



# NURSING INSIGHT

Review of disaster healthcare literature for nurses

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## Emergency Preparedness Curriculum in Nursing Schools in the United States

Weiner E, Irwin M, Trongenstein P, Gordon J  
*Nursing Education Perspectives* 2005;(26):334-339

Reviewed by K. Joanne McGlown

**PURPOSE:** To determine the types and levels of disaster preparedness curricula being delivered or in development in nursing programs in the US in 2000 to 2003.

**METHODS:** An online survey of US schools of nursing was conducted by the International Nursing Coalition for Mass Casualty Education (INCME) with the support of the National League for Nursing (NLN). The survey requested information about nursing and curricular resources most helpful in teaching disaster-related material, the content and instructional method used, and the qualifications of faculty to teach this content.

**RESULTS:** The survey was completed by 348 of the 2,013 (17.3%) identified nursing programs from 45 of the 50 United States and Puerto Rico. Most respondents (79%) were from public institutions with 39% from community colleges. The most frequently cited resources for disaster preparedness content were Websites (48%) and journal articles (44%). Most respondents cited curricular plans (79%) as being of greatest help, followed by competency lists (55%). During the academic year 2000-2001, 33% of respondents offered some disaster preparedness content; this increased to 53% in 2002-2003. The lecture format was the primary mode of content delivery, with most delivered in baccalaureate and associate degree level programs. The average number of total contact hours in disaster preparedness content has remained approximately 5 (mean 4.4 in 2000-2001 and 5.1 in 2002-2003).

Natural disasters were the focus of content in 2001-2002, while disaster content related to biological and chemical agents was more prevalent in 2002-2003. Seventy-four percent of the respondents felt that faculty were not at all or poorly prepared to teach disaster preparedness content.

**COMMENT:** These study results should alarm nursing faculty and practitioners worldwide as we address the current status of nursing education for disasters in our respective countries. The incredibly low response rate of 17%, (with only 348 directors of US nursing schools finding value in responding to this survey request!) could be an indication of

the apathy surrounding this topic in the US, or could mean that only those schools offered any type of disaster nursing education. Also foreboding is that as terrorism events have increased globally over a 3-year period, the total contact hours of disaster nursing has not changed. Although terrorism now is a greater focus in most programs, without changes in contact hours, this can only have occurred at the expense of content on natural disasters. An "all-hazards" approach is suggested to better meet educational needs. The inadequacies of nursing faculty to teach disaster preparedness content is of great concern and should receive the attention of every nursing school dean. While disaster healthcare is a nascent discipline and program and instructor inadequacies can be attributed, in part, to this, the results of this study are a clear summons to nursing school and association leaders to respond to these expressed needs. We look forward to the findings from the re-administration of this survey in the 2005-2006 academic year. The inclusion of international nursing programs in the upcoming survey would valuably expand our knowledge of the status of nursing education for disaster preparedness globally.

## The Development of Conceptual Models for Mass-Gathering Health

Arbon P

*Prehospital and Disaster Medicine* 2004;19(3):208-212

Reviewed by Robert Powers

**PURPOSE:** To present two preliminary, conceptual models that link key features of mass-gathering events in a causal relationship with the patient presentation rates at those events.

**METHODS:** Evaluation of the existing research on factors that influence the number of patient presentations at mass-gathering events.

**SUMMARY:** Two conceptual, predictive models, a Relationship Model and a Proximity Model, that demonstrate the influence and relationships between the key characteristics of mass-gatherings and the rate of injuries and illnesses during these events are proposed for use in future research on healthcare issues at mass-gathering events. The Relationship Model analyzes the influence of three mass-gathering health domains (biomedical, psychosocial, and environmental) on patient presentation and types of illnesses and injuries presented; the Proximity Model relates the type of event, crowd size,

and weather conditions and their interactions between the aforementioned domains. Both models are offered as possible approaches to planning for, as well as evaluating mass-gatherings.

**COMMENT:** (Combined with COMMENTS following the next review)

### Forecasting Medical Work at Mass-Gathering Events: Predictive Model versus Retrospective Review

Zeitz KM, Zeitz CJ, Arbon P

*Prehospital and Disaster Medicine* 2005;20(3):164–168

Reviewed by Robert Powers

**PURPOSE:** To compare and evaluate two predictive models that assist in forecasting the number of patients that will present for medical care at a mass-gathering event.

