

Planning for the Worst Case Scenario: Katrina as a Case Study for Emergency Response Planning and Recovery

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Acadian Ambulance Service, Inc. is the largest privately held emergency medical services organization in the nation. Located in Lafayette, Louisiana the company serves a population of 3.4 million people in a geographic area of roughly 24,000 square miles spanning 60% of Louisiana and counties in Texas and Mississippi. Nearly 2000 employees comprise the workforce, 1400 of which are EMT's and paramedics manning 205 ambulances and seven (7) air medical helicopters responding to approximately 800 calls on a daily basis.

Since its inception in 1971, Acadian has endured the challenges of numerous hurricanes and other natural and man-made disasters; none of which compared to the tragedy of hurricanes Katrina and Rita. As the levees broke in the city of New Orleans, the massive resources of the Acadian organization, other local, state and federal emergency response agencies, and health care organizations were quickly exhausted, leaving thousands of men, women, and children helplessly abandoned in their homes without the necessities of food, water, clothing, and shelter.

Acadian's work began as the storm entered the Gulf of Mexico with the potential to make landfall along the Mississippi – Louisiana coast. As is typical under these circumstances, Acadian began receiving calls for evacuations of nursing homes and homebound patients in low lying areas. In previous storms, most hospitals maintained a "shelter-in-place" policy. Acadian's resources in the northern area of Louisiana were repositioned to facilitate the evacuations in the southern areas of the state. As is also typical, many Louisianans did not heed the call for early evacuation, and many remained even after the call for mandatory evacuation. As Katrina turned her sites toward the city of New Orleans, all emergency response agencies prepared for the devastation of the harrowing storm and positioned themselves for a prompt response as the winds subsided. Though emergency response plans had contemplated foreseeable effects of a levee break in New Orleans, the sheer magnitude of the event quickly overshadowed plans to manage the situation. To understand the magnitude of Katrina's wrath, an overview of the storm's anatomy and ensuing aftermath is presented.

Katrina destroys Gulf of Mexico Offshore Oil Industry

Before Katrina reached the Louisiana coast it took its toll on the offshore oil and gas industry. According to the Minerals Management Service, the primary agency which regulates the offshore oil and gas industry, hurricane Katrina caused 13 semi submersibles and 8 Jackups to move off

location (Figure 1). Katrina completely destroyed or severely damaged 190+ offshore platforms and over 800 oil and gas wells were lost.



Figure 1

Additionally, 500+ offshore pipelines used to deliver oil and gas from offshore oil wells were not able to transport oil or natural gas to the refineries. Hurricane Katrina damage reduced the US supply of oil by 15% and 11% of natural gas supplies.

Katrina Destroys New Orleans

As Katrina continued its journey toward the Louisiana coast and eventually New Orleans, it continued its destruction of homes, businesses, hospitals and infrastructure. (Figure 2)

