

sal in application throughout many communities as discussed by participants illustrated similar problems in multiple communities. Interestingly, the problems of emergency department crowding seem to persist despite various methods for healthcare finance.

This session was well attended, and in addition to the specific topics discussed with each presentation, there was discussion about research methodology and methods to improve emergency public health research and evaluation.

#### Presentations

1. Alvarez WA, Gebbie KM, Valas JV: Outsourcing public health emergency drills and exercises. (USA).
2. Reilly MJ, Markenson DS: Role of the emergency medical services system as part of public health emergency response. (USA)
3. Pereira IMA, Pyrros DG, Debacker M, Peleg K: Health emergency preparedness in small islands and archipelagos—Recommendations and minimum standards. (Portugal, Greece, Belgium, Israel)
4. Grimshaw J, Challen KH: Self-presenting patients attending an emergency department: Perceptions of healthcare needs. (UK)

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## Research and Health Surveillance

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The Research and Health Surveillance Sessions had presentations from throughout the world, and represented diverse populations and communities of the globe. Topics and presentations were selected from among a number of submissions by members of the WADDEM Research Committee, with an attempt to provide information that was both diverse and innovative presented. Ten oral abstracts and six posters were presented during the sessions. This report outlines the major points presented and discussed during the sessions.

Research methods that can be used to scientifically evaluate disaster preparedness and effectiveness were a primary focus of the sessions. Included in this focus area was information and discussion on measurable indicators that can be used to assess disaster preparedness and exercises. Disaster exercises now are a common component of disaster preparation across the world, but it was mentioned that objective measures of the potential effectiveness of planning and exercises are difficult to develop and utilize. Indicators that allow quantitative measurement and comparison during current activities and prior to future exercises and disaster responses were favored. An innovative and important outcome of the discussion was the consensus that exercises to test disaster and public health emergency plans should be based on experiences gained in prior events and exercises, with measures of performance to ensure progress in developing response, and to find areas for improvement and correction.

Meta-narrative mapping, a new approach to disaster medical research that has high potential applicability for future disaster and emergency research, was discussed. The approach, which is similar to qualitative ethnographic research, is a method of study that utilizes a broad-based strategy that draws upon electronic databases and journals. Findings of searches are grouped into themes that allow for

analysis and study. This new technique is important for disaster and emergency researchers because evidence-based methods traditionally used to organize and analyze experimental studies often are not appropriate for application to disaster research.

Descriptions of the Netherlands National Academy for Medical Assistance in Accidents and Disasters, the medical needs and living challenges in the Indian Ocean tsunami of 2005, the Iran earthquakes, and the Polish project to study the effectiveness of prehospital triage in mass-casualty incidents with application of a central electronic command center were presented. In addition to being informative, these presentations were the foundation for detailed discussions of methods for scientific evaluation of structured exercises and disaster response systems.

Session presentations included discussion of trauma care and systems. Nigerian presentations were particularly innovative and interesting, showing the relationship of alcohol-impaired driving of motorbikes and high levels of trauma. As with the more developed areas of the world, impaired driving of transportation vehicles has a high association with serious traumatic injury and represents a major public health risk throughout the world. An extremely innovative approach to trauma care, presented by Nigerian representatives to the Congress, was the concept of pre-identification of person's blood type and the use of personal identification cards to allow for early medical provider knowledge of a person's blood type, should that person be involved in an event that requires emergency blood product transfusion.

A presentation that engendered a good deal of discussion focused on the need for preparation of foreign visitors and tourists to the hazards of earthquakes and tsunami when visiting areas that are prone to such disaster events. This presentation revealed that greater than half of those visiting such sudden-impact disaster areas did not know basic emergency actions and information, such as evacuation routes and first aid.

Overall, the research and surveillance presentations for 15WCDEM were well-organized and showed the forefront of research and surveillance in disaster medicine and public health emergency planning and responses. Most important is that the presentations laid a firm foundation for research and surveillance as a primary topic for future WCDEM sessions. The presentations at the 15WCDEM showed a progression of methods and sophistication in disaster and emergency research from previous years. While evidence-based research is highly regarded by disaster and emergency medical researchers, robust methods that focus on qualitative and observation techniques have become a focus for development of future research in the disaster and public health emergency research fields.

#### Presentations

##### Session #1

1. Mazurik LA, Popov LM: Researching disaster preparedness: Can it be done? (Canada)
2. Sen A: Role of meta-narrative mapping in synthesis of complex evidence in pre-hospital and disaster medicine. (UK)
3. Juffermans JHM, De Vries M, De Vries D, Bierens JJLM: National Academy for Medical Assistance in Accidents and Disasters. (Netherlands)
4. Nakata K: Comparative analysis of medical needs and living conditions in the sub-acute phase of the Iran earthquake and the Sri Lanka tsunami disaster. (Japan)

5. Ekhikamenor EE, Okoruwa O, Adeshina E: Digital screening in trauma care centers: a case study with the Save Accident Victims Association of Nigeria (SAVAN). (Nigeria).

