Pre-Meeting Preparation:
Please read/review the following enclosures:

- “USNS Comfort: Care of the Sick on the Sea” (AMSUS presentation, 2010)
- “Profile of Pediatric Admissions to the USNS Comfort” (Poster, 2010)

Conference Agenda:
- Field trip to Baltimore to tour the USNS Comfort
- Complete USNS Comfort Quiz & Discussion Questions
  (Discuss answers during car rides to and from the Comfort)

Extra-Credit:
- “Practicing Internal Medicine Onboard the USNS COMFORT in the Aftermath of the Haitian Earthquake” (Annals of Internal Medicine)
- Fun facts about the USNS Comfort
Curare Aegra Permarinum
“Care of the sick on the Sea”

LCDR Matthew D. McLean, M.D., Ph.D.
Pediatrician, Naval Medical Center Portsmouth
Continuing Promise, 2009
Operation Unified Response - JTF Haiti, 2010
LEARNING OBJECTIVE

Understand the adaptable capabilities of the USNS COMFORT with specific focus on Operation Unified Response, JTF- Haiti
USNS COMFORT: The Ship

Ship’s Master = Military Sealift Fleet Support Command

- 894 feet long
- 106 feet wide
- Max Speed 17.5 knots
- 4 water distilling plants = 300,000 gallons/day.
- Holds 2 MH-60 helicopters
- Draft- 33 ft
- Power 3000KW (4 generators)
- Range 113,420 NM

Delivered December 1 1987
One of the largest trauma facilities in the U.S.

1) Full Spectrum of Medical and Surgical Services
2) 10 Operating Rooms with C-Arms
3) 1 CAT Scan suite
4) 1 Dental suite (2 OR’s)
5) Optometry and Lens Laboratory
6) Physical Therapy Center
7) Pharmacy
8) 2 Oxygen producing plants
9) Blood bank (holds up to 5000 units)
10) Angiography Suite (under construction during OUR-Haiti)
Mobile Afloat Medical-Surgical Hospital

BED CAPACITY

20 Recovery beds
80: ICU Beds
400 Immediate care
500 Minimal care
1000 Total beds
+ 40 Casualty Receiving Beds

Theoretical Capacity
PATIENT FLOW

ICU  RECOVERY  OPERATING COMPLEX
INTER.  INTER.  INTER.  LIMITED

PATIENT FLOW

Patients arriving by boat will enter through side port.
Real Life Capability- Haiti Experience

“The hospital ship, COMFORT, is expected to arrive in Haiti, Jan 20th and will essentially provide all the assets and services of [a naval hospital] at sea”

US Fleet Forces Public Affairs 19 Jan 2010
NNS100119-18, Navy.mil
CAPABILITY: MOBILIZATION

Reduced Operating Status (ROS)

- 17 Civilian Mariners (CIVMAR)
- 58 Military Medical Personnel

Full Operating Status (FOS)

- 13 January - verbal order to deploy
- 16 January – set sail, 76 ½ hrs later
  - 550 medical personnel
  - 140 non-medical personnel
  - 67 CIVMAR

- 19 January ~2200 - 1st Pt aboard
COMFORT Medical Capabilities
First 72 hours.

Deployed with standard Humanitarian Civil Assistance mission capabilities.

**Surgical Staff**
- 1 orthopedic surgeon
- 1 Emergency Medicine physician
- Variety of other surgical specialties without front load of ortho-neuro-trauma
- Most had combat tour experience

**Medical Staff**
- Broad range of specialties based on HCA missions vice disaster-trauma
- Most with inpatient medicine skills

**Nursing Services**
- Wards staffed for 250 beds
- Filled 411 beds with critical care pts
- Few pediatric trained nurses
- all with adaptable RN/HM skills

Develop JMD tailored to provide medical capabilities for disaster response missions

Federal Physician / SMACF Program, AMSUS 2010
Admissions, discharges, deaths

USNS Comfort Operation Unified Response Haiti
Patient Admissions, Discharges, Deaths 19 Jan - 3 Mar

2nd wave providers

Project Hope

2nd group NGO, Reservists and Mental Health

Federal Physician / SMACF Program, AMSUS 2010
Federal Physician / SMACF Program, AMSUS 2010

