

# **Hurricane Katrina - After Action Report**

## **OR-2 DMAT**



**New Orleans Airport  
August 31 to September 10, 2005**

**September 25, 2005**

**Dr. Helen Miller - Team Commander  
Joel McNamara - Deputy Team Commander  
Dr. Jon Jui - Medical Officer**

## Observations and comments from

John Brandon  
Lou Bruneau  
Sandra Dunbrasky  
Ralph Garono  
Collen Grunow  
James Hicks  
Jon Jui  
Joel McNamara  
Peter Mackwell  
Ben Meigs  
Peggy Peirson  
Jeff Pricher  
Sean Shanahan  
Mike Troutman

## Abbreviations

DMAT - Disaster Medical Assistance Team  
FEMA - Federal Emergency Management Agency  
FPS - Federal Protective Services  
ICS - Incident Command System  
MST - Management Support Team  
MERS - Mobile Emergency Response Support (communications vehicles)  
NDMS - National Disaster Medical System  
NIMS - National Incident Management System  
OFDA - Office of Foreign Disaster Assistance  
USAID - U.S. Agency of International Development  
USPHS - U.S. Public Health Service  
VMAT - Veterinary Medical Assistance Team

## Overview

On August 30, 2005 OR-2 DMAT was activated to respond to Hurricane Katrina relief efforts. (Prior to activation, the team sent 8 members to augment WA-1 DMAT, which was staged in Houston, Texas prior to the hurricane making landfall.) On August 31, the team was sent to Houston, Texas where it staged and departed the next day for Baton Rouge, Louisiana. (OR-2's cache departed on August 31 from Portland, Oregon in three trucks, with 6 team drivers, with an estimated arrival time for 4 to 5 days.) The team arrived at the New Orleans International Airport at approximately 1330 hours on September 1, 2005 and immediately started treating patients. Three Type I DMAT teams were already at the location delivering medical care (WA-1, CA-4, TX-4).

The team encountered an overwhelming demand for patient assessment and treatment during the next four days. Many of the medical personnel on site were extremely fatigued. Some of the previous teams were working up to 60 hours without any sleep. Supplies of both food and water were in short supply and the power had only recently been restored to the facility.

The operation had two components. Evacuees needing medical care were triaged, treated and prepared for transport. Evacuees with no medical conditions were processed for transport to shelters in other states by commercial aircraft (over 21,000 displaced persons who didn't require medical treatment were evacuated).

The upper and lower levels of the west terminal were used as a medical facility. At any given time, approximately 1,000 patients were in a terminal area (up stairs and downstairs). The entire medical operation saw approximately 3,000 patients (official count, but unofficial estimates of 6,000 to 8,000 are more likely) with the vast majority of these patients transferred to other facilities by military aircraft.

During the course of the operation, entire medical facilities would empty their facilities without establishing continuity of care. Approximately 23 of the 26 hospitals in the city of New Orleans were disabled, incapacitated or unable to care for patients due to lack of supplies, personnel, or infrastructure. To compound the problem, all the areas nursing homes emptied out their occupants as well. The combination of the influx of both nursing home patients and acute care patients greatly taxed the medical abilities of all teams at this location.

The first four days of the operation were extremely chaotic due to the patient volume and lack of resources. Decreasing patient numbers, increased staffing with additional DMATs finally, and greater organizational structure finally brought the situation under control after the fourth day. The team received no other missions and was demobilized and arrived home on September 10, 2005.

OR-2 maintained unit integrity and operational effectiveness in spite of very adverse working conditions and the team performed exemplary medical care in substandard conditions.

