Table 1: Summary of Results: Incident Command System

Author, year Type of training	Incident Command System
Baughman, 1990 Hospital fire and explosion in the emergency department	Confusion resulted because no single person was designated as incident commander.
Cook, 1990 Transportation accident	The drill led to less confusion in incident command.
Gretenkort, 2002 Hospital fire	The leadership concept of the Coordinating Physician of the hospital working together with other hospital executives and the incident commander proved effective.
Inglesby, 2001 Biological	It was unclear how to coordinate different operation centers set up by a variety of state and federal emergency management offices. Personnel were not familiar with language used in disaster control. Leadership roles and authorities in the crisis were uncertain; it was not clear who was in charge.
Lau, 1997 Transportation accident	The disaster plan activated successfully.
Menczer, 1968 Incendiary device and boiler explosion	No overall leader was recognized to coordinate services and agencies. No medical authority was at the scene.
Weston, 1988 Hospital fire in operating room	The absence of a senior hospital nursing officer led to command confusion. Incident flow charts were needed.

Table 2: Summary of Results: Communication

Author, year Type of training	Internal Communication	External Communication
Baughman, 1990 Hospital fire and explosion in the emergency department	Considerable time delay occurred because the emergency department was immobilized.	Not addressed.
Chobin, 1989 Chemical	Hospital operator was called using established hotline. Hospital fire brigade was alerted by code. Hospital operator notified nursing administration.	Assistance was requested from local fire department. The hospital's Chief Executive Officer was asked to call a disaster code.
Classic, 2000 Radiational	Intercom system was inadequate as messages could not be understood clearly. Fire alarms worked well. Radiation call staff were contacted successfully.	Contact of radiation safety was immediate, but message was incomplete (significant deficiency).
Cook, 1990 Transportation accident	Overhead announcement was not heard. Some vital personnel had not received new disaster plan.	Not addressed.
Fishel, 1974 Transportation accident	The emergency call-up system was inadequate because names and telephone numbers were not correct.	Radio communications developed several technical and operational problems.
Gretenkort, 2002 Hospital fire	Not addressed.	The drill went smoothly and provided true interface between authorities and hospital administration.
Halstead, 1993 Hospital fire in operating room	Staff could not hear overhead announcement of fire in operating room. Staff needed printed protocol for fighting fire. Operating room representatives need to be added to hospital committee.	Not addressed.
Inglesby, 2001 Biological	A significant amount of time was spent exchanging phone, beeper, and facsimile numbers (should have been done prior to exercise).	Process of decision making by conference call was highly inefficient and led to indecision and significant delays in taking action. 800 MHz radios had efficient communication where regular phone lines were not answered or otherwise dysfunctional.
Lau, 1997 Transportation accident	Better radio training was needed.	Telephone operator preferred native language under stressful conditions.
Levy, 2000 Radiational	Not addressed.	Extensive live communication occurred among sites in 5 time zones. All sites participated in 7 live conferences within 74 hours. Proper authorities were notified in each country.

Table 2: Summary of Results: Communication (continued)

Author, year Type of training	Internal Communication	External Communication
Saxena, 1986 Chemical	Not addressed.	Notification for the activation of Emergency Operating Centers among participating agencies was not effectively accomplished. The list of chemicals involved was not correctly reported to the state Emergency Operating Center. Exercise communications between the Emergency Operating Center were inefffective and in come cases nonexistent.
Tur-Kaspa, 1999 Chemical	Not addressed.	An effective communication system between different sites and the control center is essential.
Weston, 1988 Hospital fire in operating room	Communication was poor because of small number of alarm bells and low level of buzzers.	Not addressed.

Table 3: Summary of Results: Clinical Care

Author, year Type of training	Triage	Patient Care	Patient Flow	Patient Tracking
Baughman, 1990 Hospital fire and explosion in the emergency department	Usual triage area was not available, thus causing confusion. Relief staff was inexperienced in triage.	Treatment began in triage areas before patients were sent to treatment areas.	Lack of triage area confused patient flow.	Not addressed.
Burns, 1984 Incendiary device	Not addressed.	Participants' burn care knowledge increased 6 to 7 points out of 200 from pre-test to post-exercise. The median outcome of self-scoring was 87% with a range from 60%-96%. Leadership personnel from the emergency department working with members of the burn unit scored the highest. A team consisting of an emergency department technician and a staff nurse scored the lowest.	Not addressed.	Not addressed.
Chobin, 1989 Chemical	Not addressed.	Not addressed.	Victims were evacuated to emergency department.	Admitting personnel in the emergency department made charts and identification bracelets.
Classic, 2000 Radiational	Physical barriers to identify *hot*, *warm*, and *cold* zones for ambulatory victims were not used correctly.	Plan to use building exits as "choke points" for screening worked well.	30 victims were transported to emergency department.	Not addressed.
Cook, 1990 Transportation accident	Not addressed.	Not addressed.	Congestion in triage and emergency department was less since personnel reported directly to assigned areas rather than to the emergency department to ask for guidance.	Not addressed.

