

Mass Shelters: Environmental Health Issues

**Satellite Conference and Live Webcast
Friday, June 29, 2007
12:00 - 1:30 p.m. (Central Time)**

Produced by the Alabama Department of Public Health
Video Communications and Distance Learning Division

Faculty

**Courtney Bock, RS
Sanitarian, Consumer Health Services
Houston Department of
Health & Human Services
Houston, Texas**

Faculty

**Jaret Lane, RS, MPH
Administrator, Food Safety Programs
Environmental Public Health Division
Harris County Public Health &
Environmental Services
Harris County, Texas**

Faculty

**Mark D. Miller, RS, MPH
Captain, US Public Health Service
Senior Environmental Health Officer
Environmental Health Services Branch
National Center for Environmental Health
Centers for Disease Control & Prevention**

Program Objectives

- Describe the roles of environmental health professionals in shelter operations.
- Describe key environmental health issues in shelters.
- Present sanitation standards of shelters.
- Provide educational resources on shelter operations.
- Lessons learned from Mega Shelters.

Types of Shelter

- General public shelter: self sufficient
- Special needs shelters: minor medical/nursing needs
 - Physical, emotional, sensory or visual impairment
 - Extended care facilities
 - Mental care facilities
 - Populations requiring care
- Special needs shelter - definitions vary

Special Needs Shelter

- <http://www.doh.state.fl.us/PHNursing/SpNS/SpecialNeedsShelter/SpecialNeedsShelter.html>

Shelter Classification

- Refuge of last resort
- Risk shelter
- Host shelter
- Recovery shelter
- Special needs shelter
- Recovery center



http://www.iaam.org/members/Sec_pages/Mega-ShelterPlanning&Activation.pdf

Shelter Classification

Shelter Classification	Space Allocation	Operation Period
Refuge of Last Resort	10-15 ft ²	end of event
Risk Shelter	20 ft ²	24hrs prior to 72 hrs post event
Host Shelter	40 ft ²	24hrs prior to 72 hrs post event
Recovery Shelter	40-60 ft ²	72 hrs post event and beyond
Special Needs Shelter (SpNS)	60 ft ²	24hrs prior to 72 hrs post event
•SpNS Host Shelter	60-100 ft ²	24hrs prior to 72 hrs post event
•SpNS Recovery	60-120 ft ²	24 hrs post event and beyond
Recovery Center	40 ft ²	24 hrs post event and beyond

Selecting a Shelter Site

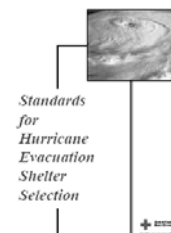
- Size
 - Evacuation shelter 40 ft²/person
 - 40-50 ft³ of air space/person
- Structural integrity
 - Hurricane rating
 - Earth quake protection
- Water facilities
 - 4-5 gallons per person per day

Selecting a Shelter Site

- Location
 - Flood zones
 - Protected areas – inland
 - Accessible to population
- Adequate sanitation facilities
- Laundry facilities
- Well lighted
 - Stairs, walk ways
 - Auxiliary light sources

Selecting a Shelter Site

- Fire and life safety code compliant
- Handicap accessibility



Publication # ARC 4496

Help Is Available...Just Ask

- Environmental health support
 - County and state assistance
 - EMAC – state to state
 - Federal support – ESF 8

Mega Shelter Experience



- August 29, 2005 – Katrina hit the central Gulf Coast
- August 30, 2005 – Levees breached in New Orleans
- August 31, 2005 - 3:00 am Governor's office of Emergency Management asked Judge Eckels to open Reliant Astrodome for evacuees from Superdome

- 6:00 am Harris County Emergency Management formed Unified Command for Hurricane Katrina Response – “Operation Dome” was born

Plans for Operation Dome Are Placed Into Action

- Facilities: Lights and A/C turned on immediately. August 31st: High was 97 degrees with 70% humidity.
- Reliant Park management and security teams prepared buildings and secured sensitive areas.
- Red Cross moved in with cots/blankets/comfort packs.

Plans for Operation Dome Are Placed Into Action

- Aramark had concession contract for the complex and hired additional food service personnel (800).
- Harris County Hospital District established a 100,000 square foot field hospital with full triage, electronic patient registration, lab, X-Ray and pharmacy.
- 2,700 doctors and medical professionals volunteered.