## Command

There were a number of command-related issues observed, including:

- ICS/NIMS (or any form of an organized internal command and control structure) was not implemented by FEMA/NDMS at the airport. (Some attempts to use ICS were made by FEMA/NDMS following the arrival of a Forest Service overhead team, but were generally not that effective.)
- There was no formalized unified command established between the many participating agencies until late in the response.
- No safety officer was initially appointed at the command level (in a very unsafe environment).
- Roles, responsibilities and reporting structure of the two MSTs (Baton Rouge and Airport) were never clearly articulated. It was unclear what role the USPHS representative at the airport had.
- Liaisons with military and civilian entities participating in relief efforts at the airport were never established.
- There did not appear to be any initial interfacing at a management level with knowledgeable local medical providers, public health officials, and local emergency medical providers.
- There appeared to be a lack of communication between the Airport MST and Baton Rouge MST as well as NDMS headquarters.
- Information was not being effectively communicated to the DMATs from either of the MSTs.
- There was considerable friction between the DMATs and the MSTs. An "us and them" attitude was prevalent.
- Only one fulltime FEMA/NDMS employee was present at the Airport MST (arriving after operations had started). All other Airport MST staff were taken from onsite DMATs, reducing the number of team personnel for patient treatment and operations support.
- Inexperienced leaders were placed in an overwhelming and chaotic environment that caused their effectiveness to rapidly deteriorate.
- Management decisions that were being made that were not based on the best interests of the patients.
- There was inadequate equipment available to produce the copies and paperwork FEMA was requiring.

Recommendation - FEMA/NDMS needs to provide better and more structured leadership at the MST level. FEMA/NDMS operations at the airport were extremely disorganized compared to parallel military and Forest Service operations. FEMA/NDMS staff assigned to leadership roles should be temporarily detailed to a Forest Service Type I overhead team during wildland fire season to learn how to successfully manage large and complex incidents. (Kudos to the Forest Service Red Team, which although outside their mission, attempted to bring organizational structure and process to a very chaotic event that wasn't

being effectively managed by FEMA/NDMS. Also kudos to the military for providing exemplary field support and being very responsive to team needs. )

Recommendation - The friction between MST/NDMS management and the DMATs has been ongoing for quite some time. This continues to compromise the efficiency of operations due to a lack of trust between both parties. The situation needs to be resolved, perhaps by using third-party mediation.

Recommendation - FEMA/NDMS leadership should be evaluated as to their performance during this incident and held accountable for their actions.

Team members were generally positive in their comments regarding OR-2's command. Strict accountability was established. Daily briefings were given. Key operational infrastructure issues (safe sleeping location, food, showers) were quickly identified. The command staff carefully monitored insertion of the team into the operation. Timely and critical communications were provided to team members. One team member observed that command was open with their criticism of FEMA and NDMS management of the event in front of non-command team members and this could have had negative morale implications. Another member observed that a formalized "home team" command staff was not left in place, since all team leadership deployed.

Recommendation - OR-2 command staff needs to discuss the issue of being forthright in personal opinions of higher echelons and decide on appropriate levels of openness with the team based on internal organizational culture.

Recommendation - A formalized "home team" needs to be established prior to deployment with clearly stated roles and responsibilities.

## **Planning**

There were a number of planning-related issues observed, including:

- FEMA/NDMS was not capable of effectively using a significant number of its resources in a first response role involving a large number of patients. The system is built upon an older model of responding to an incident 48 to 72 hours post-event after it has somewhat stabilized.
- FEMA/NDMS did not perform an adequate assessment of the facility and the situation before deploying teams to the location.
- FEMA/NDMS did not issue a formal a medical Incident Action Plan or provide written briefing about the overall situation (this continued even late into the operations phase). An overall operational incident action plan was provided and maintained by the Forest Service.
- Veterinary support was not provided until late into the incident, although there was a clear need for it.

- There appeared to be no automated computerized situational status or resource status systems used by any MST. Some of the difficulty was secondary due to lack of electricity or communications. However, this should have been performed when the MERS unit arrived on site at the airport.
- DMAT team members were unaware of the availability or timing of airframes, evacuation of hospitals and or nursing homes. MST did not establish a computerized log or registry due to lack of infrastructure and personnel. This single issue compounded the tracking and location of patients treated in the medical unit.
- Medical documentation using the standard form was dismal. There were multiple types of patient forms. Medical providers were unable to use effectively the multiple required sheets. A simplified single page easy to read sheet is urgently needed.
- Census and workload were tracked intermittently. Insufficient resources were provided for this activity. Because numbers of incoming and outgoing patients were not being recorded, there was no way to determine actual patient treatment capacity.
- No plans for alternate casualty collection points were established. The airport was overwhelmed with patients with not enough staff or outgoing to transport to handle the volume (this lasted for four days).
- No plans were in place for dealing with the influx of family members accompanying patients.
- No formal standard operating procedure was in place regarding the use of medical volunteers.