#### Session #2

1. Tengattini M, Ingrassia PL, Zanaboni S, Prato F, Geddo A, Colombo D, Calligaro S, Ragazzoni L, Bergamaschi V, Morin M, Henvald J, Della Corte F: Toward a generic method for evaluation and assessment of medical management in large-scale disaster drills. (Italy, Sweden).
2. Van de Voorde P, Sabbe M, Calle P, PENTA Study Group, De Jaeger A: Pediatric European network for treatment of AIDS (PENTA): Development of a pediatric trauma registry in Flanders, Belgium. (Belgium).
3. Trzos AT, Sosnowski WS, Mizia WM, Andres AJ: Research on increase of effectiveness of prehospital triage in mass casualty incidents with application of WASKOs command center support system. (Poland).
4. Isidore Kouadio KKI, Uehara UN: Earthquake preparedness for foreign residents in Sendai. (Japan).
5. Meda GP: Community preparedness: A disaster management trigger mechanism as a model in disaster preparedness. (India).

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## National Disaster Medical Systems Activation in a Public Health Response—A Tale of Hurricane Katrina

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### Hurricane Katrina Background

Hurricane Katrina resulted in 1,826 estimated direct and indirect deaths (mainly in Louisiana, 1,577 and Mississippi, 238)—one of the deadliest disasters in US history. Additionally, with an estimated cost of US\$81.2 billion, it had one of the highest economic impacts ever recorded for a disaster. While much of the north-central US Gulf Coast was affected, the highest mortality and most significant property damage occurred following the storm's second and third landfalls on 29 August 2005, with the subsequent flooding in the city of New Orleans due to a failed levee system.

### Session Summary

This session described critical issues surrounding the US National Disaster Medical System (NDMS) activation during Hurricane Katrina—the largest full activation of the patient movement portion of the NDMS to that date. After opening remarks by the moderator, three experts with firsthand experience described events surrounding the NDMS public health response to Hurricane Katrina. Panelists presented data from their on-the-ground experiences during and after Hurricane Katrina at all levels from the local/regional front lines in New Orleans to the State and Federal levels. Dr. Klein discussed ground level activities at the New Orleans airport, giving the audience a firsthand glimpse of issues surrounding lack of communications and organization. She also represented Dr. Ray Sweinton (University of Texas Southwestern at Dallas) and Dr. Michael Proctor (University of Texas Southwestern at Houston). She described both local preparedness and the

broader response, with specific insights into activities and operational considerations occurring at the level of the State Emergency Operations Center (EOC) and the interface to the US Federal Department of Homeland Security (DHS). Dr. Rinnert then described her experiences in receiving patients who were evacuated from the disaster area to Dallas, Texas. Finally, Dr. Marty provided a Federal perspective delineating the procedures that were in place and those that should have been in place. Panelists highlighted key issues including: (1) lack of leadership and action by government officials at all levels, (2) challenges with communications and situational awareness, (3) the failure to heed long-term warnings and the failure to prepare for and mitigate them, and (4) the lack of adequate support systems. A brief question and answer session concluded the session.

### Summary of Audience Questions (Q) and Panel Answers (A)

*Q. Is it possible to use the railways for the patient evacuation?*

A. Yes, if railways are functioning, this would be a viable transportation alternative to air evacuation.

*Chair Analysis:* The US NDMS most commonly uses air evacuation for patients being moved to areas of the country unaffected by the disaster. While there are some civilian aircraft programs as a back-up, this evacuation generally is accomplished using military aircraft. The system is problematic because the primary wartime mission of the US military diverts resources (aircraft, supplies, and personnel) away from domestic missions and they may not be available to assist in patient movement during a civilian disaster. In addition, as was seen after the US terrorist attacks of 9/11 in 2001, airplanes may not be permitted to fly. Thus, alternatives to air transportation such as trains should be considered.

*Q. Would it be possible to enlist the help of uninjured laypersons?*

A. This technique was used, but some of the rescuers were uncomfortable being in the in the baggage claim area of the New Orleans airport.

*Chair Analysis:* Many experts encourage the use of uninjured bystanders to assist with victim management and treatment. Not only can this extend personnel assets in a resource poor environment, but it also can provide psychological first aid to the bystanders by giving them something useful to do and diverting their attention from the tragedy. Planners must account for human behavior and realize that people may be willing only to help under certain circumstances.

*Q. Which people were evacuated before Hurricane Katrina made landfall?*

A. People with money and other assets and patients in resource-rich hospitals were evacuated prior to landfall. The portion of the population with the lowest baseline socioeconomic status remained behind and was not rescued until after the hurricane made landfall.

*Chair Analysis:* Public health leaders and government officials must ensure that a pre-event evacuation plan is in place for all members of the population at risk, especially