or work around this volcano, in an area which includes one of Cameroon's main economic resources. An original methodology was used for obtaining the information to reply to questions raised by the authorities. It involves several stages: identifying the different geological hazard components, defining each phenomenon's threat matrix by crossing intensity and frequency indices, mapping the hazards, listing and mapping the exposed elements, analyzing their respective values in economic, functional and strategic terms, establishing typologies for the different element-at-risk groups and assessing their vulnerability to the various physical pressures produced by the hazard phenomena, and establishing risk maps for each of the major element-at-risk groups (population, infrastructures, vegetation, atmosphere). At the end of the study we were able (a) to identify the main critical points within the area, and (b) provide quantified orders of magnitude concerning the dimensions of the risk by producing a plausible eruption scenario. The results allowed us to put forward a number of recommendations to the Cameroon Government concerning risk prevention and management. The adopted approach corresponds to a first level of response to the authorities. Later developments should make it possible to refine the quality of the methodology.

Vandermoere, Frederic. 2008. Hazard perception, risk perception, and the need for decontamination by residents exposed to soil pollution: The role of sustainability and the limits of expert knowledge. *Risk Analysis* 28(2): 387-398.
This case study examines the hazard and risk perception and the need for decontamination according to people exposed to soil pollution. Using an ecological-symbolic approach (ESA), a multidisciplinary model is developed that draws upon psychological and sociological perspectives on risk perception and includes ecological variables by using data from experts' risk assessments. The results show that hazard perception is best predicted by objective knowledge, subjective knowledge, estimated knowledge of experts, and the assessed risks. However, experts' risk assessments induce an increase in hazard perception only when residents know the urgency of decontamination. Risk perception is best predicted by trust in the risk management. Additionally, need for decontamination relates to hazard perception, risk perception, estimated knowledge of experts, and thoughts about sustainability. In contrast to the knowledge deficit

model, objective and subjective knowledge did not significantly relate to risk perception and need for decontamination. The results suggest that residents can make a distinction between hazards in terms of the seriousness of contamination on the one hand, and human health risks on the other hand. Moreover, next to the importance of social determinants of environmental risk perception, this study shows that the output of experts' risk assessments or the objective risks can create a hazard awareness rather than an alarming risk consciousness, despite residents' distrust of scientific knowledge.

Visschers, Vivianne H. M., and Michael Siegrist. 2008. Exploring the triangular relationship between trust, affect, and risk perception: A review of the literature. ***Risk Management*** **10(3): 156-67.**

Various incidents in the past, such as the BSE crisis in the UK, have shown that people's perceptions of hazards influence the risk management process. In this literature review, the authors investigated how people's affective evaluations and their trust in responsible agencies shape risk perception. In addition, the authors explored the relation between affect and trust, and the implications of these factors for risk management. Affect and trust appear to be important determinants of risk perception. Both factors act as heuristics when people have insufficient time, cognitive capacity, or motivation to evaluate risks deliberately. Trust and affect influence each other but more research is needed to clarify the direction of this relation. Risk managers should consider people's instantaneous responses to risks in addition to their deliberate responses. Additionally, they should focus on compatible values and other trust-enhancing factors.

Visshers, Vivianne H. M., Ree M. Meertens, Wim F. Passchier, and Nanne K. de Vries. 2008. Audiovisual risk communication unravelled: Effects on gut feelings and cognitive processes. ***Journal of Risk Research*** **11(1-2): 207-221.**

Audiovisual material is increasingly applied in risk communication (e.g., information films on the Internet) to affect the public's risk perception. This study investigated how the sound/footage and text of videos can influence two processes of risk perception: a primary (associative) and a secondary (deliberate) evaluative process. The main hypothesis was that the sound/footage of a video would particularly influence the primary evaluative process and its text would affect the secondary evaluative process. This was investigated using a two (text: yes/no) by two (sound/footage: yes/no) design. The authors applied an indirect test to measure the videos' effects on the primary evaluative process (the Extrinsic Affective Simon Task) and a direct test (questionnaire) to assess the effects on the secondary evaluative process. These two tests were applied immediately after the respondents had seen one of the videos and two weeks later. Text appeared to affect the self-reported risk perception (questionnaire) only at the first measurement. Sound/footage influenced risk perception as measured by the EAST merely at the second measurement. The results are discussed in light of the two risk perception processes.

Wang, Xiao-Tian. 2008. Risk communication and risky choice in context: Ambiguity and ambivalence hypothesis. ***Annals of the New York Academy of Sciences*** **1128(1): 78-89.**

This article takes a synthetic approach to six related lines of research on decision making at risk and views risky choice as a function of cue use with priorities in the context of risk communication. An evolutionary analysis of risk and risk communication is presented in which risk is defined not only as variance in monetary payoff but also as variance in biological relatedness, social relations, and ultimately in reproductive fitness. Empirical evidence of ecological and social significance embedded in risk messages is analyzed, and how these risk cues affect behavioral decisionmaking is examined. A new explanatory framework, the ambiguity and ambivalence hypothesis, identifies two key preconditions contributing to inconsistency and biases in making risky choices as a result of cue use in the course of risk communication.

Willis, Vogt, and Vince Willis. 2008. Weighing up the risks: The decision to purchase housing on a flood plain. ***The Australian Journal of Emergency Management*** **23(1): 49-53.**

This paper examines how residents living in a floodplain perceive risk. Sixty residents in Invermay/Inveresk in Launceston, Tasmania, were interviewed in a study conducted by Launceston City Council and the University of Tasmania to identify their level of worry, flood preparedness and risk communication strategies. In order to explore ideas of voluntary and involuntary risk, this paper analyses the views of those residents who were owners and/or renovators in the flood-prone area. The authors argue that risk decision-making is a complex undertaking involving the consideration and weighing-up of a range of factors. In addition, the authors found that just as people may be viewed as 'risk takers', they are also 'at risk' and they see broader

social factors such as development in the area as contributing to their risk.

Zhou, P. G., and H. Q. Chen. 2008. Research on geologic hazard risk management in China based on geologic hazard survey and zoning. ***International Journal of Risk Assessment and Management*** **8(4): 362-372.**
China is a typical developing country. Risk management has become an inevitable trend in China's geologic hazard management so it is imperative to conduct geologic hazard risk evaluation. Although China has laid the foundation for geologic hazards survey and zoning, the large-scale geologic environment information is not fully available and the geologic hazard risk evaluation must be pressed ahead steadily. Based on the research on existing conditions and problems of geologic hazard survey and zoning in China, the paper proposes the planning for geologic hazard risk evaluation in the coming ten years. It will no doubt help the country with a large population and vast territory in its fast pace of economic development to conduct the geologic hazard risk evaluation.

Zou, Le-Le, and Jiu-Tian Zhang. 2008. The attitudes of university students toward crisis events: A survey in Beijing. ***International Journal of Risk Assessment and Management*** **8(4): 444-471.**
In this paper, a survey was conducted on the impacts of characters and social-economic environments of Beijing university students on their awareness and concerns in crisis management. On the basis of quantitative analysis of statistical data, the relationship between five aspects of people's character (including living attitude, attitude to changes, basic inclination, self-orientation and ambitiousness) and the awareness and concerns towards crisis events was revealed. The conclusions will be helpful for further study and development in the area of crisis management.

Technological Hazards

Busenberg, George J. 2008. Managing the hazard of marine oil pollution in Alaska. ***Review of Policy Research*** **25(3): 203-218.**
This study examines the development of safeguards against marine oil pollution in Alaska since the 1989 Exxon Valdez disaster, in which oil spilled from the tanker Exxon Valdez polluted more than 2,000 kilometers of Alaskan coastline. Since 1989, a series of enduring institutional reforms have contributed to major enhancements in the safeguards against the continuing hazard of marine oil pollution in Alaska. This study is the first to comprehensively examine these new institutions and safeguards in two regions of Alaska with marine oil transportation systems. The major oil production streams of Alaska are transported through these two regions. In comparing the development of oil pollution safeguards in these two regions, this study finds a pattern of enduring yet unequal policy reforms.