Recommendation - The NDMS system needs to be reorganized to better deal with events where DMATs are tasked with first response missions involving a large number of patients. This includes improved communications, adequate staffing, and sufficient supplies.

Recommendation - Assessment teams should be sent in on the ground to assess a situation before committing a full DMAT to a location.

Recommendation - ICS/NIMS must be used to provide order and structure to complex and chaotic incidents.

Recommendation - Incident managers should use effective tracking systems for patients and resources to aid in better decision-making.

Recommendation - Standardized patient record forms that are designed for optimal efficiency should be used. Modern computerized systems should be used. (One team member observed, "we should be tracking patients like FedEx or UPS tracks packages.")

Recommendation - Contingency plans should always be created in case patient-handling capacity is exceeded at a single location.

Recommendation - VMATs should be activated and deployed early for incidents that clearly will have a significant animal component.

Recommendation - A model commonly used by international relief organizations, where only one family member is allowed to accompany a patient seeking medical treatment should be established when large populations are dealt with.

Recommendation - Volunteer organizations (offering both medical and non-medical services) need to be utilized very early in response operations. Policies and procedures should be in place that deals with this.

## **Public Information**

There were a number of public information-related issues observed, including:

- Media was allowed to film patients and team members in treatment tents without permission.
- Media was allowed to enter team-sleeping areas unaccompanied.
- Media was allowed to interrupt teams while they were working.
- Teams were not briefed on how they should interact with the media.
- At times celebrity visits seemed to take precedence over patient care.

Recommendation - While there was a single FEMA press officer onsite, he was not knowledgeable about medical operations and did not have a good control of the media. Unaccompanied media were allowed to freely roam around the operations area. During a large incident it is essential to provide enough experienced liaison staff to deal with the media. Team members should be briefed on handling requests for interviews.

## **Operations**

**Standardized operations** - There were different team-specific approaches to triage and patient movement. This resulted in inefficiency when another team relieved a team at shift change and had a different way of doing things (equipment was rearranged and processes reorganized). Teams coming on shift would constantly be changing the way things were done. (One team member observed that the triage and patient processing done by some teams ran counter to START procedures described in the internal NDMS online training with problems arising due to EMS and conventional hospital triage systems both being used.)

Recommendation - Standardized operating procedures for triage and other common processes need to be established and adhered to for optimal efficiency.

**Support staff** - An insufficient number of litter bearers were available until approximately four days into the event. Insufficient nursing aids or helpers were available to perform daily living activities for nursing home patients.

Recommendation - Provisions must be made for adequate support staff during a large incident. Military, Forest Service fire crews, and volunteers could have been used early in this incident.

**Red Cross** - Red Cross was requested early during the incident, but didn't arrive at the airport until very late in the response cycle. This deficiency contributed to the suffering of the displaced persons and adversely affected the health and welfare of the population being evacuated. (When Red Cross did arrive, they requested to use on-scene, NDMS supplies, which were already in limited supply, instead of their own. This caused organizational friction.)

Recommendation - Red Cross needs to be included in planning and in an early support role during large FEMA/NDMS operations. There needs to be some mechanism for communicating with local Red Cross and establishing priorities for their missions.

**Shift accountability** - There were numerous occasions where other teams showed up late for their shifts or abruptly left with no real hand-off to a new shift. This prevented team members from getting rest or resulted in less than optimal patient care.

Recommendation - Team commanders must be accountable for their personnel and ensure shifts are responsibly staffed.

**Flight line** - DMATs ended up staffing a significant part of flight line operations (unloading and transporting patients from helicopters). Aircraft operations are a hazardous component of any mission, requiring specialized training and experience.