Sept. 1 – Next Day – Buses Kept Coming

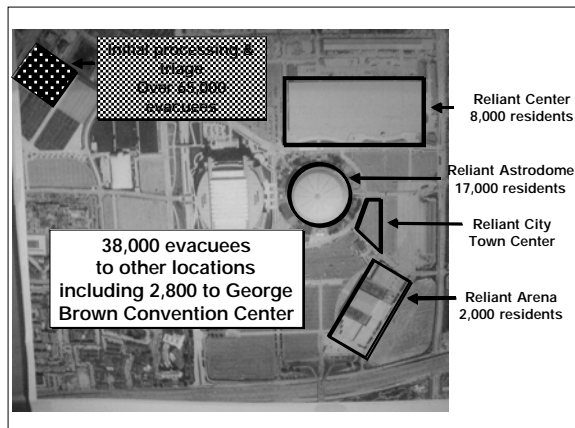
- Hundreds of volunteers arrived, turned into thousands.
- Increased number of law enforcement officers, EMS and fire safety personnel required to maintain controlled chaos.
- Approx. 500 police officers and 50 EMS/Fire personnel were on site each day.

Sept. 2 - Expanding Situation

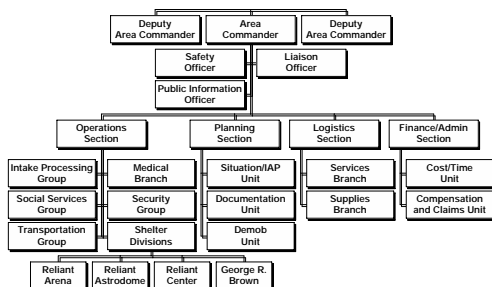
- Reliant Astrodome was reaching capacity. City of Houston Fire Marshal ordered cap at 8,000.
- Arriving buses were asked to continue on to next county. Drivers refused, abandoned buses and left passengers.

Sept. 2 - Expanding Situation

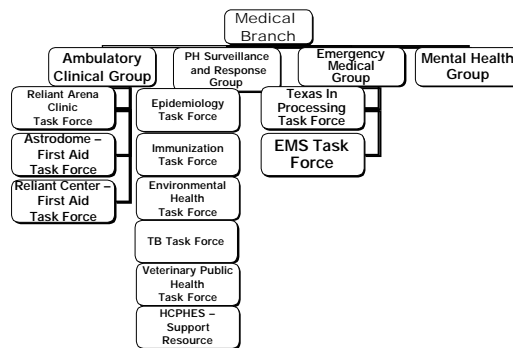
- Houston's mayor overrode his fire marshal and authorized up to 12,000 evacuees inside Astrodome.
- Other complex facilities were opened.
- Smaller community shelters continued to open.



NIMS Incident Command System



Reliant Medical Branch



Roles of Environmental Health in Shelters

- Shelter site selection
- Organization and layout of shelter
- Food safety
- General safety
- Water supplies and handling
- Wastewater
- Solid waste disposal
- Fixed and portable sanitary facilities
- Air quality/climate control

Roles of Environmental Health in Shelters

- Infection and disease control
- Oversight of cleaning and sanitation
- Vector control
- Laundry (clothes and bedding)
- Barbershops
- Outside premises
- Daycare
- Playgrounds
- Long lines

Food Safety

- Protection
 - Storage
 - Preparation
 - Service
- Control
 - Hoarding
 - Pests
 - Incorrect Temperatures

Food Issue Encountered

- Pooling water
- Suspected food borne illness
- Condemnation of product
 - Uncovered potentially contaminated food
 - Incorrect storage temperature

Food Issue Encountered

- No self-service of foods excepted packaged and whole fruit
- Feeding people who are in restricted area of shelter
- Donated food
- If in doubt throw it out.

Housekeeping

- Protect staff
- Protocol to clean
- Identify areas needing cleaning that may transmit disease
 - Phone bank
 - Hand rails
 - Restrooms

Housekeeping

- Laundry services
 - Separate sorting and folding
 - Cleaning
 - Returning cleaned clothes

Cleaning Procedures

- Identify area, objects, or sites to be cleaned
- Procedures for staff and volunteers
- Education
 - How often do you make cleaning agents?
 - Where and when should people clean?