Clarke, Simon F. J., Rob P. Chilcott, James C. Wilson, David J. Baker, and Anthony Hallett. 2008. Decontamination of multiple casualties who are chemically contaminated: A challenge for acute hospitals. ***Prehospital and Disaster Medicine*** **23(2): 175-181.**
Patients who have been contaminated by chemical compounds present a number of difficulties to emergency departments, in particular, the risk of secondary contamination of healthcare staff and facilities. The Department of Health in the United Kingdom has provided equipment to decontaminate chemically contaminated casualties who present at emergency departments. The capacity of this equipment is limited, and although both the ambulance and fire services have equipment to cope with mass casualties at the scene of a chemical incident, there is still the possibility that acute hospitals will be overwhelmed by large numbers of self-presenting patients. The risks and potential consequences of this gap in resilience are discussed and a number of possible practical solutions are proposed.

Guerrero, Flor M., Macarena Lozano, and Jose M. Rueda-Cantuche. 2008. Spain's greatest and most recent mine disaster. ***Disasters*** **32(1): 19-40.**
On 25 April 1998, the mineral waste retaining wall at the Swedish-owned pyrite mine at Aznalcóllar (Seville, Spain) burst, causing the most harmful environmental and socio-economic disaster in the history of the River Guadiamar basin. The damage was so great that the regional government decided in May 1998 to finance a comprehensive, multidisciplinary research initiative with the objective of eradicating or at least minimizing all of the negative social, economic and environmental impacts. This paper utilizes a Strengths, Weaknesses, Opportunities and Threats analysis to identify eight strategic measures aimed at providing policymakers with key guidelines on implementing a sustainable development model, in a broad sense. Empirical evidence, though, reveals that, to date, major efforts to tackle the negative impacts have centered on environ-

mental concerns and that the socio-economic consequences have not been completely mitigated.

Horton, D. Kevin, Maureen Orr, Theodora Tsongas, Richard Leiker, and Vikas Kapil. 2008. Secondary contamination of medical personnel, equipment, and facilities resulting from hazardous materials events, 2003-2006. ***Disaster Medicine and Public Health Preparedness*** **2(2): 104-113.**

When not managed properly, a hazardous material event can quickly extend beyond the boundaries of the initial release, creating the potential for secondary contamination of medical personnel, equipment, and facilities. Secondary contamination generally occurs when primary victims are not decontaminated or are inadequately decontaminated before receiving medical attention. This article examines the secondary contamination events reported to the Agency for Toxic Substances and Disease Registry (ATSDR) and offers suggestions for preventing such events. Data from the ATSDR Hazardous Substances Emergency Events Surveillance system were used to conduct a retrospective analysis of hazardous material events occurring in 17 states during 2003 through 2006 involving secondary contamination of medical personnel, equipment, and facilities. Fifteen (0.05 percent) Hazardous Substances Emergency Events Surveillance events were identified in which secondary contamination occurred. At least 17 medical personnel were injured as a result of secondary contamination while they were treating contaminated victims. Of the medical personnel injured, 12 were emergency medical technicians and five were hospital personnel. Respiratory irritation was the most common injury sustained. Adequate preplanning and drills, proper decontamination procedures, good field-to-hospital communication, appropriate use of personal protective equipment, and effective training can help prevent injuries of medical personnel and contamination of transport vehicles and medical facilities.

Lederman, Sally Ann, Mark Becker, Stephen Sheets, Janet Stein, Deliang Tang, Lisa Weiss, and Frederica P. Perera. 2008. Modeling exposure to air pollution from the WTC disaster based on reports of perceived air pollution. ***Risk Analysis*** **28(2): 287-301.**

This article examines the utility of a newly developed perceived air pollution (PAP) scale and of a modeled air pollution (MAP) scale derived from it for predicting previously observed birth outcomes of pregnant women enrolled following September 11, 2001. Women reported their home and work locations in the four weeks after September 11, 2001 and the PAP at each site on a four-point scale designed for this purpose. Locations were geocoded and their distance from the World Trade Center (WTC) site determined. PAP values were used to develop a model of air pollution for a 20-mile radius from the WTC site. MAP values were assigned to each geocoded location. Researchers examined the relationship of PAP and MAP values to maternal characteristics and to distance of home and work sites from the WTC site. Both PAP and MAP values were highly correlated with distance from the WTC. Maternal characteristics that were associated with PAP values reported for home or work sites (race, demoralization, material hardship and first trimester on September 11) were not associated with modeled MAP values. Relationships of several birth outcomes to proximity to the WTC, which the researchers previously reported using this data set, were also seen when MAP values were used as the measure of exposure, instead of proximity. MAP developed from reports of PAP may be useful to identify high-risk areas and predict health outcomes when there are multiple sources of pollution and a "distance from source" analysis is impossible.

Lindell, Michael K., and Seong Nam Hwang. 2008. Households' perceived personal risk and responses in a multihazard environment. ***Risk Analysis*** **28(2): 539-556.**

This study proposed and tested a multistage model of household response to three hazards -- flood, hurricane, and toxic chemical release in Harris County Texas. The model, which extends Lindell and Perry's (1992, 2004) Protective Action Decision Model, proposed a basic causal chain from hazard proximity through hazard experience and perceived personal risk to expectations of continued residence in the home and adoption of household hazard adjustments. Data from 321 households generally supported the model, but the mediating effects of hazard experience and perceived personal risk were partial rather than complete. In addition, the data suggested that four demographic variables gender, age, income, and ethnicity affect the basic causal chain at different points.

Phelps, Scot. 2008. The performance-level model of hospital decontamination preparedness. ***American Journal of Disaster Medicine*** **3(3): 157-163.**

Described is a multilevel model of decontamination capacity for hospitals. Acute care hospitals with decontamination responsibilities. This multilevel model of defining decontamination capacity would allow more realistic assessment of current capacity, allow

for fluctuating service levels depending on time of day, incorporate realistic ramp-up and ramp-down of decontamination services, allow for a defined fall-back decontamination model should decontamination processes fail, allow hospitals to define long-term decontamination service level goals, and allow better understanding of when and why to focus on low-risk/low-resource patients rather than high-risk/high-resource patients. This multiple-level model would allow for more realistic and effective hospital-based decontamination service models and should become part of the national decontamination paradigm.

Shaluf, Ibrahim Mohamed. 2008. Technological disaster stages and management. D*isaster Prevention and Management* 17(1): 114-126.

This paper aims to provide graduate students, researchers, governmental and independent agencies with an overview on the stages and management of technological disasters. The technological disasters are a subject of concern to the researchers, the academicians, the governmental and independent agencies. The disasters, which involve major hazard installations (MHIs), are known as technological disasters. The information has been collected from several sources such as the technical and general articles, internet web sites, and internal reports. The technological disaster definition and stages have been reviewed. This paper presents an overview on the technological disaster management cycle. Technological disasters consist of three stages. The stages are classified into pre-, during and post-disaster stages. Disaster management is a collective term encompassing all aspects of planning for and responding to disasters, including both pre-disaster and post-disaster activities. Disaster management cycle is an open-ended process. The four phases comprising the cycle begin and end with mitigation. The stages are not mutually exclusive; there is an overlap. The stages of disaster management can be operative concurrently, because those stages are not independent. This paper presents an overview on the technological disaster definition and stages. It provides the MHIs management and the related authority with a background on the technological disaster management cycle. It motivates the members of the MHIs, particularly managerial staff, and the emergency planners to continually improve the control of MHIs. It provides the background and basis for further research in disaster and disaster management.

Stone, Brian. 2008. Urban sprawl and air quality in large U.S. cities. *Journal of Environmental Management* 86(4): 688-698.