Recommendation - Flight line operations need to be handed off to experienced military staff as soon as possible. DMAT members with helicopter and aviation experience can be used to initially staff flight line positions, but from a safety perspective this responsibility should be tasked to the military, especially during extended operations and those involving a large number of aircraft.

**Treatment tent supplies** - Several team members commented that supplies in treatment tents were inefficiently organized.

Recommendation - Having labeled stacking shelves with designated standard supplies per each unit would greatly help in efficiency and evaluating inventory.

**Demobilization** - There were several demobilization-related issues observed, including:

- Mental health assessment and insertion was a good idea but execution was counter-productive. Most team members did not want an assessment at the time.



This should have been run through team mental health staff that was present. (The rumored plan to bus team members to Memphis in luxury motor coaches for a few days of relaxation at a hotel, providing them with swimming suits to lounge around the pool, was ill conceived and would have been greeted with extreme hostility by the team.)

- While immunizations for those who needed them was a good idea, inexperienced military personnel were performing immunizations. Most team members felt like they were guinea pigs.
- Paperwork for time and attendance needs to be better explained. It was difficult to enter hours when you worked the night shift.

Recommendation - Team mental health professionals, who have been operating during the deployment and are trusted by team members, should be consulted and integrated into any demobilization mental health plans.

Recommendation - Immunizations for team members should be performed by qualified team members.

Recommendation - Time keeping paperwork should have a clearly written instruction sheet that explains how to correctly fill out forms.

**Follow-up mission activation** - On September 15, 2005, the team commander received a call at 1110 that OR-2 had been activated and would be going to Baton Rouge. At 1116 a call countermanded the activation and placed it on hold. A request to talk to someone in operations was denied. The team was finally notified it was being activated to return to Louisiana again, late afternoon, September 17.

Recommendation - FEMA/NDMS does not seem to understand that DMAT team members have other jobs, and need to seek permission from their employers to deploy as well as make appropriate work and family arrangements. DMATs are voluntary organizations. Placing teams on alert or activation status, providing no additional status information, or seeming to arbitrarily stand teams down, causes considerable issues for team members. This has been an ongoing issue that FEMA/NDMS needs to have a greater awareness of.

## **Logistics and Supply**

**Onsite supplies** - Teams initially arriving at the airport were forced to work with two deficient caches (from TX-1 and TX-4 DMATs). According to a logistics officer, the caches were not updated versions and lacked critical equipment such as ventilators. In addition, there was a lack of standardization among some types of equipment that caused inefficiencies. One team member observed 5 different models/brands of glucose monitors, all using their own proprietary test strips that weren't interchangeable. The CA-4 cache, which was current, arrived later and supplemented these caches.

Recommendation - FEMA/NDMS needs to ensure that caches in the system are current, standardized and have essential equipment and supplies. The Basic Load cache contents should be re-evaluated, as the caches were insufficient to meet the needs of this incident.

**Resupply** - Critical medical supplies and pharmaceuticals were quickly expended. Requests for resupply items went unfilled after several days by FEMA/NDMS logistics, and the team made requests to the Air Force and PRC Compassion (a volunteer organization performing relief work at the airport). These requests were quickly filled within a 24-hour period. (It was later discovered some supplies had been restocked, but were delivered to the airport in unlabeled containers with no notification.)

Recommendation - The system needs to be improved to ensure medical supplies are promptly available when supplies are diminished. At the very minimum, it would have been appropriate to use part of the Strategic National Stockpile to support this operation.

**Cache restock and availability** - Upon arrival in Baton Rouge, the team's cache was assigned to another DMAT (a developmental team, that had no experience in setting up tents and other equipment). OR-2 had no idea when its cache would be restocked and returned to the Portland, Oregon home base. This is a critical deficiency that leaves the team without medical equipment in case there is another incident.

Recommendation - FEMA/NDMS should develop a redundant cache system that allows team caches to be immediately available after they are expended, so a team is fully deployable soon after an incident.

**Lack of accountability/MCI (Mass Casualty Incident) equipment** - There were no command vests, no command/accountability boards, and a limited number of triage tags.