USNS Comfort Pediatric Population

Date

Pediatric Patient

19-Jan 23-Jan 27-Jan 31-Jan 4-Feb 8-Feb 12-Feb 16-Feb 20-Feb 24-Feb 28-Feb

providers Arrive

Project Hope Arrives

2nd Group NGO's, Reservists, and Mental Health

TOTAL PEDS CENSUS

2FWD PEDS

3FWD PEDS

5FWD PEDS

ICU PEDS CENSUS

UNCLAS//FOUO
Ancillary Services
USNS Comfort 20 Jan - 28 Feb 2010

- Radiology Studies – 3,896
  - Plain film x-rays – 3,296
  - CT Scans – 482
  - Ultrasound – 118
- Prescriptions – 70,286
  - Inpatient – 64,840
  - Outpatient – 5,446
- Blood Products – 376 units
  - Red Blood Cells – 348
  - Plasma – 16
  - Platelets – 12
- Laboratory Studies – 4,257
- Physical Therapy - 1,318
- Discharge Planning
  - Key coordination between network of NGO/Haitian facilities- 16 different sites
Joint Medical-Surgical Capability

Delivered and Coordinated Care for 794 Haitan Nationals
185 patient escorts
52 Active Duty
3 Allied Troops
23 American Citizens
1057 Total Admissions

- 7 OR’s 12 hours/day
- 3 OR’s 24 hours/day
- 820 Surgeries
- 931 total procedures

16 Craniotomy 44 Spinal
33 Pelvis 676 Extremity
122 Femur Fracture surgeries

48% of pediatric patients did not require surgery
Thank You
Profile of Pediatric Injuries not requiring Surgery

CATEGORIZATION OF ADMISSIONS
NOT NECESSARILY SURGERY
OTHER
MEDICAL
TUMOR
ALREADY TREATED
OPHTHALMOLOGIC
CHRONIC PROBLEM

RESULTS
1. 224 (28.5%) of the 787 total humanitarian admissions were pediatric patients. (Figure 1 and 2).
2. Pediatric census peaked at 126 patients on 29 January prior to arrival of additional pediatric providers and nursing staff from Project Hope. Initial limited staff spread over 3 separate wards with a peak single ward census of 50 patients. (Figure 2).
3. 156 (69%) of pediatric admissions were classified as quake related injuries. These patients were significantly older (9.2 vs 5.5 yrs) and admissions longer (10.4 vs 8.2 days) than non-quake related admissions. (Figure 3).
4. 167 (75%) of pediatric admissions were for trauma related injuries. These patients were significantly older than those admitted for medical reasons (9.53 vs 3.25 years). (Figure 3).
5. A Bimodal Age Distribution of pediatric patients was observed with peak admissions for infants < 1 year and children 12 years of age. (Figure 4).
6. The anatomic location of injuries profile in pediatric patients admitted to the COMFORT was similar to that seen at field hospitals during other earthquake disasters (Figure 5).
7. Only 113 patients (51%) required surgery and 68% of these had their 1st procedure in one day or less (Figure 6).
8. 48% of the patients not requiring surgery were evaluated by a surgeon although 35% could have been treated afloat with basic film radiology services been available before transfer to the ship. 25% had already been treated prior to transfer or had an inoperable chronic disease unrelated to the earthquake (Figure 7).
9. Fifty-six patients (25%) were admitted to the PICU, the majority (44%) for non-quake related (Figure 8) and non-traumatic injuries. (Figure 9).
10. A CBC was obtained on 106 patients (47%) with no relationship to type of injury. The average hemoglobin concentration (9mg/dL) was identical across injury profile groups. (Figure 10).
11. The packed RBC per patient index was comparable to that seen in Operation Iraqi Freedom using the OIF Mass Casualty Resource Assessment. (Figure 10).

REFERENCES

CONCLUSIONS
1. Despite the challenges in transferring patients to a ship based hospital platform, the percentage of pediatric patients and the overall injury profile was similar to that seen at land based hospitals during previous earthquake disasters. This should be considered when planning resources for future missions.
2. Pediatric providers were integral in supporting the surgical team effort by managing most of the pre- and post-surgical pediatric care on the wards allowing surgeons to focus efforts in the operating suite. This hospitalist approach contributed to the minimal delays seen from time of admission to first surgical procedure despite the initial overwhelming influx of patients.
3. Manning decisions for future disaster relief missions should include pediatric intensivists given an expected early surge and sustained PICU census with a step down area to more efficiently utilize limited critical care resources.
4. Future studies should evaluate the referral process to the COMFORT during disaster relief missions to optimize utilization of its advanced level 3 medical capabilities and maximize support available for referring field hospitals.
**USNS Comfort Quiz**