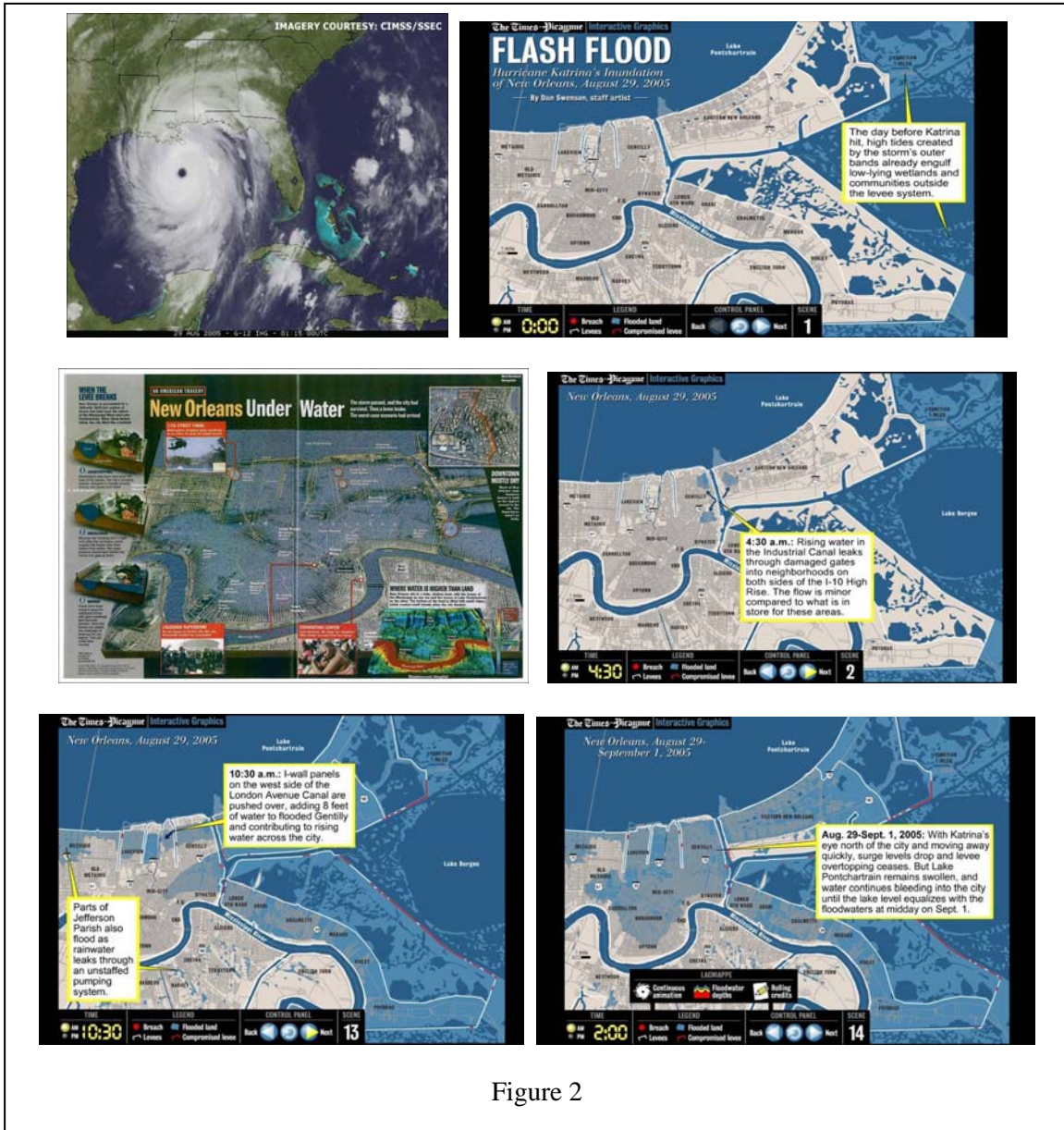


Figure 2

The destruction and devastation can not be described with words alone. The severity of Katrina is painted in the faces of the victims and the landscape of this historic city. Figure 3 photos depict only a few of the portraits of ruin and destruction painted by hurricane Katrina.