**METHODS:** Data from a prospective evaluation of patient presentations and ambulance transfers during a 9-day mass-gathering was compared to predicted data using Arbon's predictive model and a seven year, historical, retrospective review developed by Zeitz *et al*.

**RESULTS:** Patient presentation rate was 1.6 per 1,000 with a hospital transport rate of 0.07 per 1,000 attendees. In general, there was a good correlation between the actual and predicted number of patient presentations during the event using the Zeitz method, while the Arbon method tended to over-estimate the number of patient presentations for most days. Neither method reliably predicted the number of patients that required transport to a hospital. The Zeitz model of prediction tended to be more accurate than the Arbon model in those situations in which historical data were available, while the Arbon method proved particularly useful for events with limited or no prior healthcare information.

**COMMENT:** It is important in planning and implementing medical care for mass-gatherings to be able to anticipate the number of patients and the problems that will present to the healthcare team. Both the Arbon and Zeitz papers address this need and evaluate methods to forecast the number of patient presentations at mass-gatherings in order to plan for prehospital care including staffing, supplies and/or equipment. Arbon's paper provides the nidus for needed standardization of terminology and data collection related to mass-gatherings to predict crowd attendance levels and patient presentation rates. Building on previous research (e.g., Milsten *et al*), Arbon adeptly proposes two models, both of which demonstrate the relationship between the key characteristics of an event and those factors that have a direct bearing on the medical needs of a mass-gathering. Zeitz *et al* compared the use of Arbon's predictive model with historical data obtained from an earlier mass-gathering. A retrospective analysis was performed of the actual number of patients presenting for treatment during a week-long event with a total of 622,234 attendees.

The Zeitz method and the Arbon method, which both utilize these factors to predict patient presentation rates, are compared by applying them to an actual mass-gathering event. When compared to the actual numbers from the event, the predicted patient presentation rates using either method was

quite accurate, with the last two days being a notable exception for both methods. Also, there was inaccuracy with both methods in predicting the number of ambulance transports. Details of any changes (e.g., weather conditions or temperature drops, which may have played a factor in these discrepancies), would have aided understanding of the aberrancy in otherwise remarkably accurate predictive methodologies.

Additionally, it would have been valuable to see the models applied retrospectively with the known data from the event. The analysis of the application of both methods with the known variables of temperature, humidity, crowd numbers, etc., would have provided more applicable information.

The authors comment that their methods do not predict the level of medical assistance required. Since, as the authors note, the need is to predict medical workload at these events, incorporating other information would have added to its applicability by medical response planners. This information could include such factors as findings by Milsten *et al* that temperatures >80°F are linked to an associated increase in the need for advanced medical care. Milsten *et al* also have developed a planning table that, once anticipated levels of attendance are known, will produce data predicting the type of injuries that might occur at a given event. Future researchers should incorporate some of this injury-specific information into their methods because planners must know the level and type of care that will be required at a given mass-gathering; having the predicted patient presentation rates is helpful for planners. However, planners will be required to continue making the kind of educated guesses that Zeitz and Arbon are trying to avoid if specific injury predictions are not incorporated into the method; for example, five patients presenting with chest pain require entirely different supplies and skill sets than do 25 patients asking for Tylenol.

The Zeitz model is able to predict attendance and patient presentation rates on different days of a multi-day event. Equally important is being able to determine the hour of the day that the medical needs will occur. Peak times of presentation and the overall spread of patients seeking care during the day are crucial pieces of information for planners' decisions regarding staffing needs. If the Zeitz model predicts that 11 ambulance transports will occur on a given day, ambulances would be staged on hand in different numbers if those 11 patients all arrive within an hour or if only one patient needing transfer presents per hour.

Both Zeitz and Arbon have made major strides in the development of research methods capable of taking the guesswork out of determining the medical requirements for an upcoming mass-gathering event. Both methods have their particular usefulness; the Zeitz is particularly helpful when the event has been held previously and the Arbon method when the event is new and there are no previous data to utilize.

## Public Health Preparedness for Mass-Casualty Events: A 2002 State-by-State Assessment

Mann NC, MacKenzie E, Anderson C  
*Prehospital and Disaster Medicine* 2004;19(3):245–255

Reviewed by Patricia Padjen

**PURPOSE:** To provide summary information on individual state disaster readiness after September 2001.

**METHODS:** A cross-sectional survey developed by a panel of experts and completed by state stakeholders (emergency medical system administrators, hospital administrators, trauma nurse and surgeon, rural health officials, public health officials and citizen advocates) in 50 states assessed: (1) disaster plan contents; (2) coordination and communication plans; (3) disaster training requirements; (4) resource availability; and (5) preparedness for biological or chemical terrorism in 2002. An overall disaster readiness score was calculated by summing percentage points for readiness attributes.