Table 3: Summary of Results: Clinical Care (continued)

Author, year Type of training	Triage	Patient Care	Patient Flow	Patient Tracking
Eisner, 1985 Transportation accident	53% of the group that needed immediate care arrived at care location greater than 1.5 hours post-disaster. 85% of patients triaged to the trauma center required admission, indicating excellent correlation between action and need.	Not addressed.	Not addressed.	Not addressed.
Fishel, 1974 Transportation accident	Teams of doctors and nurses were not experienced or knowledgeable in triage. A course to develop triage personnel is needed. The triage tags were not easily identifiable. Color coded tags may address this problem.	Not addressed.	Ambulance crews became exhausted moving the victims.	Not addressed.
Gofrit, 1997 Not specified	9% of patients were over-triaged. 4% of patients were under-triaged.	Simulated casualties were not examined head-to-toe. Patients with post-traumatic stress disorder were not examined fully and referred directly to psychology.	Delays were encountered in treatment due to lack of leadership and shortage of personnel. Patients were transferred from one area to another without appropriate medical escort and without properly controlled ventilation.	Medical documentation was inadequate.
Gretenkort, 2002 Hospital fire	Not addressed.	Not addressed.	Patient flow and staff allocation was greatly aided by *Jaerven Rescue Drag Sheet.*	Not addressed.
Halstead, 1993 Hospital fire in operating room	Not addressed.	Operating room beds were too heavy to maneuver for evacuation.	Corridors, exits, and evacuation routes were blocked with equipment. More storage space was needed for extra equipment.	Not addressed.

Table 3: Summary of Results: Clinical Care (continued)

Author, year Type of training	Triage	Patient Care	Patient Flow	Patient Tracking
Inglesby, 2001 Biological	There was concern over ability to distinguish between the concerned and potentially exposed and those harboring early signs of plague.	Hospitals were beyond capacity for patients in less than 24 hours.	Plans were inadequate for disposition of patients before and after triage, and for the deceased.	Not addressed.
Lau, 1997 Transportation accident	19 patients were triaged and discharged. Patients' particulars were inadequately up-dated on the Accident and Emergency clinical records sheets.	Charting and filling out forms detracted from patient care. Staff summoned from other units were not familiar with the emergency department.	It was 45 minutes from first patient in to last patient out. Porters did not know role in drill.	Patients were given bracelets and record sheet with identification. All patients were accounted for.
Levi, 1998 Not specified	Not addressed.	Not addressed.	The drill identified bottlenecks and predicted ability to care for more casualties.	Not addressed.
Levy, 2000 Radiational	Correlations were made between clinical symptoms in emergency department and common source of exposure. Names of those exposed were identified and sent to the Departments of Public Health in participating countries.	Not addressed.	Not addressed.	Not addressed.
Maxwell, 1987 Transportation accident	6 victims were not assigned any hospital triage category.	13 of the 14 victims were judged to have received appropriate treatment.	The median time to triage was 3 minutes with a range of 0 to 10. The median time to treatment area was 10 minutes with a range from 0 to 39.	4 victims slipped through hospital triage without being tagged.

Table 3: Summary of Results: Clinical Care (continued)

Author, year Type of training	Triage	Patient Care	Patient Flow	Patient Tracking
Menczer, 1968 Incendiary device and boiler explosion	There was no selection of victims for removal from the scene. Immediate establishment of an area for victim safety and treatment was an unfulfilled need. One observer found no evidence of effective triage and no follow-up.	Training of police and fire department personnel in first aid was deficient. Victims need more thorough and adequate first aid after being removed from the disaster site.	Transportation of victims from the disaster scene was done with little regard to the type or site of injury. A great deal of unnecessary handling of victims occurred. Several victims were laid on cold ground uncovered for as long as 20 to 30 minutes. Ambulance services generally provided proper handling and transportation.	Not addressed.
Paris, 1985 Transportation accident	5% of victims were never assigned to a triage category. 44% of victims were assigned to proper triage category.	All 133 patient-tracking cards were collected. 3% of victims with correctable injuries “died” as a result of necessary treatment not provided in timely manner. 6% of victims had deterioration attributed to lack of timely intervention.	Not addressed.	Not addressed.