This study presents the results of a paper of urban spatial structure and exceedances of the 8-h national ambient air quality standard for ozone in 45 large US metropolitan regions. Through the integration of a published index of sprawl with metropolitan level data on annual ozone exceedances, precursor emissions, and regional climate over a 13-year period, the association between the extent of urban decentralization and the average number of ozone exceedances per year, while controlling for precursor emissions and temperature, is measured. The results of this analysis support the hypothesis that large metropolitan regions ranking highly on a quantitative index of sprawl experience a greater number of ozone exceedances than more spatially compact metropolitan regions. Importantly, this relationship was found to hold when controlling for population size, average ozone season temperatures, and regional emissions of nitrogen oxides and volatile organic compounds, suggesting that urban spatial structure may have effects on ozone formation that are independent of its effects on precursor emissions from transportation, industry, and power generation facilities.

Vandermoere, Frederic. 2008. Hazard perception, risk perception, and the need for decontamination by residents exposed to soil pollution: The role of sustainability and the limits of expert knowledge. *Risk Analysis* 28(2): 387-398.

This case study examines the hazard and risk perception and the need for decontamination according to people exposed to soil pollution. Using an ecological-symbolic approach (ESA), a multidisciplinary model is developed that draws upon psychological and sociological perspectives on risk perception and includes ecological variables by using data from experts' risk assessments. The results show that hazard perception is best predicted by objective knowledge, subjective knowledge, estimated knowledge of experts, and the assessed risks. However, experts' risk assessments induce an increase in hazard perception only when residents know the urgency of decontamination. Risk perception is best predicted by trust in the risk management. Additionally, need for decontamination relates to hazard perception, risk perception, estimated knowledge of experts, and thoughts about sustainability. In contrast to the knowledge deficit model, objective and subjective knowledge did not significantly relate to risk perception and need for

decontamination. The results suggest that residents can make a distinction between hazards in terms of the seriousness of contamination on the one hand, and human health risks on the other hand. Moreover, next to the importance of social determinants of environmental risk perception, this study shows that the output of experts' risk assessments or the objective risks can create a hazard awareness rather than an alarming risk consciousness, despite residents' distrust of scientific knowledge.

Tsunamis

Allen, S. C. R., and D. J. M. Greenslade. 2008. Developing tsunami warnings from numerical model output. ***Natural Hazards*** **46(1): 35-52.**

A method is introduced for issuing tsunami warnings in the Australian region based on numerical model output. The method considers the maximum modeled wave amplitude within pre-defined coastal waters zones and uses this as a proxy for the potential impact on the coast. A three-level stratified warning is proposed: (1) No threat, (2) Marine threat and (3) Land threat. This method is applied to several case studies and the resulting warning characteristics are shown. While the method has its limitations, it is a significant improvement over current operational warning strategies, which are typically based solely on the magnitude of the earthquake and distance from the source.

Birkmann, Jorn, and Nishara Fernando. 2008. Measuring revealed and emergent vulnerabilities of coastal communities to tsunami in Sri Lanka. ***Disasters*** **32(1): 82-105.**

This paper presents the important findings of a study undertaken in two selected tsunami-affected coastal cities in Sri Lanka (Batticaloa and Galle) to measure the revealed and emergent vulnerability of coastal communities. International risk studies have failed to demonstrate the high vulnerability of coastal communities to tsunami in Sri Lanka. Therefore, indirect assessment tools to measure pre-event vulnerability have to be complemented by assessment tools that analyze revealed and emergent vulnerability in looking at the aftermath and impact patterns of a real scenario, as well as in examining the dynamics of disaster recovery in which different vulnerabilities can be identified. The paper first presents a conceptual framework for capturing vulnerability within a process-oriented approach linked to sustainable development. Next, it highlights selected indicators and methods to measure revealed and emergent vulnerability at the local level using the examples of Batticaloa and Galle. Finally, it discusses the usefulness and application of vulnerability indicators within the framework of reconstruction.

Davis, Ian, and Yasamin O. Izadkhah. 2008. Tsunami early warning system (EWS) and its integration within the chain of seismic safety. ***Disaster Prevention and Management*** **17(2): 281-291.**

This paper aims to provide a broad overview of the South Asian tsunami in relation to the development of the early warning system (EWS) as well as its integration within the seismic safety chain. It focuses on social and administrative aspects that require detailed attention as key elements within the overall system. The observations grow from experience gained by Ian Davis from working on the UK IDNDR Flagship project Warnings and Forecasts from 1996-9 and from participation in the Working Group advising Prime Minister Tony Blair on the development of warnings in preparation for the G8 meeting held in Scotland in June 2005. The conclusions of the paper grow from variety of experiences that both the authors have gained in working for many years in the field of disaster management. A number of requirements emerge from the experience such as specific administrative measures, political will, scientific knowledge and the development of tsunami safety culture. The paper provides an overview of some of the social and administrative measures needed to enable scientific warnings to be disseminated and applied at every level to protect people and their property. It attempts to stress the importance of the totality of an effective warning system. At present, the scientific side has secured vital attention. But this has to be complemented with the social and administrative elements on which all scientific detection depends. The authors argue that these neglected safety elements require urgent attention if a full safety system is to function effectively.

Doocy, Shannon, Diane Johnson, and Courtland Robinson. 2008. Cash grants in humanitarian assistance: A nongovernmental organization in Aceh, Indonesia, following the 2004 Indian Ocean tsunami. ***Disaster Medicine and Public Health Preparedness*** **2(2): 95-103.**

Historically cash interventions, as opposed to material or in-kind aid, have been relatively uncommon in the humanitarian response to emergencies. The widespread implementation of cash-based programs following the 2004 Indian Ocean tsunami provided an opportunity to examine cash distributions following disasters. The Mercy Corps cash grant program in Aceh, Indonesia, was a short-term intervention intended to assist in recompensing losses from the December 2004 tsunami. An evaluation of the Mercy Corps cash grant

program was conducted for the 12-month period following the tsunami using program monitoring data and a systematic survey of cash grant beneficiaries. In 2005, the cash grant program disbursed more than US$3.3 million to more than 53,000 beneficiaries; the average cash grant award was US$6,390, which was shared by an average of 108 beneficiaries. In a beneficiary survey, more than 95% of respondents reported the grant allocation processes were fair and transparent and that grant funds were received. The Mercy Corps experience with cash programs suggests that cash interventions in the emergency context, when properly administered, can have an immediate impact and serve as an efficient mechanism for providing assistance. Organizations involved in humanitarian relief, particularly donors and nongovernmental organizations, should consider incorporating cash-based interventions as an element of their response in future emergencies.

Escaleras, Monica P., and Charles A. Register. 2008. Mitigating natural disasters through collective action: The effectiveness of tsunami early warnings. ***Southern Economic Journal*** **74(4): 1017-1034.**
The megathrust earthquake centered near Sumatra on December 26, 2004, generated a tsunami that resulted in an estimated 150,000 deaths in Indonesia alone. In response, commitments have been made to extend the existing tsunami early warning systems in the Pacific to the remainder of the world subject to tsunamis. Surprisingly, while these systems have been in place in some cases for more than half a century, to date no analysis of their effectiveness has been presented. This article fills this research gap by analyzing 146 out of the 202 tsunamis occurring worldwide since 1966. Relying on a negative binomial regression model that controls for the dynamics of the tsunami, the authors find early warnings to be quite effective in reducing deaths. The model also controls for additional factors important in determining a tsunami's death toll such as socioeconomic conditions, which have been shown to be important in other natural disasters.

Hawkins, Catherine A., and P. Nalini Rao. 2008. CEDER3: A social development response to the tsunami recovery in Tamil Nadu, India. ***Social Development Issues*** **30(1): 29-46.**
This article summarizes some of the literature on disaster recovery and describes the impact of the 2004 tsunami in Tamil Nadu, India. It discusses the relevance of social development to the tsunami recovery efforts and uses the example of the Centre for Disaster Relief, Rehabilitation and Reconstruction to illustrate how the social development components of human capital, social capital, and employment were used to improve the lives of the survivors in Pudiakalpakkam, a fishing village that was destroyed by the tsunami.