**RESULTS:** All 50 states responded, indicating written statewide disaster plan in 47 states (94%); mock disaster drills in 29 states (58%); and designated state operations center in 50 states (100%). Disaster training included: disaster management in 28 states (56%); biological terrorism in 27 states (54%); chemical terrorism in 23 states (46%); statewide biological/chemical preparedness in 1 state (2%); and statewide disaster capacity assessment system in 8 states (16%). States with a mature, organized, statewide trauma system were most likely to demonstrate components of preparedness.

**COMMENT:** During the first quarter of 2002, only a few of the United States had implemented programs necessary to ensure a prompt and effective response to a mass-casualty event. Although “disaster plans” were present in almost all states, key programs and policies were absent. Operation centers were prevalent, but communication systems were fragmented, limiting a state’s ability to identify and respond to biological/chemical events in a disaster. Adequate training programs and protective equipment for health personnel were lacking in most states. Since 2002, federal funding has allowed the enhancement and expansion of programs to aid state preparedness and the situation today may be quite different. However, that assessment must be determined by replicating this study. Such a study also would allow some measurement of the progress each state has made towards disaster preparedness and could be used to appropriately target future funding and resources.

## A Review of Instruments Assessing Public Health Preparedness

Asch S, Stoto M, Mendes M, Valdez R, Gallagher M,  
Halverson P, Lurie N  
*Public Health Reports* 2005;120:532–541

Reviewed by Patricia Padjen

**PURPOSE:** To review and assess the level of supporting evidence of the instruments used to evaluate the level of prepared-

ness of California’s state and local public health departments to respond to health threats such as bioterrorism.

**METHOD:** Literature search of the *Medline* database and canvassing of field experts.

Two independent reviewers classified each evaluation instrument by whether preparedness was the primary or secondary focus; instruments were evaluated for: (1) clarity of measurement parameters; (2) balance between structural and process measures; (3) evidence of effectiveness; and (4) specification of an accountable entity.

**RESULTS:** A total of 27 evaluation instruments were identified (only 2 from the peer-reviewed literature); 24 focused on public health emergencies; 13 addressed preparedness, in general. Deficiencies in preparedness measures identified using the defined criteria were:

1. Clarity of measurement parameters and normative standards;
  - a. Many of the measures were subjective, in the form of checklists;
  - b. Reporting of key diseases did not specify thresholds for timeliness, completeness or whether thresholds varied by the reportable conditions; and
  - c. A description of the validity of identified measures was lacking.
2. Balance between structural and process measures;
  - a. Structural (capacity) measures were more dominant than were process measures.
3. Evidence of effectiveness;
  - a. Lack of scientific evidence supporting even common measures; and
  - b. Lack of evaluations on recommended measures, even those most widely recommended.
4. Specification of an accountable entity
  - a. Lack of a process for assigning responsibility; and
  - b. Lack of specifically designated responsibilities.

**COMMENT:** Despite the large amounts of funding currently directed into US disaster preparedness programs, the absence of scientific evidence supporting measures of preparedness has resulted in a lack of consensus and standardization in the planning and evaluation of public health preparedness. In an attempt to improve this, the authors recommend: (1) better communication across agencies to obtain a common set of goals and measurements/assessments; (2) better delineation of accountability for specific preparedness functions in measurement/assessment instruments; and (3) research to develop quality measures to assess the level of preparedness. This in-depth review of current instruments is of value for nurses involved in disaster preparedness planning programs and is a “must read” for all individuals interested in conducting research studies in disaster preparedness. Only through such studies can we gain evidence to support recommended practices and improve the quality and, hopefully, the effectiveness of disaster preparedness programs.

## Infection Control and Hurricane Katrina

Todd B

*American Journal of Nursing* 2006;106(3):28–31

Reviewed by Elaine Daily

**PURPOSE:** To present information on the incidence of infections in the aftermath of Hurricane Katrina.

**METHODS:** A review of published reports (*Morbidity and Mortality Weekly Report*) from the US Centers for Disease Control and Prevention (CDC).