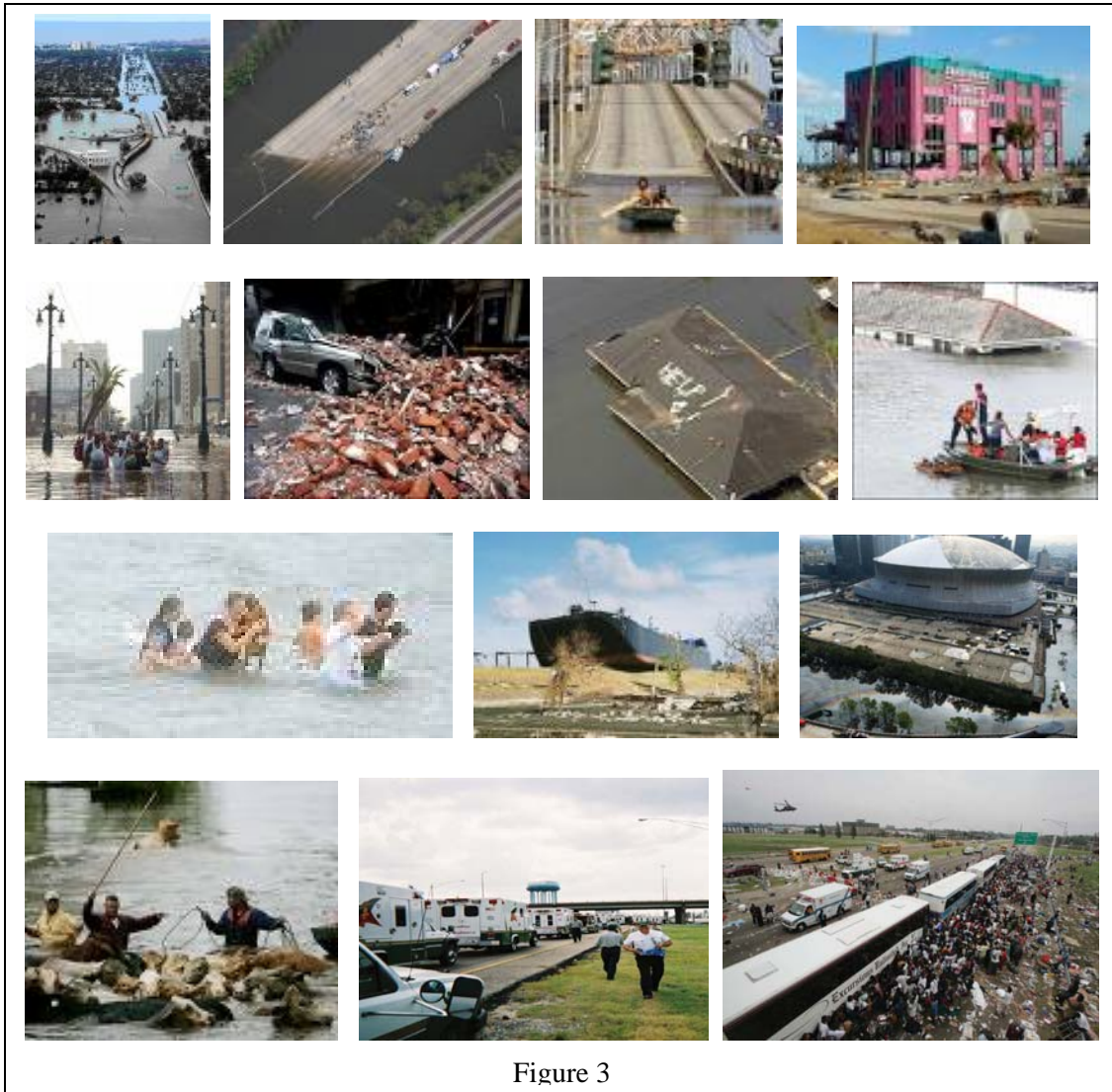


Figure 3

As emergency medical personnel worked to render aid to the sick and injured, a destroyed medical infrastructure unable to manage these patients presented an even greater challenge. (See Figure 4 and 5 for the statistics on the number of hospitals destroyed and the number of available beds which are currently available). Those hospitals with marginal operations quickly depleted medical supplies and loss of generator power from disruption of fuel supply.

| New Orleans Hospitals Open for Services | | | | | | Figure 4 |
|---|-------------|-----------|-----------|-----------|-----------|-----------|
| Parish | Pre-Katrina | 10/5/2005 | 1/6/2006 | 4/6/2006 | 9/6/2006 | 12/6/2006 |
| Orleans | 23 | 2 | 7 | 7 | 10 | 12 |
| Jefferson | 14 | 11 | 13 | 13 | 13 | 13 |
| St. Bernard | 2 | 0 | 0 | 0 | 0 | 0 |
| Plaquemines | 0 | 0 | 0 | 0 | 0 | 0 |
| St. Charles | 2 | 2 | 2 | 2 | 2 | 2 |
| St. John | 2 | 2 | 2 | 2 | 2 | 2 |
| St. Tammany | 11 | 11 | 11 | 11 | 11 | 11 |
| Total | 54 | 28 | 35 | 35 | 38 | 40 |