Jordan, Benjamin R. 2008. Tsunamis of the Arabian Peninsula: A guide of historic events. ***Science of Tsunami Hazards*** **27(1): 31-46.**
The Arabian Peninsula has been affected by tsunamis in the past. The Peninsula is bounded by the Persian Gulf on its northeast side, the Red Sea on its west side, and the Arabian Sea, the Gulf of Aden, and the Indian Ocean to its east and south. Each of these areas is very different geographically, tectonically, and bathymetrically. Only two localized tsunamis have been recorded in the Red Sea and one doubtful tsunami in the Persian Gulf. Almost all of the recorded tsunamis along the Arabian Peninsula have occurred on its eastern and southern edge. Some, such as the one formed by the 1945 Makran earthquake, were extremely destructive. The Indian Ocean is the most likely source area for future destructive tsunamis that would impact the Arabian Peninsula.

Kietpawpan, Monte, Parichart Visuthismajarn, Charlchai Tanavud, and Mark G. Robson. 2008. Method of calculating tsunami travel times in the Andaman Sea region. ***Natural Hazards*** **46(1): 89-106.**
A new model to calculate tsunami travel times in the Andaman Sea region has been developed. The model specifically provides more accurate travel time estimates for tsunamis propagating to Patong Beach on the west coast of Phuket, Thailand. More generally, the model provides better understanding of the influence of the accuracy and resolution of bathymetry data on the accuracy of travel time calculations. The dynamic model is based on solitary wave theory, and a lookup function is used to perform bilinear interpolation of bathymetry along the ray trajectory. The model was calibrated and verified using data from an echosounder record, tsunami photographs, satellite altimetry records, and eyewitness accounts of the tsunami on 26 December 2004. Time differences for 12 representative targets in the Andaman Sea and the Indian Ocean regions were calculated. The model demonstrated satisfactory time differences (<2 min/h), despite the use of low resolution bathymetry (ETOPO2v2). To improve accuracy, the dynamics of wave elevation and a velocity correction term must be considered, particularly for calculations in the near shore region.

Kilby, Patrick. 2008. The strength of networks: The local NGO response to the tsunami in India. *Disasters* 32(1): 120-130.

This paper examines the role played by a network of 12 local non-governmental organizations (NGOs) -- the East Coast Development Forum (ECDF) -- in the response to the Indian Ocean tsunami of December 26, 2004, which devastated the east coast of India. It examines how the ECDF sought to meet the needs of affected people through a direct relief program, a rehabilitation program focused on the restoration of livelihoods, and through advocacy to press for changes to government programs to make them inclusive and to ensure that they satisfy the priority needs of the people most affected. The paper concludes that it was the trust and capacity built up through past network activities of the fisher, dalit, and tribal communities that enabled the ECDF to launch an effective response to the tsunami. A lesson to emerge is that the use of similar existing networks could be employed in other disaster responses around the world.

King, David, and James Cook. 2008. How people responded to the April 2007 tsunami warning in Cairns and Townsville. *The Australian Journal of Emergency Management* 23(1): 10-20.

Following the Indian Ocean Tsunami in 2004, there was heightened international awareness of this hazard and strategies were developed to improve tsunami warning systems worldwide. Australian emergency management and scientific agencies such as EMA, Geoscience Australia, the Bureau of Meteorology and state emergency management departments released warning and behavior information through websites, and the development of warning systems has been ongoing. Despite the enormity of the tsunami, research on tsunami awareness has been limited. The tsunami warning that took place on April 2, 2007 was a rare opportunity to record how people responded. Surveys carried out by the Centre for Disaster Studies showed that most (76 percent) people heard the warning while it was current during the morning of 2nd April, primarily before 0930, but that most people sought no extra information (70 percent) and took no action (53 percent). Townsville was significantly more laid back than Cairns, but only 35 percent considered future tsunami warnings to be unlikely or are not bothered about them. People called for more information and advice. There were strong levels of concern about the warning, future warnings, and knowledge of correct actions. However, significant proportions of residents did not know whether or not they lived in a storm surge zone.

Morin, Julie, Benjamin De Coster, Raphael Paris, Franck Lavigne, Francois Flohic, and Damien Le Floch. 2008. Tsunami-resilient communities' development in Indonesia through educative actions: Lessons from the 26 December 2004 tsunami. *Disaster Prevention and Management* 17(3): 430-446.

Following the December 26, 2004 tsunami, Planet Risk NGO took part in the international research program TSUNARISK and ATIP-CNRS Jeune Chercheur. The aim of this paper is to encourage the development of tsunami-resilient communities essentially through educative actions. The tsunami risk in Indonesia was assessed by researchers. Planet Risk then used scientific findings and advice for building adapted prevention actions among Javanese populations. Many people could have survived if they had received a basic knowledge of tsunamis. The Indonesian public as well as local authorities must be educated to face tsunami risk. To be efficient, this education must be adapted to local cultural and geographical characteristics. Collaboration between researchers and practitioners is a good means of reaching such an objective. The paper is the result of a two-year successful collaboration between interdisciplinary scientific teams and an NGO team. It demonstrates that an efficient prevention scheme can be implemented through this kind of collaboration. To the authors' knowledge it is the first time that such tsunami education programs have been led in Indonesia.

Paton, Douglas, Chris E. Gregg, Bruce F. Houghton, Roy Lachman, Janet Lachman, David M. Johnston, and Supin Wongbusarakum. 2008. The impact of the 2004 tsunami on coastal Thai communities: Assessing adaptive capacity. *Disasters* 32(1): 106-119.

The suddenness and scale of the December 26, 2004 tsunami and the challenges posed to affected communities highlighted the benefits of their members having a capacity to confront and adapt to the consequences of such a disaster. Research into adaptive capacity or resilience has been conducted almost exclusively with Western populations. This paper describes an exploratory study of the potential of a measure of collective efficacy developed for Western populations to predict the capacity of members of a collective society, Thai citizens affected by the 2004 tsunami, to confront effectively the recovery demands associated with this disaster. Following a demonstration that this measure could predict adaptive capacity, the role of religious affiliation, ethnicity and place of residence in sustaining collective efficacy is discussed. The implications of the findings for future research on, and intervention to de-

velop, adaptive capacity among Thai citizens in particular and collectivist societies in general are discussed.

Paton, Douglas, Bruce E. Houghton, Chris E. Gregg, Duane A. Gill, Liesel A. Ritchie, David McIvor, Penny Larin, Steven Meinhold, J. Horan, and David M. Johnston. 2008. Managing tsunami risk in coastal communties: Identifying predictors of preparedness. ***The Australian Journal of Emergency Management*** **23(1): 4-9.**

This paper discusses the testing of a model predicting tsunami preparedness. Using data collected from a community identified as facing a high risk from locally-generated tsunami, the model illustrates how people's beliefs about the efficacy of mitigation interact with social context factors (community participation, collective efficacy, empowerment, trust) to influence levels of tsunami preparedness. The implications of the findings for tsunami hazard education programs are discussed.

Ravisankar, N., and S. Poongothai. 2008. A study of groundwater quality in tsunami affected areas of Sirkazhi Taluk, Nagapattinam District, Tamilnadu, India. ***Science of Tsunami Hazards*** **27(1): 47-55.**

The December 26, 2004 tsunami had major impact on the quality of groundwater along the southeast coast of India, but especially in the tsunami-affected areas of the Nagapatinam district of Tamilnadu. Major pollution resulted primarily from increases in the salinity of groundwater. The post-tsunami water quality posed problems to general health and contributed significantly to agricultural and environmental degradation in the Sirkazhi taluk and Nagapattinam districts. The adverse impact was particularly significant in the areas of Pazaiyar, Madavaimedu, Thirumullaivasal, Thoduvai, Koozaiyar, Puthupattinam, Kizhamoovarkarai, Poombhukar and Vanagiri. The present study assesses the source, degree, extent and nature of groundwater contamination in the Sirkazhi coastal region. Samples of groundwater were collected from 11 wells in this area and analyzed chemically to determine the extent of contamination. The results showed significant variations in water quality parameters in the study area and helped understand the longer-term adverse impacts that tsunami inundation can have upon groundwater resources.

