

**MERCY HOSPITAL**

**ASSESSMENT OF  
VULNERABILITY  
TO HURRICANES**

**In Support of Request for  
Hurricane Evacuation  
Waiver**

*November 1998*

**Assessment of Vulnerability to Hurricanes**

***of the  
Main Building Complex  
at  
Mercy Hospital***



**Prepared in Support  
of  
Request for Evacuation Waiver  
Submitted to  
Miami-Dade County Office of Emergency Management**

**MERCY HOSPITAL  
PLANT OPERATIONS DEPARTMENT  
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**October, 1998**

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## *Executive Summary*

### **BACKGROUND**

Hospitals are considered to be among the critical facilities of a community. In Miami-Dade County hospitals become true *keystones* of the community that is vulnerable to hurricanes. This essential role of hospitals is highlighted during emergencies and disasters, when the protection of life and health become paramount.

Indeed it could be stated that while hospitals are always needed they are even more so during disasters, such as caused by hurricanes, and in the aftermath of these events.

When considering the role of hospitals in emergency management, it is important to also address the issue of vulnerability of such facilities specially when they are located in hurricane evacuation zones as defined by the Miami-Dade County Office of Emergency Management [OEM].

#### Evacuation of Hospitals for Hurricanes

OEM has designated hurricane evacuation zones [HEZ] in Miami-Dade County based on the State of Florida Hurricane Surge Atlas.

HEZ are based on the projected storm surge, starting from the coastal zone and moving inland, from the different categories of hurricanes. Without going into the specifics of how storm surge projections have been established, let it be stated that they are based on the *best science* available to the Federal, State and County governments, through the use of models calibrated by empirical information derived from real hurricane events.

OEM hurricane evacuation policies are *generic* rather than *discrete* meaning that when a *mandatory evacuation order* is issued, all facilities and dwellings within the affected HEZ must be evacuated regardless of the specific conditions found at any given facility.

In Miami-Dade County there are several hospitals located within HEZ which are, therefore, subject to evacuation should an evacuation order be issued by OEM.

**Mercy Hospital**, located on the shores of Biscayne Bay at 3663, South Miami Avenue, in the City of Miami, is one of those hospitals within a HEZ.

Evacuation of Mercy Hospital, or most any other hospital for that matter, raises several critical issues including the following:

1. How much *advanced warning time* is required to safely evacuate the hospital?
2. How do you evacuate critically ill patients who may be dependent on life-support equipment and would be placed in life-threatening situations if transported or moved to other locations?

3. How do you evacuate patients who may be in isolation due to contagious conditions?
4. How do you evacuate patients suffering from mental illness who are normally separated from other patients?
5. How do you resolve the issue of essential medical records when moving patients from one facility to another?
6. How do you resolve the issue of medical responsibility when patients are evacuated to other facilities and the physician in charge has no access to such alternate facility?
7. How do you ensure that the receiving facility has the necessary *structural integrity* to resist sustained hurricane winds without major damage?
8. How do you ensure that the receiving facility, which although not exposed to storm surge may nevertheless become isolated due to severe flooding, can remain *self-sufficient* for a minimum required period of time?
9. How do you ensure enough quality medical evacuation transport will be available for given hospital, specially in view of the fact that several other facilities may be competing for the same transport services from limited available resources?
10. How is the issue of liability for the safety and wellbeing of patient resolved during the transportation phase of evacuation, and while at the receiving facility?

### Sheltering in Place

Recognizing the serious nature of the issues involved in evacuation of hospitals OEM has determined that evacuation policies for hospitals can be re-evaluated, on a case by case basis, provided each affected institution can show that it meets specific criteria to warrant receiving an *evacuation waiver*.

Evacuation waivers are based on the principle that *sheltering in place*, meaning riding out a hurricane in a well-protected facility, may present a lower level of risk than that involved in the evacuation process.

In addition to lowering the risk, sheltering in place has three other important benefits:

1. It provides an incentive for the hospital to invest in protective mitigation measures to reduce the potential for damage to its facility. Often, the needed investment is less than the cost associated with evacuating and shutting down the hospital, even if it is for only a period of a few days;
2. It enhances the possibility that the hospital will *continue to function* in the aftermath of hurricane impact, mainly as a result of the structural integrity and protective measures required

by OEM to issue a waiver. This, in turn, provides the community with a functioning health care facility when it needs it the most: after a hurricane;

3. It alleviates in some measure the complex task faced by OEM in deciding whether to issue an evacuation order or not because of an approaching hurricane. Each hospital that shelters in place becomes one fewer facility to evacuate, and also one more facility that may offer *higher-level special-need* shelter space.

#### Mercy Hospital Request for an Evacuation Waiver

The Management of Mercy Hospital has decided to submit a request for an evacuation waiver to OEM. This decision is based on a careful assessment of:

1. The level of vulnerability of this facility to hurricanes;
2. The need to protect patients and staff and the risks/liabilities involved in sheltering in place versus those of evacuating;
3. The best interest and needs of Mercy Hospital, of OEM and of the community at large;
4. The effectiveness of the hazard mitigation measures implemented for the protection of the main building complex;
5. The results of a comprehensive *Assessment of Hurricane Impact on Mercy Hospital*, addressing the requirements set by OEM, prepared with the support and advice of the professional team [Team] retained by Mercy Hospital.

#### The Professional Team

The Team includes the following firms and individuals:

1. EXCELCONSULT INTERNATIONAL, INC. [EXCEL], represented by Ricardo A. Alvarez an expert in the fields of vulnerability analysis and hazard mitigation.
2. DISASTER CONSULTANTS, INC. [DCI], represented by its principals Lawrence F. Brill and Ricardo A. Alvarez. Mr. Brill is a structural engineer licensed by the State of Florida and registered in 32 other states.
3. Brill & Rodriguez, Inc. – Consulting Engineers, represented by its principals Luis M. Rodriguez and Lawrence F. Brill. Mr. Rodriguez is a structural engineer licensed by the State of Florida.

Messrs. Alvarez, Brill and Rodriguez were part of the professional team that completed a *Hurricane Impact Study* for Mount Sinai Medical Center, in May of 1996, the first of its kind, exclusively prepared to support a request for an evacuation waiver. Said study made an important contribution toward the criteria for requesting evacuation waivers set by OEM.