Table 3: Summary of Results: Clinical Care (continued)

Author, year Type of training	Triage	Patient Care	Patient Flow	Patient Tracking
Tur-Kaspa, 1999 Chemical	Not addressed.	Continuous care and repeated reevaluation of patients are essential during transfer and treatment. Clinicians must know dosages and side-effects of antidotes. Training should occur in full protective equipment and include “intubation dolls”, ventilation, and decontamination procedures. At each treatment site, medical personnel must be ready to handle casualties with injuries other than those of the specific type and severity for which they have been prepared. Note: The above statements were presented as results of the study.	Not addressed.	Clear labeling, identification, and record keeping were vital for efficient reception and treatment of casualties.
Weston, 1988 Hospital fire in operating room	Not addressed.	Patient casualty occurred due to evacuation from the operating room.	Patients were incorrectly moved outside the building instead of to behind the first fire door.	In the 28-minute evacuation, all patients and staff were accounted for.

Table 4: Summary of Results: Security, Materials and Resources, Decontamination, and Other

Author, year Type of training	Security	Materials/Resource	Decontamination	Other Findings
Baughman, 1990 Hospital fire and explosion in the emergency department	Security informed fire department of situation.	Disaster charts were not available because stored in the emergency department.	Not addressed.	Not addressed.
Chobin, 1989 Chemical	Not addressed.	Fire department arrived on scene in full gear: material safety data sheet and breathing apparatus were used.	Not addressed.	Not addressed.
Classic, 2000 Radiational	Security of building and perimeter exceeded the standards.	Not addressed.	County Hazardous Materials Response Team required an hour to set up the portable decontamination facility. Only one nurse had been released to prepare the hospital decontamination facility, an activity that requires at least two people. Victims found dead on the scene were not released to local funeral homes until they had first gone to the autopsy laboratory, allowing control of the body in the event it is contaminated. County response team set up a portable decontamination facility outside the perimeter. Bodies should not be released until decontamination is done.	Disaster response personnel needed special identification. Bioassay specimen collection was needed for those with radiation exposure. Access to facilities may not occur within regulatory time frames.
Cook, 1990 Transportation accident	Not addressed.	Not addressed.	Not addressed.	At least one person in each department now has an in-depth understanding post-drill. Staff stress levels were more manageable with game approach.

Table 4: Summary of Results: Security, Materials and Resources, Decontamination, and Other (continued)

Author, year Type of training	Security	Materials/Resource	Decontamination	Other Findings
Gofrit, 1997 Not specified	Not addressed.	There was a shortage of ventilators and other trauma care equipment resulting from failure to report from in-hospital storage to emergency department.	Not addressed.	Not addressed.
Gray, 1996 Transportation accident	Not addressed.	Not addressed.	Not addressed.	In a video describing the use of a control room, a staff reporting station, field equipment, and protective clothing in a transportation accident, video viewers retained information significantly better than those who had read the disaster plan (72% versus 45%, $p<0.01$).
Gretenkort, 2002 Hospital fire	Not addressed.	Not addressed.	Not addressed.	Preparation of patient collection points did not meet the needs for the actual number of patients.
Halstead, 1993 Hospital fire in operating room	Not addressed.	Gas levers were difficult to find. Fire door in back corridor did not close. A second water hose was needed.	Not addressed.	A secondary program taught the operating room staff how to use fire extinguishers.
Inglesby, 2001 Biological	There were concerns about ability of security to create an effective “security lock-down”.	Antibiotic supplies were exhausted early in the exercise and antibiotic distribution was logistically difficult. Other resources were scarce.	Not addressed.	Serious disagreements occurred about antibiotic distribution. It was not clear which healthcare workers should be wearing protective equipment or what level of protection was appropriate.

Table 4: Summary of Results: Security, Materials and Resources, Decontamination, and Other (continued)

Author, year Type of training	Security	Materials/Resource	Decontamination	Other Findings
Lau, 1997 Transportation accident	Not addressed.	Nurse wasted time to summon back staff. There were not enough wheelchairs, extra chairs in waiting room, or poles and ropes to maintain order.	Not addressed.	Not addressed.
Levi, 1998 Not specified	The exercise identified crowd control issues and other security problems.	The exercise identified specific medical equipment/medication needs and electro-mechanical failures.	Not addressed.	Not addressed.
Menczer, 1968 Incendiary device and boiler explosion	Not addressed.	First aid equipment and supplies in quantity must be taken to site as soon as the type of disaster is ascertained.	Not addressed.	Out-of-town ambulance drivers did not know hospital locations as the state highway signs were inadequate.
Tur-Kaspa, 1999 Chemical	Not addressed.	Not addressed.	Full protective equipment must be worn in the “contaminated area.” Decontamination must be directed by personnel with loudspeakers.	Adequate pre-drill instruction and training were vital for the drill’s success.