Sirikulchayanon, Poonthip, Wanxiao Sun, and Tonny J. Oyana. 2008. Assessing the impact of the 2004 tsunami on mangroves using remote sensing and GIS techniques. ***International Journal of Remote Sensing*** **29(12): 3553-3576.**

While tsunami characteristics and effects are not fully understood in the countries around the Indian Ocean, there are reports suggesting that mangroves, acting as a barrier, significantly reduce the devastation caused by the waves. This study proposes a creative approach to investigating the impact of the 2004 tsunami on mangrove vegetation. The approach involves a combination of Geographic Information System (GIS) proximity analyses and change detection methods in remote sensing to delineate multiple buffer distances from the coastline into four homogeneous subregions. The changes in land cover are then assessed in these subregions before and after the tsunami event. The proposed approach provides a more reliable and accurate means than conventional methods to evaluate spatial patterns of damaged areas through different land characteristics along the coastline. There are major damages to land cover, representing an average of 26.87 percent change, in those geographic locations with low mangrove coverage that are in close proximity to the coastline in all four subregions, whereas less damage is apparent in locations with high mangrove coverage, representing an average of only 2.77 percent change. The optimum distance between 1000 and 1500 m of mangrove buffer would be favorable and most effective for reducing the damage by potential tsunami waves. The findings support the need for mangrove replanting and management in the future and may serve as a prototype for studying impacts of tsunamis in other countries.

Theilen-Willige, Barbara. 2008. Tsunami hazard assessment in the Northern Aegean Sea. ***Science of Tsunami Hazards*** **27(1): 1-16.**

Emergency planning for the assessment of tsunami hazard inundation and of secondary effects of erosion and landslides requires mapping that can help identify coastal areas that are potentially vulnerable. The present study reviews tsunami susceptibility mapping for coastal areas of Turkey and Greece in the Aegean Sea. Potential locations vulnerable to tsunamis were identified from LANDSAT ETM imageries, Shuttle Radar Topography Mission (SRTM, 2000) data and QuickBird imageries and from a GIS integrated spatial database. LANDSAT ETM and Digital Elevation Model (DEM) data derived by the SRTM-Mission were investigated to help detect traces of past flooding events. LANDSAT ETM imageries, merged with digitally processed and enhanced SRTM data, clearly indicate the areas that may be prone to flooding if catastrophic tsunami events or storm surges occur.

Volcanoes

Dove, Michael R. 2008. Perception of volcanic eruption as agent of change on Merapi volcano, Central Java. ***Journal of Volcanology and Geothermal Research*** **172(3-4): 329-337.**

Events like volcanic eruptions challenge equilibrium models of nature. This is a study of the perceptions of eruptions as agents of change, taking Mt. Merapi in Central Java as a case study. Villagers living on Merapi have developed a system of religious belief, and a system of agro-ecological practices, that 'domesticates' the volcanic hazard. The villagers view eruptions as agents of change, often change for the good. The Indonesian government, on the other hand, technologizes and exoticizes the volcanic hazard, and conceptually and materially separates it from the realm of civil society. The state focuses its attention exclusively on intermittent moments of heightened volcanic activity, whereas the villagers focus their attention on the much longer interim periods when there is little or no such activity. This case study shows that not just the perception of risk, but the very concept of risk itself can vary. The cultural production of such concepts co-evolves with natural patterns of perturbation.

Gaillard, Jean-Christophe, and Christopher J. L. Dibben. 2008. Volcanic risk perception and beyond. ***Journal of Volcanology and Geothermal Research*** **172(3-4): 163-169.**

Lavigne, Franck, Benjamon De Coster, Nancy Juvin, Francois Flohic, Jean-Christophe Gaillard, Pauline Texier, Julie Morin, and Junun Sartohadi. 2008. People's behavior in the face of volcanic hazards: Perspectives from Japanese communities, Indonesia. ***Journal of Volcanology and Geothermal Research*** **172(3-4): 273-287.**

This paper is concerned with the way in which the Indonesian people living on the slopes or near active volcanoes behave in the face of volcanic threats. It explores the role of three factors in the shaping of this behavior, e.g. risk perception, cultural beliefs and socio-economic constraints. The paper is mainly based on field data collected during the last 5 years on four volcanoes in Central Java, namely Sumbing, Sindoro, Dieng, and Merapi. The common assumption that hazard knowledge, risk perception and people's behavior are closely related and conditional on volcanic activity is debatable in the Indonesian context. Factors that play a role in hazard knowledge -- e.g. basic knowledge of volcanic processes, personal experience of volcanic crisis, time lapsed since the last volcanic eruption, etc. -- differ from those that influence risk perception. Indeed, local people often underestimate the scientifically or statistically estimated risk. This poor risk perception is characterized by an approximate personal representation of the volcanic processes, an excess of trust in concrete countermeasures, the presence of a physical-visual obstructions, or cultural beliefs related to former eruptions. In addition, the commonly acknowledged factors that influence hazard knowledge and/or risk perception may be at odds with the nonhazard-related factors that prompt or force people to live in or to exploit areas at risk. These factors may be either socio-cultural e.g., attachment to place, cultural beliefs, etc. or social and socio-economical e.g., standard of living, strength of people's livelihoods, or well-being. These factors are fundamental in explaining the short-term behavior in the face of a developing threat during a volcanic crisis.

Munoz-Salinas, Esperanza, C. S. Renschler, D. Palacios, and L. M. Namikawa. 2008. Updating channel morphology in digital elevation models: Lahar assessment for Tenenepanco-Huiloac Gorge, Popocatépetl volcano, Mexico. ***Natural Hazards*** **45(2): 309-320.**

In contrast to dramatic flow regime changes by less frequent large-scale volcanic eruptions, those caused by more frequent small-scale processes in volcanic landscapes may also drastically change the direction and dynamics of flow in a drainage system formed solely by fluvial processes. During such periods of channel morphology change, it is necessary to frequently update channel flow parameters to assess preventive measures for civil protection purposes. Often aerial photography is impracticable, since parts of the channels are covered by dense vegetation, while total station and laser topographic surveys are often too slow and costly, particularly during a high frequency of events. This article introduces and validates a new methodology for updating the representation of channel morphology in Digital Elevation Models (DEM) used specifically for assessing the dangers of frequently occurring lahars along gorges in volcanic landscapes during eruptive and non-eruptive periods. The updating of channel cross-sections was achieved by inserting more detailed representative profiles of homogeneous channel sectors in DEMs derived from existing less detailed topographic maps. The channel profiles were surveyed along the thalweg in equidistant points according to Universal Transverse Mercator (UTM) (x,y) coordinates and elevation derived from the existing DEM. The proposed technique was applied at Tenenepanco-Huiloac Gorge on Popocatépetl volcano, Mexico, in an area affected by major lahars during the volcano's most recent eruptive period from 1994 to 2005. The proposed method can reduce the cost and person-hours of a regular channel

topographic survey dramatically and the enhanced DEM can determine volume parameters and flood zones associated with the July 1, 1997 and January 21, 2001 lahars, respectively. In addition, the updated DEM with better channel representation allowed a more realistic fluid flow and lahar simulation with the process-based TITAN2D model.