| Licensed Bed Versus Available Bed in New Orleans | | | | Figure 5 |
|---|------------------|-------------|-------------|-------------|
| Hospital Name | Parish | Licensed | Operational | Available |
| Chalmette Medical Center | St. Bernard | 265 | NO | 0 |
| Children's Hospital | Orleans | 201 | YES | 143 |
| Community Care Hospital | Orleans | 38 | YES | 22 |
| Doctors Hospital of Slidell | St. Tammany | 10 | YES | 10 |
| East Jefferson General Hospital | Jefferson | 455 | YES | 439 |
| East Side Hospital | Orleans | 17 | NO | 0 |
| Fairway Medical Center | St. Tammany | 21 | YES | 21 |
| Genesis Specialty Hospital | Orleans | 38 | NO | 0 |
| Greenbrier Hospital | St. Tammany | 26 | YES | 16 |
| Gulf States Long Term Care | St. Tammany | 58 | YES | 58 |
| Gulf States LTAC | St. Tammany | 34 | YES | 34 |
| HealthSouth Specialty Hospital | Orleans | 28 | NO | 20 |
| Healthwest Rehabilitation Hospital | Jefferson | 29 | YES | 14 |
| Ochsner Medical Center-Kenner | Jefferson | 203 | YES | 74 |
| Kindred Hospital - New Orleans | Orleans | 168 | YES | 46 |
| Lakeview Regional Medical | St. Tammany | 178 | YES | 178 |
| LaPlace Rehabilitation Hospital | St. John Baptist | 22 | YES | 21 |
| Lifecare Hospitals of Kenner | Orleans | 68 | NO | 0 |
| Lifecare Hospitals of New Orleans | Orleans | 82 | NO | 0 |
| Lindy Boggs Medical Center | Orleans | 187 | NO | 0 |
| Louisiana Heart Hospital, LLC | St. Tammany | 58 | YES | 58 |
| Louisiana Specialty Hospital LLC | Jefferson | 56 | YES | 56 |
| Louisiana Specialty Hospital LLC | Jefferson | 56 | YES | 56 |
| Luling Rehabilitation Hospital, Inc. | St. Charles | 16 | YES | 16 |
| Ochsner Medical Center-West | Jefferson | 207 | YES | 119 |
| Medical Center of New Orleans | Orleans | 714 | YES | 39 |
| Memorial Medical Center | Orleans | 317 | NO | 0 |
| Methodist Hospital | Orleans | 350 | NO | 0 |
| New Orleans Adolescent Hospital | Orleans | 124 | YES | 34 |
| Northshore Regional Medical | St. Tammany | 165 | YES | 165 |
| Ochsner Foundation Hospital | Jefferson | 483 | YES | 494 |
| Omega Hospital LLC | Jefferson | 10 | YES | 10 |
| Psychiatric Pavilion New Orleans | Orleans | 24 | YES | 24 |
| Regency Hospital of Covington | St. Tammany | 38 | YES | 34 |
| River Oaks Child and Adolescent | Jefferson | 26 | YES | 26 |
| River Oaks Hospital | Jefferson | 100 | YES | 100 |
| River Parishes Hospital | St. John Baptist | 106 | YES | 85 |
| Select Specialty Hospital | Jefferson | 31 | YES | 31 |
| Slidell Memorial Hospital | St. Tammany | 182 | YES | 131 |
| Southeast Louisiana Hospital | St. Tammany | 446 | YES | 153 |
| Southern Surgical Hospital | St. Tammany | 37 | YES | 37 |
| Specialty Hospital of New Orleans | Orleans | 27 | NO | 0 |
| St. Charles Parish Hospital | St. Charles | 56 | YES | 49 |
| St. Charles Specialty Hospital | Orleans | 10 | NO | 0 |
| St. John's Specialty Hospital | Orleans | 26 | YES | 12 |
| St. Tammany Parish Hospital | St. Tammany | 223 | YES | 210 |
| Touro Infirmary | Orleans | 504 | YES | 325 |
| Touro Rehabilitation Center | Orleans | 63 | YES | 51 |
| Tulane University Hospital | Orleans | 464 | YES | 97 |
| West Jefferson Medical Center | Jefferson | 451 | YES | 352 |
| <i>source: Department of Health and Hospitals</i> | | 7498 | | 3860 |