**RESULTS:** Disease surveillance was conducted by the CDC in conjunction with state public health authorities obtaining data from functioning hospitals and clinics in the area, health posts, evacuation centers, mobile units, and first-responder logs. Diarrhea and vomiting affected more than 1,000 of the more than 200,000 evacuees; included in these was a small outbreak of *norovirus* in one of the evacuation centers. Wound infections were frequent with methicillin-resistant staphylococcus aureus wounds reported in 30 evacuees at one center. Twenty-four cases of wounds infected with *Vibrio vulnificus* and *Vibrio parahaemolyticus* (organisms endemic to warm coastal waters) resulted in six deaths. Pre-existing conditions (heart or renal disease, diabetes, etc.) that increased the risk of infection were reported in 72% of these wound-infected cases. There were approximately 200 cases of conjunctivitis reported.

**COMMENT:** Environmental conditions after disasters caused by natural hazards increase the risk for infectious disease and present considerable challenges to healthcare workers in both prevention and management. Early and thorough surveillance is essential to implement timely and effective interventions. Proper surveillance requires dedicated personnel as well as standardized data collection forms, methods, and reporting in order to target early, appropriate interventions to prevent outbreaks. With large-scale disasters, this requires the coordination of multiple jurisdictions. The outbreak of *norovirus* at one facility necessitated isolation of some victims. Disaster preparedness plans must address these important surveillance and communication issues as well as the potential need for isolation areas in evacuation centers. Healthcare workers involved in disaster planning (particularly in hurricane-prone areas) and relief workers will find this article (as well as the more extensive, detailed information on <http://www.cdc.gov/mmwr>) useful in preparation and planning.

## Standardized Emergency Management System and Response to a Smallpox Emergency

Kim-Farley RJ, Celentano JT, Gunter C, Jones JW, Stone RA, Aller RD, Mascola L, Grigsby SF, Fielding JE  
*Prehospital and Disaster Medicine* 2003;18(4):313–320

Reviewed by Elaine Daily

**PURPOSE:** To describe the Smallpox Preparedness, Response and Recovery Plan developed by the Los Angeles County Department of Health Services (LACDHS)

**METHODS:** This is a non-research based, informative article describing the development and contents of a plan a public health services department developed to prepare for the possibility of a smallpox outbreak.

**SUMMARY:** The operational plan, which covers the preparedness, response, and recovery phases, was developed (and is reviewed frequently) by a working group using information and recommendations from the US Centers for Disease Control and Prevention's (CDC) Smallpox Response Plan and Guidelines and the Advisory Committee on Immunization Practices. When criteria described by the CDC are met, the response plan is activated using the Standardized Emergency Management System (SEMS) Model to ensure compatibility and coordination of operations among all levels (regional, state, and federal). The elements included in the SEMS model are Incident Command with Operations, Planning/Intelligence, Logistics and Finance/Administration sections. Overall responsibility is the duty of the SEMS incident commander (typically the health officer of the department) who sets objectives and priorities and coordinates all aspects of the emergency with other local, state, and federal authorities. The incident commander designates section chiefs as well as an Information Officer to deal with the public and media, a Safety Officer to ensure safety of conditions and assigned personnel, and a Liaison Officer to coordinate with other agencies.

The Operations Section is organized into working groups including vaccinations, adverse events monitoring, case management, contact management, active surveillance and decontamination. The Planning/Intelligence Section is organized into groups responsible for the preparation of the incident action plan, the epidemiological investigation of cases, and the epidemiological assessment of vaccination coverage status and quarantine implementation. The Logistics Section is organized into units consisting of the vaccine unit, the supply and procurement unit, the transport unit, the personnel unit, and the communications unit. The final section, the Finance and Administration Section, provides accounting and cost analyses as well as other administrative tasks.

**COMMENT:** This article describes a detailed plan developed by a public health department of a large, metropolitan area to be activated during a smallpox emergency. Its structure is based on the Standardized Emergency Management System, which is the system used in California to standardize responses to emergencies involving multiple jurisdictions or agencies. The system includes an incident command system, multi-agency or inter-agency coordination, established mutual-aid agreements, and system and operational area. Thus, it is specific to structural systems of that state. However, the contents and organization of this plan are well-outlined and described, and could serve as a model for the development of similar plans for other areas. As is, it could be adapted to outbreaks of other infectious diseases (including a flu epidemic) and could be part of any bioterrorism preparedness program.