Paton, Douglas, Leigh Smith, Michele Daly, and David Johnston. 2008. Risk perception and volcanic hazard mitigation: Individual and social perspectives. ***Journal of Volcanology and Geothermal Research*** **172(3-4): 179-188.**

This paper discusses how people's interpretation of their experience of volcanic hazards and public volcanic hazard education programs influences their risk perception and whether or not they adopt measures that can mitigate their risk. Drawing on four studies of volcanic risk perception and preparedness, the paper first examines why experiencing volcanic hazards need not necessarily motivate people to prepare for future volcanic crises. This work introduces how effective risk communication requires communities and civic agencies to play complementary roles in the risk management process. Next, the findings of a study evaluating the effectiveness of a public volcanic hazard education program introduce the important role that social interaction amongst community members plays in risk management. Building on the conclusions of these studies, a model that depicts preparing as a social process is developed and tested. The model predicts that it is the quality of the relationships between people, communities and civic agencies that determines whether people adopt measures that can reduce their risk from volcanic hazard consequences. The implications of the model for conceptualizing and delivering volcanic hazard public education programs in ways that accommodate these relationships are discussed.

Perry, Ronald W., and Michael K. Lindell. 2008. Volcanic risk perception and adjustment in a multi-hazard environment. ***Journal of Volcanology and Geothermal Research*** **172(3-4): 170-178.**

Hazard risk perceptions and protective behaviors are examined for wildfires, earthquakes and volcanic activity. Data were gathered in two northern California (USA) communities that are exposed to all three hazard types. It was found that resident risk perceptions approximated the risks calculated by experts. Personal risks associated with fires were significantly lower than property risks associated with the same threat. The discrepancy between person and property risks for earthquakes and volcanic activity was much smaller. In general, it was found that the number of protective adjustments undertaken for each hazard was small (averaging about half of the possible number measured). When combined in a regression analysis, risk perception was not a statistically significant predictor of number of adjustments for any of the three hazards. Resident's sense of responsibility for self-protection and experience with property damage were significant predictors of adjustment for all three hazards. Information seeking behavior was significantly related to protective actions for earthquakes and volcanic activity, but not for fire hazards. In general, an insufficient number of residents reported experience with personal injury or harm to make meaningful assessments of the effect of this variable on adjustments.

Skinner, Jonathan. 2008. The text and the tale: Differences between scientific reports and scientists' reporting on the eruption of Mount Chance, Montserrat. ***Journal of Risk Research*** **11(1-2): 255-267.**

This article looks at the difference between scientists' written reports and their oral accounts, explanations and stories. The subject of these discourses is the eruption of Mount Chance on Montserrat, a British Overseas Territory in the Eastern Caribbean, and its continued monitoring and reporting. Scientific notions of risk and uncertainty which feature in these texts and tales will subsequently be examined and critiqued. Further to this, this article will end by pointing out that, ironically, the latter - the tale - can in some cases be a more effective and approximate mode of communication with the public than the former - the text.

Solana, M. C., C. R. J. Kilburn, and G. Rolandi. 2008. Communicating eruption and hazard forecasts on Vesuvius, Southern Italy. J*ournal of Volcanology and Geothermal Research* **172(3-4): 308-314.**

Emergency response plans have been formalized for only one third of the 32 volcanoes that have erupted in the past 500 years in Europe and its dependent territories. As local and tourist populations increase around the remaining 67 percent, the need for an appropriate emergency plan becomes more urgent. A cornerstone of such a plan is to ensure that local decision makers are aware of the volcanic hazards that may be faced by their communities. Hence, instead of applying existing plans from another volcano, it is pertinent first to evaluate the impact that these plans have had on local decision makers. This paper reports results from a preliminary evaluation of interviews with decision makers at Vesuvius, in Southern Italy, for which an emergency response plan has been available since 1995. The volcano last erupted in 1944, so that none of the monitor-

ing scientists or civil authorities has direct experience of responding to Vesuvius in eruption. The results of the surveys suggest that, although the civil authorities on the volcano are aware that Vesuvius poses a hazard, their understanding of how to respond during an emergency is incomplete. They also indicate opportunities for increasing such understanding during future revisions of the emergency plan, provided they are done before a crisis arises.

Thierry, Pierre, Laurent Stieltjes, Emmanuel Kouokam, Pierre Ngueya, and Paul M. Salley. 2008. Multi-hazard risk mapping and assessment on an active volcano: The GRINP project at Mount Cameroon. ***Natural Hazards*** **45(3): 429-456.**

The purpose of this paper is to help improve the safety of its population faced with natural disasters, the Cameroon Government, with the support of the French Government, initiated a program of geological risk analysis and mapping on Mount Cameroon. This active volcano is subject to a variety of hazards: volcanic eruptions, slope instability and earthquakes. Approximately 450,000 people live or work around this volcano, in an area which includes one of Cameroon's main economic resources. An original methodology was used for obtaining the information to reply to questions raised by the authorities. It involves several stages: identifying the different geological hazard components, defining each phenomenon's threat matrix by crossing intensity and frequency indices, mapping the hazards, listing and mapping the exposed elements, analyzing their respective values in economic, functional and strategic terms, establishing typologies for the different element-at-risk groups and assessing their vulnerability to the various physical pressures produced by the hazard phenomena, and establishing risk maps for each of the major element-at-risk groups (population, infrastructures, vegetation, atmosphere). At the end of the study we were able (a) to identify the main critical points within the area, and (b) provide quantified orders of magnitude concerning the dimensions of the risk by producing a plausible eruption scenario. The results allowed us to put forward a number of recommendations to the Cameroon Government concerning risk prevention and management. The adopted approach corresponds to a first level of response to the authorities. Later developments should make it possible to refine the quality of the methodology.

Warnings and Evacuations

Allen, S. C. R., and D. J. M. Greenslade. 2008. Developing tsunami warnings from numerical model output. ***Natural Hazards*** **46(1): 35-52.**

A method is introduced for issuing tsunami warnings in the Australian region based on numerical model output. The method considers the maximum modeled wave amplitude within pre-defined coastal waters zones and uses this as a proxy for the potential impact on the coast. A three-level stratified warning is proposed: (1) No threat, (2) Marine threat and (3) Land threat. This method is applied to several case studies and the resulting warning characteristics are shown. While the method has its limitations, it is a significant improvement over current operational warning strategies, which are typically based solely on the magnitude of the earthquake and distance from the source.

Chen, Xuwei. 2008. Microsimulation of hurricane evacuation strategies of Galveston Island. ***The Professional Geographer*** **60(2): 160-173.**

This article investigates the effectiveness of simultaneous and staged evacuation strategies for hurricane evacuations of Galveston Island using agent-based microsimulation techniques. In the simultaneous strategy the entire population is informed to evacuate simultaneously, whereas in a staged evacuation strategy, people are informed to evacuate in a sequence. The results suggest that (1) the most efficient staged evacuation strategy can help reduce the evacuation time for Galveston Island by approximately one hour, (2) previous studies might have underestimated the evacuation time of Galveston, and (3) an evacuation under the rapid response assumption does not necessarily lead to an effective evacuation.

Davis, Ian, and Yasamin O. Izadkhah. 2008. Tsunami early warning system (EWS) and its integration within the chain of seismic safety. ***Disaster Prevention and Management*** **17(2): 281-291.**

This paper aims to provide a broad overview of the South Asian tsunami in relation to the development of the early warning system (EWS) as well as its integration within the seismic safety chain. It focuses on social and administrative aspects that require detailed attention as key elements within the overall system. The observations grow from experience gained by Ian Davis from working on the UK IDNDR Flagship project Warnings and Forecasts from 1996-9 and from participation in the Working Group advising Prime Minister Tony Blair on the development of warnings in preparation for the G8 meeting held in Scotland in June 2005. The conclusions of the paper grow from variety of experiences that both the authors have gained in work-

ing for many years in the field of disaster management. A number of requirements emerge from the experience such as specific administrative measures, political will, scientific knowledge and the development of tsunami safety culture. The paper provides an overview of some of the social and administrative measures needed to enable scientific warnings to be disseminated and applied at every level to protect people and their property. It attempts to stress the importance of the totality of an effective warning system. At present, the scientific side has secured vital attention. But this has to be complemented with the social and administrative elements on which all scientific detection depends. The authors argue that these neglected safety elements require urgent attention if a full safety system is to function effectively.