As Katrina dissipated along a northeasterly path following landfall, local, state, and federal agencies were mobilized to assess and initiate response plans. One of the greatest obstacles was the complete disruption of communications. The loss of electrical power necessary for landline telephone and cellular systems halted reliable communication. Coordination of resources became fragmented, and organized response became impossible.

From an EMS perspective, Acadian became one of the ad-hoc coordinating agencies for emergency medical services. Ambulance and fire services from around the nation called to render assistance. The response was overwhelming. Their noble efforts were unfortunately met with frustration. At one point, Acadian identified and placed on notice over 400 ambulances and emergency personnel from multiple states only to face a barrage of governmental 'red tape'. Per the State's Emergency Response Plan, the Governor of the requesting state must make a written request of the Governor from the sending state before resources can enter into the emergency response system. The plan also required that civilian medical personnel must assemble at a central staging area to be credentialed. This process created a "bottleneck" and caused undue delays in getting emergency responders to the effected areas.

The New Orleans Superdome and Convention Center became a triage and infirmary area. A staging area was then created at I-10 and Causeway Boulevard to arrange evacuation of patients to outlying medical facilities. Acadian transported over 3000 patients in Katrina's aftermath.

The health care system also experienced "worker flight". Prior to Katrina, Louisiana was already facing a shortage of health care workers. Many medical personnel left the state for safe haven with their families.

Lessons Learned

The hard-won lessons learned in the wake of Hurricane Katrina are strengthening disaster readiness. As the nation watched in horror, Hurricane Katrina wreaked havoc upon the city of New Orleans and the Gulf Coast. Amidst her wake of devastation, Katrina left valuable lessons about disaster readiness and medical response. Katrina showed the medical community that much of what is already in place for disaster response must be improved and increased. She demonstrated that there must be a plan to not only care for patients, but for their families and the families of hospital personnel. And she provided ample reminder that high-tech needs to be backed up with low-tech.

Challenges from an Emergency Medical System perspective:

1. A system of leadership in medical response must be developed, implemented and tested.
2. You can not wait on your federal government for your first line of response.
3. A reliable communications system to coordinate response of multiple agencies and services. These communications systems must be able to interface with each agency.
4. You may have to "throw the rule book out of the window" and adapt quickly to changes in established plans.

5. Systems and methods of transport must be developed for depleting medical supplies & medications
6. A system must be developed and implemented to track patient movement and relay the information to families.
7. A plan must be established to accommodate relief workers which are on the way.
8. A system of credentialing out of state emergency medical services personnel must be developed and implemented.
9. A system must be developed to replace destroyed medical facilities.
10. A contingency plan must be developed to deal with EMS worker who evacuate the area for safe haven for themselves and their families.
11. A contingency plan to assist the families of EMS workers who did not evacuate and are providing necessary medical services.
12. A reliable supply of fuel for auxiliary power generations systems with delivery systems must be developed and tested.
13. A regional system for overflow of health care and shelter facilities must be developed.
14. A system to deal with the exhaustion of workers must be considered.
15. The emotional stress of health care workers must be a consideration during and after the disaster is under control.
16. Supplies of multiple types of inoculations must be a consideration.
17. Reliable sources of respiratory protection for emergency medical workers must be established.
18. Supplies of antivenin for snake bites must be available.