Sanitation

- Protocol for correct body fluid spills
- Waste receptacle
 - Women's showers
 - Food area
- Hand washing
- Restroom cleaning

Chemical Sanitization

- Effective chemicals
- Construction of correct chemical concentration
- Frequency of cleaning
- Disinfectants
 - Bleach
 - Registered EPA Norovirus Disinfection Agents: Vikron, Miikro-Bak III, Eco Tru

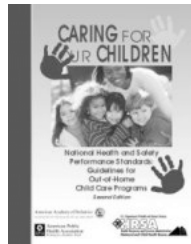
Chemical Sanitization

- Chemical safety
 - Mixing
 - Food safety

Children's Area Inspection

- Protocol
- Hand Sanitization
- Clean of Fomites
 - Toys
 - Commonly touches surfaces
 - Diaper changing
- Correct Sanitization
- Special needs children
- Observed toys in area
- Approved child care workers

Children's Area Inspection



<http://nrc.uchsc.edu/CFOC/index.html>



Infection Control

- Gastrointestinal illness
 - Viral
 - Bacteria
 - Parasites
- Respiratory illness
 - Airborne droplets
 - Direct contact
 - Fomites

Transmission Routes

- Airborne
- Droplet
- Contact
 - Direct – person to person
 - Blood borne, STD
 - Indirect – person to object to person
 - Fomites (objects, surfaces)

Outbreak Control

- Separate area for ill persons
 - Maintain separation until symptoms have ceased for 24 hours
- Hand washing/sanitizing stations at each entrance to isolation area
- Increased housekeeping

Outbreak Control

- Respiratory hygiene
 - Cough/sneeze into sleeve
 - Use disposable tissues, dispose of immediately
 - Wash hands often and avoid close contact with others
- Maintain adequate supplies
 - Tissues, trash receptacles, hand sanitizer

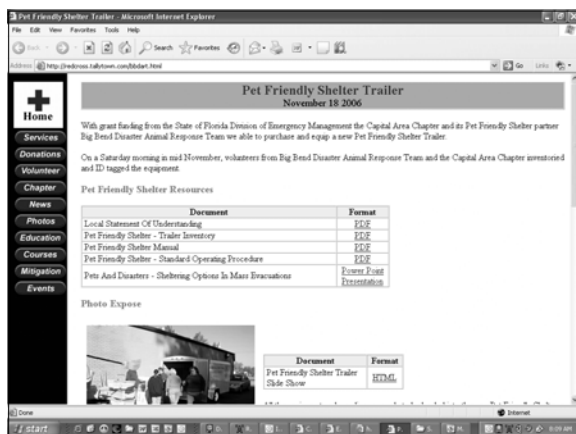
Outbreak Control

- Provide paper towels to open restroom doors
- Increased restroom cleaning frequency
 - Hourly
- Sanitize surfaces with bleach or other disinfectant
- Hand washing, hand washing, hand washing

Pets Shelters and Human Shelters



<http://redcross.tallytown.com/bbdart.html>
<http://www.flsart.org>



Pet Shelters – Health Considerations

- Hand washing for pet owners and staff
- General cleaning and disinfection
- Allergies
- Air flow
- Worker protection
- Fecal management
- Animal food storage
- Biohazards/sharps



Options for Emergency Shelters

- People and pets in same room
- People and pets in separate spaces in same building
- Animal-only shelters
- Large animal/livestock facilities

People and Pets in Same Room

- Least labor-intensive
- Owners feed, exercise and clean up after pets
- Rules about keeping pets in crates, waste disposal and so on

People and Pets in Same Room

- Benefits
 - Avoid separating people and pets
 - Many pets do better with owners taking care of them

People and Pets in Same Building

- Owners in same building, but separate area
 - Still care for pets
- Somewhat labor-intensive
 - Owners not immediately available
- Used in many Florida counties during 2004 hurricanes

Animal-Only Shelter

- Often based at an existing animal shelter
- More labor intensive
 - Staff cares for animals
 - Sometimes expanded role for shelter staff

Pet Shelter Requirements

- Meet safety standards
- Conducive to housing animals
 - Solid, non-porous floors
 - Good ventilation
- Free of other obligations during declared emergencies