Recommendation - Sufficient MCI and accountability equipment should be carried in the caches.

## **Pharmacy**

An annex containing pharmacy-specific issues will be attached to this report when completed.

## **Transportation**

**Cache transportation** - The team was ordered to drive their cache from Portland, Oregon to Baton Rouge, Louisiana (3,000+ miles), adding five days to the availability of essential medical equipment. This also removed six team members who served as drivers from the availability roster.

Recommendation - In critical incidents, team caches should be flown by military or commercial aircraft. On long distance responses, professional drivers should be used to drive trucks to free up team members for medical and support roles. (FEMA/NDMS policy has been to air transport caches to incidents greater than 1,000 miles away from team warehouses. No explanation was given for this policy deviation. Other teams in Washington and California also ended up driving their caches.)

**Recalled FEMA/NDMS trucks** - FEMA/NDMS trucks were subject to a recall that was not communicated to the teams at the time of the recall. The three recalls on the FEMA/NDMS issued trucks had not been corrected, due to the dealer in Portland not having the required parts and technical bulletins. One truck experienced a cooling system failure during the cache transport. Since this same failure had occurred previously on the other two trucks the driving team was familiar with it and was able to repair with a minimal amount of time lost.

Recommendation - Teams need to be notified immediately of vehicle recalls and have service immediately performed. Trucks are a mission critical resource.

**Deployment timeframe** - The team was activated on the afternoon of Tuesday, August 30, and given instructions to be in Houston the next day (August 31). Because of the policy of making individual travel arrangements (see below), the last team member arrived in Houston shortly after midnight on September 1. The team departed for Baton Rouge in rental SUVs and vans at 5:00 AM on September 1. During the drive, team commanders had several phone conversations with other teams at the New Orleans Airport who stated the team was urgently needed due to the large number of patients. Instead of heading directly to the airport, the team was requested to first stage at Louisiana State University. After staging for nearly two hours, the team received an escort to the New Orleans airport, arriving at approximately 3:30 PM. Roughly 48 hours had elapsed since the activation order and the team arriving at the incident.

Recommendation - During critical incidents teams should be flown together as a group as close to the incident as possible. More efficient and rapid ground transportation methods should be explored.

**Travel arrangements** - Upon activation, team members must individually call a National Travel desk and make their own airline reservations to a designated location (it's worth noting that team member experience in dealing with National Travel has been quite positive). This results in team members arriving singly or in small groups. During the Katrina deployment, team members arrived in Houston over an 18-hour time period due to individually arranged flights. This policy caused a delayed response.

Recommendation - Group arrangements should be made through a single travel arrangement to allow the team to arrive together or as timely as possible.

**Convoy** - During the drive from Baton Rouge to the Airport, the team was in a law enforcement escorted convoy, traveling above the speed limit. There were no placards or

flashing lights used to identify the placard (the Federal Protective Services escort cars were not well marked and used grill flashing lights). Not all team members have experience or training in high-speed driving, and traveling in a tightly spaced convoy increased the level of risk of a motor vehicle accident.

Recommendation - Designated vehicle drivers should have fire, EMS or law enforcement driving experience and training. Efforts should be made to minimize the number of vehicles in convoys by using 15-passenger vans or buses to transport team members. Risk mitigation needs to be applied to any situation where vehicles are operated above the speed limit. The question needs to be asked whether the few minutes saved in arrival time justifies the risk of high-speed vehicle operations.

Recommendation - Identifying placards and/or flashing lights should be used during any convoy movement. Liquid white shoe polish should be used for marking windows with vehicle numbers.

**Demobilization** - Several team members observed that there were unsafe conditions during the convoy back to Houston, with speeding vehicles and a lack of coordination.

Recommendation - Wildland fire statistics show a significant number of motor vehicle accidents occur following demobilization. Safety needs to be strongly emphasized during demobilization vehicle operations.

## **Communications**

**Activation** - Team activation is a very labor-intensive activity, involving sending email, pages, text-messages and manually calling team members.