Louisiana Hospital Association Takes Action:

The Louisiana Hospital Association has made strategic changes to their response systems to meet the challenges Louisiana encountered during the back-to-back hurricanes of Katrina and Rita. The following document summarizes some of the strategic planning undertaken.

Louisiana Hospital Association Summary of NIMS Implementation Activities for Hospitals and Healthcare Systems: *September 12, 2006*

Organizational Adoption:

Element 1 - Adopt the National Incident Management System (NIMS) at the organizational level for all appropriate departments and business units, as well as promote and encourage NIMS adoption by associations, utilities, partners and suppliers.

Command and Management:

Element 2 - Incident Command System (ICS) - Manage all emergency incidents, exercises and preplanned (recurring/special) events in accordance with ICS organizational structures, doctrine, and procedures, as defined in NIMS. ICS implementation must include consistent application of Incident Action Planning and Common Communication Plans.

Element 3 - Multi-agency Coordination System - Coordinates and supports emergency incident and event management through the development and use of integrated multiagency coordination systems (MACs). That is, develop and coordinate connectivity capability with Hospital Command Center (HCC) and local Incident Command Posts (ICPs), local 911 centers, local Emergency Operations Centers (EOCs), the state EOC and others as applicable.

Element 4 - Public Information System (PIS) - Implements processes and/or plans to communicate timely accurate information through a Joint Information System (JIS) and Joint Information Center (JIC).

Preparedness Planning:

Element 5 - Hospitals and healthcare systems will track NIMS implementation annually as part of the organization's emergency management program.

Element 6 - Develop and implement a system to coordinate appropriate hospital preparedness funding to employ NIMS across the organization.

Element 7 - Revise and update plans [i.e. Emergency Operations Plan (EOPs)] and standard operating procedures (SOPs) to incorporate NIMS components, principles and policies, to include planning, training, response, exercises, equipment, evaluation, and corrective actions.

Element 8 - Participate in and promote interagency mutual-aid agreements, to include agreements with public and private sector and/or nongovernmental organizations.

Preparedness Training

Element 9 - Complete *IS-700: NIMS: An Introduction*

Element 10 - Complete *IS-800.A: NRP: An Introduction*

Element 11 - Complete *ICS 100* and *ICS 200* Training or equivalent courses

Preparedness Exercises:

Element 12 - Incorporate NIMS/ICS into internal and external local, regional, and state emergency management training and exercises.

Element 13 - Participate in an all-hazard exercise program based on NIMS that involves responders from multiple disciplines, multiple agencies and organizations.

Element 14 - Hospitals and healthcare systems will incorporate corrective actions into preparedness and response plans and procedures.

Resource Management:

Element 15 - Maintain an inventory of organizational response assets.

Element 16 - To the extent permissible by law, ensure that relevant national standards and guidance to achieve equipment, communication, and data interoperability are incorporated into acquisition programs.

Communications and Information Management:

Element 17 - Apply standardized and consistent terminology, including the establishment of plain English communication standards across the public safety sector.

Acadian Ambulance Services - Disaster Response Training

Within the Acadian organization senior management and support services have been engaged in a systematic training program to prepare our leaders to interface with state agencies. The training programs listed in Figure 6 details some of these programs.

| <i>National Incident Management System Courses</i> | |
|---|--|
| IS 100 - Introduction to Incident Command Systems | |
| IS 200 - Incident Command Systems for Single Resources and Initial Action | |
| IS 700 - National Incident Management System: An Introduction | |
| IS 800.A - National Response Plan (NRP): An Introduction | |
| <i>Training for National Incident Management System (NIMS) exercises</i> | |
| ICS 300: Intermediate Incident Command Systems (ICS) | |
| ICS 400: Advanced Incident Command Systems (ICS) | |

Figure 6

Acadian Ambulance Service Corporate Response Plan:

Acadian has developed a corporate response plan to ensure our internal resources are systematically reviewed and actions taken to be fully prepared for any future disaster of the magnitude of hurricane Katrina or Rita. Figure 7 is a summary of the detail master response plan for our corporation.