Potential Shelter Locations

- Fairgrounds
- Pastures
- Restaurants
- Schools (gyms)
- Ball fields
- Warehouses
- Vacant stores
- Parking lots

Marion County Preparing Building



Lining hallway with plastic

Marion County Preparing Building



Placing rubber runner

Marion County Registration



Fastening armbands on owners and neckbands on dogs

Pet Owner Responsibilities

- Conduct pre-disaster training
 - Pets and disasters: personal planning
- Provide crates or cages large enough to stand, sit and turn around
- Supply medications

Marion County Floor Still Shiny



Special Needs Individuals Encountered in Shelters

- Elderly
- Individuals with pre-existing medical conditions
 - Diabetes, obesity, hypertension, handicapped, and deafness
- Addicted individuals

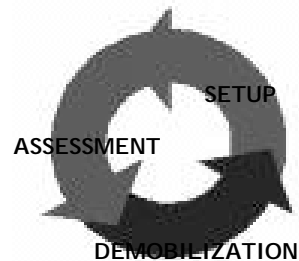
Special Needs Individuals Encountered in Shelters

- Mothers
- Children with special needs
- Individuals with mental conditions
- Families
- Multiple languages

Emergency Operations Management

- Supervision of operations
- Wear many hats – planner, educator, communicator, coordinator, trouble shooter, developer of policies and procedures, staff advocate
- Delegate
- Determine battles that can be lost, those that must be won

Environmental Health Involvement in Shelter Operations



Planning

- Pre-event planning – location, procedures, checklists
- Know layout of facilities; obtain floor plan and blueprints
- Evaluate adequacy of food preparation and serving areas

Planning

- Assist in determining location of living quarters, rest rooms and showers
- Anticipate situations, human needs, establish procedures and “be prepared for the unexpected.”

Communication

- Communicate expectations of staff now.
- Build teams early on.
- Don't forget the safety officer.
- Identify and meet with other organizations that have overlapping responsibilities.

Communication

- Obtain agreement from IC for situations that won't require IC approval.
- Develop a list of key contacts in charge of shelter operations, housekeeping, supplies and food service.

Communication

- Provide summary reports using standardized forms for IC.
- Develop method of receiving feedback from IC regarding status of request.
- Establish briefing/debriefing routines.
- Get wired (radios, pagers, cell phones, lap tops, printers.)

Staffing

- Staff robustly – ask for help
 - Permanent staff
 - On-call staff
 - Staff from other entities
- Identify and utilize special skills of staff; guard against misuse of staff

Staffing

- Location assignments, strike teams
- Work schedules, staff rhythm
- Consider staff needs (physical, emotional, safety)
- Staff must be easy to identify up close and at a distance

Health Education

- Determine priority health messages and make them simple
- Educate IC, shelter staff, volunteers, residents
- Use variety of tools (banners, signs, announcements, videos, hands-on.)
- Use media to disseminate health information
- Communication needs (language, deaf)

Volunteers

- Meet with volunteer coordinator early on.
- Identify education and skills volunteers will need regarding environmental health issues.
- Screen volunteers.
- Provide just in time training.
- Provide self-inspection checklists, people in charge

Janet's Lessons Learned

- Environmental health plays a significant role in preventing or decreasing the spread of disease in a disaster relief facility.
- Prepare now – establish relationships and procedures.
- Communicate importance of basic sanitation and get commitment from incident command.
- Accept offers of help.

Courtney's Lessons Learned

- More on-site inspectors with increased communication
 - Daily correction
 - Volunteers
 - Organization
 - Food service
 - Cleaning of portable restrooms

Courtney's Lessons Learned

- Observe, correct and enforce Regulations to protect public health.
- It's not if but when and where will the next event happen.
- When in doubt throw it out.

Mark's Lessons Learned

- Robust staff with diversity of skills
 - Food safety
 - Institutional
 - Occupational health and safety
 - Support staff
- Have a can do service attitude
- Be prevention minded
- Develop a daily schedule/rhythm
- Enforce the basics of public health

Upcoming Programs

Pandemic Influenza Information for
First Responders: The Basics
Thursday, July 19, 2007
12:00 - 1:30 p.m. (Central Time)

For complete listing of upcoming
programs visit: www.adph.org/alphn