Recommendation - Teams have been told for several years that NDMS will provide access to a program that automatically contacts cell phones and pagers during activations. Critical events such as Hurricane Katrina reinforce the need for a means of rapidly notifying team members.

**Convoy communications** - Before departing, the team pulled its Motorola JT-1000 radios from the cache to ensure communications during the convoy (there still weren't enough radios for all vehicles though). The need for communications during convoy operations was made very clear during Hurricane Ivan, especially when running a large convoy (for Katrina, the team fielded 11 rental SUVs and vans). Other teams, who didn't have access to their radios, had no communications during convoys and encountered safety-related issues due to a lack of communications.

Recommendation - Allow the use of personal FRS radios during convoy operations. NDMS/FEMA issued a directive banning the use of FRS radios last year during Hurricane Ivan, threatening to confiscate radios and send teams home. FRS radios are small, cheap, run on AA batteries, and have a sufficient range for convoy operations.

**Cellular phone communications** - There is an over reliance on cellular phones for communications. The cellular infrastructure was severely damaged during Katrina and cell phone service was initially unavailable (this also occurred during Hurricane Ivan, but was not as severe).

Recommendation - More satellite phones should be issued to the teams. These phones should be removed from the cache upon deployment so they can be used by team leadership en route to an incident or at the scene.

**Onsite radio communications** - Radios were not being effectively utilized within the airport for inter-team communications. (The JT-1000 radios failed to reach many areas of the airport.) Interoperability with other agencies present was a large issue. Until Bendix King radios were supplied by the Forest Service (which had greater penetration both inside and outside the buildings), there was no way for treatment tents or individuals to communicate with security personnel.

Recommendation - Interoperability and performance issues with the current FEMA/NDMS radios needs to be evaluated. Repeaters, using a common frequency, should be considered for urban areas with poor communications and multiple-agency use.

**Truck communications** - Radios and satellite phone provided with the FEMA trucks were not programmed and could not be used for communications by the team driving the cache.

Recommendation - FEMA/NDMS issued communications equipment should be programmed and readily usable upon delivery.

**GPS** - Personal GPS receivers and laptops with GPS and moving maps were successfully used during vehicle movement.

Recommendation - Portable GPS receivers that support moving-maps should be issued to the teams.

## **Security**

The airport was a moderate to high-risk environment during the initial part of the team's deployment. Assaults, rapes, and non-violent confrontations occurred both inside and outside of the airport. Displaced individuals were evacuated by helicopter and bus and transferred to the other concourses not being used for medical treatment. Many weapons (knives, guns, bats) were found on some of these individuals. According to unofficial sources, two rival gangs were evacuated and were housed in the same concourse. Many displaced individuals, including some of the alleged "troublemakers" relocated from the Superdome, were extremely unhappy and the possibility of a riot in this population was high. There clearly was not enough security during initial operations to provide adequate

safety for team members. (This was eventually remedied by a very large military and law enforcement presence.)

**Assessment** - To the best of knowledge, no security assessment was performed of the airport facilities before or upon arrival of the DMATs.

Recommendation - In conjunction with DMAT and/or MST command, security professionals should assess a potential deployment site. (DMAT security officers can perform this task, if they have the appropriate training and experience. Just because a team member has law enforcement experience does not necessarily mean they are qualified to perform threat assessments and mitigation.)

**Federal Protective Services** - The airport detail was very well managed, extremely professional and interacted well with team members. Initially the FPS team was understaffed, but was supplemented by other federal and military law enforcement and security forces.

Recommendation - Deployments to Hurricane Ivan and Katrina both showed the value of FPS personnel being deployed with DMATs. This is a positive and should continue.

**Chain of command** - As operations progressed, and a greater number of security forces arrived, there was no clear chain of command or defined roles and responsibilities of security assets. Late into the incidents, an effort was made to coordinate security forces.

Recommendation - Coordination of multi-agency security resources needs to begin early. MST should assign a law enforcement liaison early on during large-scale events.

**Patient food and water** - Food and water for patients, when it was finally available, was being stored in the midst of the medical operations area. This presented a security risk, because ambulatory patients and family members were entering the treatment area to get food. In addition, there was no clear food distribution plan established, which presented a significant security risk.