Escaleras, Monica P., and Charles A. Register. 2008. Mitigating natural disasters through collective action: The effectiveness of tsunami early warnings. ***Southern Economic Journal*** **74(4): 1017-1034.**

The megathrust earthquake centered near Sumatra on December 26, 2004, generated a tsunami that resulted in an estimated 150,000 deaths in Indonesia alone. In response, commitments have been made to extend the existing tsunami early warning systems in the Pacific to the remainder of the world subject to tsunamis. Surprisingly, while these systems have been in place in some cases for more than half a century, to date no analysis of their effectiveness has been presented. This article fills this research gap by analyzing 146 out of the 202 tsunamis occurring worldwide since 1966. Relying on a negative binomial regression model that controls for the dynamics of the tsunami, the authors find early warnings to be quite effective in reducing deaths. The model also controls for additional factors important in determining a tsunami's death toll such as socioeconomic conditions, which have been shown to be important in other natural disasters.

King, David, and James Cook. 2008. How people responded to the April 2007 tsunami warning in Cairns and Townsville. ***The Australian Journal of Emergency Management*** **23(1): 10-20.**

Following the Indian Ocean Tsunami in 2004, there was heightened international awareness of this hazard and strategies were developed to improve tsunami warning systems worldwide. Australian emergency management and scientific agencies such as EMA, Geoscience Australia, the Bureau of Meteorology and state emergency management departments released warning and behavior information through websites, and the development of warning systems has been ongoing. Despite the enormity of the tsunami, research on tsunami awareness has been limited. The tsunami warning that took place on April 2, 2007 was a rare opportunity to record how people responded. Surveys carried out by the Centre for Disaster Studies showed that most (76 percent) people heard the warning while it was current during the morning of 2nd April, primarily before 0930, but that most people sought no extra information (70 percent) and took no action (53 percent). Townsville was significantly more laid back than Cairns, but only 35 percent considered future tsunami warnings to be unlikely or are not bothered about them. People called for more information and advice. There were strong levels of concern about the warning, future warnings, and knowledge of correct actions. However, significant proportions of residents did not know whether or not they lived in a storm surge zone.

Rowley, Elizabeth A., Byron L. Crape, and Gilbert M. Burnham. 2008. Violence-related mortality and morbidity of humanitarian workers. ***American Journal of Disaster Medicine*** **3(1): 39-45.**

The objectives of this paper are to: (1) to determine the rate of violence related deaths, medical evacuations, and hospitalizations occurring to national and expatriate staff of participating humanitarian organizations; (2) to describe the distribution of all-cause and cause specific mortality and morbidity of humanitarian workers with regard to possible risk factors. Surveillance study of field-based humanitarian workers; data were regularly collected from headquarters of participating organizations via e-mail and telephone between September 2002 and December 2005. The participants were eighteen humanitarian organizations reported on any death, medical evacuation, or hospitalization of any national or expatriate staff, for any cause, in any field location during the study period. The main outcome measures were risk of violence related events was calculated as the number of deaths, medical evacuations, and hospitalizations during the study period divided by the total number of field staff for organizations that had staff in those countries where events occurred to the staff of any participating organization. Distribution descriptions are presented as simple proportions. Risk of violence-related deaths, medical evacuations, and hospitalizations was six per 10,000 aid worker person-years. Fifty percent of intentional violence cases were lethal. Intentional violence accounted for 55 percent of all deaths reported, followed by coincidental illness (27 percent) and accidents (15 percent). Aid worker deaths in this group were more frequently caused by intentional violence than either accidents or coincidental illness. The rate of six intentional violence

events per 10,000 person-years can be used as a baseline by which to track changes in risk over time.

Spence, Patric R., Kenneth A. Lachlan, and Jennifer A. Burke. 2008. Crisis preparation, media use, and information seeking: Patterns across Katrina evacuees and lessons learned for crisis communication. ***Journal of Emergency Management*** **6(2): 11-23.**
This study examined crisis preparation, information seeking patterns, and media use in the aftermath of Hurricane Katrina. Surveys were collected from 964 Katrina evacuees. Results indicated a continued need to create messages encouraging crisis preparation, especially among at-risk subpopulations. Differences in information seeking behavior were detected across age, income, and sex, while new media proved to be a non factor. The findings are discussed in terms of pragmatic implications for crisis communication practitioners regarding message design and placement.

Solana, M. C., C. R. J. Kilburn, and G. Rolandi. 2008. Communicating eruption and hazard forecasts on Vesuvius, Southern Italy. ***Journal of Volcanology and Geothermal Research*** **172(3-4): 308-314.**
Emergency response plans have been formalized for only one third of the 32 volcanoes that have erupted in the past 500 years in Europe and its dependent territories. As local and tourist populations increase around the remaining 67 percent, the need for an appropriate emergency plan becomes more urgent. A cornerstone of such a plan is to ensure that local decision makers are aware of the volcanic hazards that may be faced by their communities. Hence, instead of applying existing plans from another volcano, it is pertinent first to evaluate the impact that these plans have had on local decision makers. This paper reports results from a preliminary evaluation of interviews with decision makers at Vesuvius, in Southern Italy, for which an emergency response plan has been available since 1995. The volcano last erupted in 1944, so that none of the monitoring scientists or civil authorities has direct experience of responding to Vesuvius in eruption. The results of the surveys suggest that, although the civil authorities on the volcano are aware that Vesuvius poses a hazard, their understanding of how to respond during an emergency is incomplete. They also indicate opportunities for increasing such understanding during future revisions of the emergency plan, provided they are done before a crisis arises.

Wei, Fangqiang, Kaiheng Hu, Peng Cui, and Qun Guan. 2008. A decision support system for debris-flow hazard mitigation in towns based on numerical simulation: A case study at Dongchuan, Yunnan Province. ***International Journal of Risk Assessment and Management*** **8(4): 373-383.**
The hazard mitigation decision support system is an efficient method to avoid severe human damage by debris flow. Using modern technology, the multi-functional synthetical mitigation decision support system integrates debris flow monitoring, information transmission, disaster forecast and alarm, disaster estimate, evacuation and rescue plan to provide support for making mitigation strategic decision in all aspects before and after the disaster. The system was successfully utilized in debris flow hazard mitigation in the Dongchuan suburb in Yunnan Province. According to the data of monitoring and predicting, the system can simulate the movement of debris flow, and define the range and hazard zone of debris flow disaster. The result can be used to conduct disaster estimation, and prepare evacuation and rescue plan, which increases the degree of disaster mitigation.

Zakour, Michael. 2008. Social capital and increased organizational capacity for evacuation in natural disasters. ***Social Development Issues*** **30(1): 13-28.**
Ensuring disaster evacuation capacity through social capital in organizations is an important part of sustainable social development. This study used a sequential regression controlling for organizational type to predict evacuation capacity of organizations (N = 67). Two social capital variables, diversity of organizational types in an organization's ego network and client-centered service delivery capacity, are found to be positively and significantly (ps < .05) related to evacuation (R2 = .32, p < .001).

Wildfires

Cox, Robin S., Bonita C. Long, Megan I. Jones, and Risa J. Handler. 2008. Sequestering of suffering: Critical discourse analysis of natural disaster media coverage. ***Journal of Health Psychology*** **13(4): 469-480.**
This article is a critical discourse analysis of the local print-news media coverage of the recovery process in two rural communities following a devastating forest fire. Two hundred and fifty fire-related articles from the North Thompson Star Journal (2003) were analyzed. Results revealed a neoliberal discursive framing of recovery, emphasizing the economic material aspects of the process and a reliance on experts. A sequestering of suffering discourse promoted psychological functionalism and focused attention on a return to normalcy through the compartmentalization of distress. The dominant 'voice' was male, authoritative, and

institutionalized. Implications for disaster recovery and potential health consequences are discussed.