| Acadian Ambulance & Air Med Services Hurricane Preparation Checklist – Timeline Criteria & Responsibilities | |
|--|--|
| 120 Hours (5 days out) | |
| <input type="checkbox"/> | CRS - Initial Contact with facilities in vulnerable parishes within the 5 day cone to urge early evacuation decisions. |
| 96 Hours (4 days out) | |
| <input type="checkbox"/> | CRS – Maintain contact with facilities in the 5 day cone to make evacuation plans. |
| <input type="checkbox"/> | State EMS contacts all Louisiana providers for availability. |
| <input type="checkbox"/> | Employees urged to finalize plans for security of family and property. |

| 72 Hours (3 days out) | |
|------------------------------|--|
| <input type="checkbox"/> | Incident Commander post manned |
| <input type="checkbox"/> | Gourd Transportation Officer post manned |
| <input type="checkbox"/> | Air Transportation Officer post manned |
| <input type="checkbox"/> | CRS – Maintain contact with facilities within 3 day cone, finalize evacuation plans. |
| <input type="checkbox"/> | Deadline for decision is 48 hours before Tropical Storm winds in area. |
| <input type="checkbox"/> | ASSI Incident Commander requests mutual aid from State of LA Bureau of EMS |
| <input type="checkbox"/> | OM – Assign rep to EOC in each vulnerable parish to coordinate special needs patients. |
| <input type="checkbox"/> | Patients should be taken to destinations that are a reasonable distance & not to North LA. |
| <input type="checkbox"/> | Extra crew scheduling begins. |
| <input type="checkbox"/> | Extra Crews are informed of possible longevity of shift. |
| <input type="checkbox"/> | Support personnel are recruited for extra crews |
| 48 Hours (2 days out) | |
| <input type="checkbox"/> | Parish reps attend EOC meetings. |
| <input type="checkbox"/> | Transport coordinators identified and briefed |
| <input type="checkbox"/> | Evacuations begin. |
| <input type="checkbox"/> | Military aircraft assets are requested through local and state officials for major hospital evacuations. |
| <input type="checkbox"/> | Transport coordinators complete rosters for each facility. |
| 24 Hours (1 day out) | |
| <input type="checkbox"/> | All evacuations should be scheduled and continuing..... |
| <input type="checkbox"/> | Incident Commander utilizes all mutual aid ambulances. |
| <input type="checkbox"/> | AASI infrastructure planning and pre-deployment |
| | Notes: |
| <input type="checkbox"/> | Fuel, Supplies, Food/Water, Generators, AC, Command Post Trailers, Secure buildings. |
| <input type="checkbox"/> | Coastal parishes evacuated before inland parishes |
| <input type="checkbox"/> | Facility transports are blended with special needs transports |
| | Deadlines: |
| <input type="checkbox"/> | ...cessation of operations has been established for each area and communicated with appropriate facilities and agencies. |
| <input type="checkbox"/> | ...all appropriated crews and dispatchers aware of established safe locations to ride out the storm. |
| Landfall | |
| <input type="checkbox"/> | Operations suspended in each area when winds are sustained at 50 mph or greater. |
| <input type="checkbox"/> | Employees in affected areas should be resting. |
| Winds Subside | |
| <input type="checkbox"/> | Emergency operations resume. |
| <input type="checkbox"/> | Damage assessment teams sent out in affected areas to evaluate company assets. |

| | |
|--------------------------|---|
| <input type="checkbox"/> | Re-entry transports are scheduled appropriately at AASI discretion after parish officials allow citizens to return. |
| <input type="checkbox"/> | Incident Commander directs re-entry with the state. |
| <input type="checkbox"/> | Mutual aid resources are utilized for re-entry transports. |

The time restraints of this presentation and paper can not tell the full story of the valiant efforts of many dedicated emergency medical service specialists from Louisiana and many other states during the devastating hurricanes of Katrina and Rita. For additional information please visit <http://www.acadian.com/hurricane%20information.htm>