Recommendation - Food and water distribution needs to be located away from treatment areas, with a predetermined distribution plan in place.

## **Evacuees**

There didn't appear to be a clear plan for dealing with the approximately 25,000 evacuees who arrived at the airport. There was insufficient food, water and sanitation. One team member commented on the fact that evacuees were being taken from a very dehumanizing experience (flooding and rescue) and placed into an equally dehumanizing environment at the airport. There didn't seem to be any consideration given to the potential of civil unrest because of these conditions. The situation was very similar to those found in the Third World.

Recommendation - FEMA/NDMS should have consulted USAID/OFDA or an international NGO such as CARE who had experience dealing with large displaced populations and could have provided skills and expertise in developing effective food, water and sanitation programs. Relationships with these organizations should be established and plans established for successfully handling displaced person populations.

Recommendation - An effective screening process needs to be established that separates evacuees into categories of those who need medical treatment and those who don't. A number of healthy evacuees ended up being triaged, simply because they didn't know they were in a medical treatment line. Additionally, a number of evacuees choose to enter the triage line, thinking they would be evacuated sooner or receive preferential treatment.

## **Personnel-Related**

**Meals** - Forest Service catering provided a large boost to morale and nutritional needs (especially sack lunches and coffee for the night shift).

Recommendation - While the team could have subsisted on MREs for the deployment duration, morale would have been definitely impacted. Efforts to supplement MREs with "real" food should be made at every opportunity.

**Crew rest** - Team efficiency was likely adversely impacted by a substandard crew rest and sleeping area. The overhead PA system, constant foot traffic, and lack of sufficient light and noise controls hampered rest. Some teams made the mistake of working for over 24-hours with no rest.

Recommendation - Adequate sleeping and R&R areas need to be identified and established. This is especially critical in supporting a night shift.

Recommendation - While it's easy to fall into the trap of "needing to save lives" and working until you drop, operational efficiency diminishes dramatically with no rest and has negative implications during an extended incident. Developing operational periods and shifts to ensure crew rest is essential. OSHA and the federal government wildland firefighting have established 2 to 1 rest ratios (a maximum of 16 working hours without rest) in the interest of safety and efficiency. NDMS should follow these standards. Crew rest is also very important when driving to an incident, especially at night, in unfamiliar locations, and during hazardous conditions.

**Personal hygiene** - Forest Service shower facilities were essential to morale and personal hygiene. Restrooms were inadequate for the population size (especially the women's facilities).

Recommendation - While DMATs are supposed to operate to austere environments for an extended period of time, the reality is many team members don't have much experience in

living in true austere conditions. This needs to be considered and as many "creature comforts" as possible related to personal hygiene should be introduced.

**Morale** - Team morale tended to be upbeat considering the challenging and stressful environment.

Recommendation - Task a mental health professional with "morale officer" duties. This was effectively implemented during the Hurricane Ivan deployment. Access to the Internet, telephone calls home, and access to news sources would all have been beneficial from a morale standpoint.

## **Health**

**Mental Health** - The presence of team mental health staff was very important for both team members and patients.

Recommendation - Mental health professionals need to continue to be deployed on missions. The roster depth needs to be increased to support this. Training sessions dealing with triaging psychiatric illnesses would be useful for medical staff.

**Public Health** - There were a number of public health-related issues observed:

- Airport water was not tested for potability.
- There was potential contamination from team members walking in urine and feces (a bleach tub was initially placed outside the sleeping area, but wasn't subsequently used).
- Restrooms were crowded and not kept clean.
- Flies became active in the sleeping area toward the end of the deployment.
- Immunization vaccines were lacking in the pharmacy cache.

Recommendation - The assigned safety officer needs to take an expanded role in identifying and remedying public health issues.

Recommendation - Food discipline in sleeping areas should be enforced with separate eating areas.

Recommendation - Team members need to be current with their immunizations. In environments where public health risks are identified, sufficient doses of appropriate vaccines should be available.