Goodman, Helen, and John Gawen. 2008. Glimpses of "community" through the lens of a small fire event. ***The Australian Journal of Emergency Management*** **23(1): 30-36.**

In eliciting feedback from household members affected by ember attack in an urban interface fire, researchers found evidence of latent and actual strengths at the individual, household and community levels. How the emergency services acknowledge and work with these strengths across Australia's varied community landscape provides both ongoing challenges and opportunities for increasing community safety.

Laidlaw, Prue, Dirk H. R. Spennemann, and Catherine Allan. 2008. Protecting cultural assets from bushfires: A question of comprehensive planning. ***Disasters*** **32(1): 66-81.**

Cultural heritage sites form an nonrenewable asset that is threatened by natural disasters. Given the high bushfire risk, mandatory Bush Fire Risk Management Plans have been drawn up throughout New South Wales, Australia. The authors compared their mandatory provisions for the protection of heritage assets with an 'Ideal Heritage Disaster Plan', containing a series of nonnegotiable elements. The examined plans fell well short of the ideal. Preparedness plans generally lacked a discussion of suppression techniques (for historic heritage), prevention, prescribed drills, and communication procedures. None of the response plans or recovery plans contained any of the required core elements, such as rapid suppression techniques and stabilization procedures. Where aspects were covered, they were addressed in an inadequate level of detail. The overall quality of the cultural heritage components of the plans is judged to be poor. Suggestions are made on how to improve the situation if heritage assets are to have future following bushfire events.

Perry, Ronald W., and Michael K. Lindell. 2008. Volcanic risk perception and adjustment in a multi-hazard environment. ***Journal of Volcanology and Geothermal Research*** **172(3-4): 170-178.**

Hazard risk perceptions and protective behaviors are examined for wildfires, earthquakes and volcanic activity. Data were gathered in two northern California (USA) communities that are exposed to all three hazard types. It was found that resident risk perceptions approximated the risks calculated by experts. Personal risks associated with fires were significantly lower than property risks associated with the same threat. The discrepancy between person and property risks for earthquakes and volcanic activity was much smaller. In general, it was found that the number of protective adjustments undertaken for each hazard was small (averaging about half of the possible number measured). When combined in a regression analysis, risk perception was not a statistically significant predictor of number of adjustments for any of the three hazards. Resident's sense of responsibility for self-protection and experience with property damage were significant predictors of adjustment for all three hazards. Information seeking behavior was significantly related to protective actions for earthquakes and volcanic activity, but not for fire hazards. In general, an insufficient number of residents reported experience with personal injury or harm to make meaningful assessments of the effect of this variable on adjustments.

Proudly, Mae. 2008. Fire, families and decisions. ***The Australian Journal of Emergency Management*** **23(1): 37-43.**

Scant attention is paid to women and their roles in the emergency management landscape. This is particularly relevant in the field of community bushfire preparedness and mitigation. The culture of emergency management remains a very masculine field with the command and control system continuing to dominate and influence the roles and processes of emergency events. Within this context, research into gaining a deeper understanding of families and the role of women in bushfire has been neglected. Acknowledging and understanding how families and women make decisions in critical times must help shape future bushfire education programs. This includes the modification, application and implementation of the 'prepare, stay and defend, or leave early' policy. The family and a woman's role within the family are where crucial decisions are made in advance of and during a bushfire. The family unit, in its various forms, is an important and frequently overlooked field of bushfire research. This paper explores how family dynamics inform critical decisions and suggests that there is significant value in listening to the narratives of families and couples who have experienced a major bushfire. A people-centered focus, not a predetermined system or a theory, is needed. In order to reduce or eliminate last minute decisions to evacuate at the height of a bushfire, there must be recognition and understanding of how family dynamics and women's role within the family influence behavior during a crisis.

Wind Storms, Winter Storms, Lightning, and other Severe Weather

Blennow, Kristina. 2008. Risk management in Swedish forestry: Policy formation and fulfillment of goals. ***Journal of Risk Research*** **11(1-2): 237-254.**

The formation of a risk management policy in Swedish forestry and its consequences for fulfillment of goals was analyzed. The risk of wind damage was used as a model where an apparent gap between stated accepted risk and extent of risk-reducing measures taken among south Swedish non-industrial private forest owners was used as a starting point. The results of an enquiry, and personal experiences from the debate after an extensive wind damage event in January 2005, were used and complemented study of literature. It was concluded that risks have not been particularly actively managed in the Swedish forestry culture. This was explained by notions of seeing (i) risks such as wind damage as a natural hazard rather than a technological risk that can be modulated, and (ii) forestry as an enterprise free of valuation in which value aspects of risk were neglected. A narrow agenda in Swedish forest research influenced the risk management policy, where forest consultants played an important role as a link between science and practice and between the public and the private. Neither the legislator nor the forestry consultants declared how they weighted risk which reduced the fulfillment of goals. At the national level relaxation of regulations after 1993 has not yet resulted in markedly diversified privately owned forests and spreading of risk as intended, and the management of the risk of wind damage before January 2005 was in many cases not adapted to the risk the individual forest owner was prepared to take. The results were discussed with respect to possibilities for improved fulfillment of goals in Swedish forestry by facilitating more active risk management.

Cretikos, Michelle A., Keith Eastwood, Craig Dalton, Tony Merritt, Frank Tuyl, Linda Winn, and David N. Durrheim. 2008. Household disaster preparedness and information sources: Rapid cluster survey after a storm in New South Wales, Australia. ***BMC Public Health*** **8(195): 1-22.**

It is well understood that the effectiveness of public information strategies can determine the success of a disaster response. The level of community preparedness is also known to be important in determining the impact of a disaster. However, very little is known about levels of household disaster preparedness or about information sources used by households before and during disasters. The authors investigated these issues immediately after a storm-related natural disaster in New South Wales, Australia, in order to better understand the most effective methods of communicating public health messages during a disaster, and to improve preparedness for future disasters. Rapid cluster survey of 320 randomly selected households in Newcastle and Lake Macquarie, New South Wales, Australia. 227 households (71 percent) responded to the survey. By the day before the storm, 48 percent (95 percentCI 40-57 percent) of households were aware of a storm warning, principally through television (67 percent; 58-75 percent) and radio (57 percent; 49-66 percent) announcements. Storm preparations were made by 42 percent (28-56 percent) of these households. Storm information sources included: radio (78 percent; 68-88 percent); family, friends, colleagues and neighbors (50 percent; 40-60 percent); and television (41 percent; 30-52 percent). Radio was considered more useful than television (62 percent; 51-73 percent vs. 29 percent; 18-40 percent), even in households where electricity supply was uninterrupted (52 percent; 31-73 percent vs. 41 percent; 20-63 percent). Only 23 percent (16-30 percent) of households were aware that the local government-operated radio network has a designated communication role during disasters. A battery-operated household radio and appropriate batteries were available in 42 percent (34-50 percent) of households, while only 23 percent (16-29 percent) had all of: a torch, battery-operated radio, appropriate batteries, mobile phone, emergency contact list and first aid equipment. Local broadcast media networks, particularly radio networks, are important and useful sources of information for communities affected by disasters. Radio proved particularly valuable in providing information to communities affected by electricity interruptions. However, most surveyed households were not adequately prepared for a disaster. To ensure effective communication of health advice during disasters, health services should promote the role of radio networks during a disaster, together with household disaster preparedness in general. Formal arrangements between media networks and emergency service organizations are needed to facilitate communication during a disaster.

Wang, Yongguang, Zijiang Zhou, Qiang Zhang, and Chaoying Huang. 2008. Main meteorological disasters and their impacts on the economic and societal developments in China. ***International Journal of Risk Assessment and Management*** **8(4): 384-394.**

The main meteorological disasters and their impacts on society in China are summarized. China has meteorological disasters that take many different types, affect large area, have a high frequency, and cause severe

damages. Since the 1980s, climate in China seems to become more variable and extreme meteorological events have occurred more frequently, which is most likely a consequence of the global warming. Agriculture is the sector that has been most seriously affected by meteorological disasters. Over the last ten years, there are 350 million people affected by various disasters and 200 billion RMB economic losses each year.

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