*Some questions are based on the readings; some will need to be completed during the tour.*

1. What day had the most admissions during the Haiti operation? **January 21**
2. What day had the highest census in the Haiti op? Highest pediatric census? **January 29**
3. How many football fields long is the Comfort? **3**
4. How fast is the max speed of the Comfort when translated to miles per hour for a car? **20 mph (1 knot = 1.15 mph)**
5. Name a type of Navy vessel that has a max speed faster than the Comfort? **HSV-2 Swift (Dr. Higginson’s ship); 45 knots**
6. Name a type of Navy vessel with a max speed slower than the Comfort?
7. What's the average water usage of a person living in DC and how does it compare to the daily water available to personnel on the Comfort when underway with a full crew? **80-100 gallons/day vs. 300,000 gallons/day**
8. If you were designing a hospital ship, where would you locate the ORs and why? **See pic**
9. How many ships have been named COMFORT? What was the name of *this ship* before she was converted to the USNS Comfort? *(Hint: Look around the mess deck walls)*
   - **The USNS Comfort (T-AH-20) is the third ship to bear the name. Previous Comforts (AH-3 & AH-6) distinguished themselves in service during the world wars. The prior name of this ship was SS Rose City.**
10. How many hospital beds does the Comfort have? OR’s? Lifeboats? Patient elevators? **1,000 beds; 12 OR’s; 10 lifeboats; 9 elevators**

**USNS Comfort Discussion Questions**

*You are on a humanitarian mission to a developing nation devastated by a natural disaster:*

1. **As a pediatrician, what diseases should you prepare for?**
   - *This largely depends on the type of natural disaster. As mentioned in the article, the illnesses/injuries seen after the Haitian earthquake (crush injuries, blunt trauma, wound infections) were very different than the illnesses/injuries seen after the Indonesian tsunami (drowning, water-related injuries). Another big lesson learned from the Haiti earthquake was to be prepared for deliveries, both of term and pre-term infants.*
   - In general, though, humanitarian emergencies are associated with four primary infectious sources of mortality: **MEASLES, MALARIA, DIARRHEAL ILLNESS, and ACUTE RESPIRATORY INFECTIONS.**
   - *What you should prepare for also depends on the platform on which you’re deploying and the medical capabilities you’ll have. Deploying on the USNS Comfort and practicing medicine onboard is very different from deploying on a gray hull and primarily seeing patients on the ground.*
2. What supplies would you need?

There is often a large dichotomy between what supplies you will need versus what supplies you will actually have. A large hospital ship is obviously much better equipped than a smaller gray hull. At the time of deployment, particularly in an emergency setting, you are generally not going to be able to change/edit what supplies/meds are available (this is usually done early by the medical mission planners, with or without input from physicians). Any smaller supplies that you think might be important have to fit in your personal luggage (i.e. seabag). As combat cargo says, “Don’t bring more than you can carry.”

Things to consider: pediatric supplies (IV catheters, NG tubes, ET tubes, umbilical lines, neonatal/pediatric masks). Reference materials (Harriet Lane, Redbook, Gomella), keeping in mind that ship internet access is SLOW and you will be unable to access online texts. However, email is semi-functional and you can correspond with your colleagues ashore with any questions that might arise. Something to keep you sane—in the initial stages of patient care upon arrival to Haiti after the earthquake, the doctors were overwhelmed with patients. One pediatrician stated that her experience was “worse than a CNMC PICU call.” After the initial rush calmed down, though, general ship (boring) life sets in. Coupled with the stress of a humanitarian disaster, you need something to distract you when you’re not working (e-reader, movies, etc).

3. Onboard, where would you set up your MTFs to triage, treat, and manage children?

50-bed receiving bay for “triage”. Ideally, triage should occur shore-side before transporting to ship. Getting on and off the ship is a huge limiting factor and avoiding transport of patients who do not need the advanced services it provides is a better use of resources, rather than deciding after the fact. This was clearly seen in Haiti where many patients (including a few dead ones) were transported on-board because there was no one on the ground to prevent them being loaded on a helicopter.

4. Describe the movement of patients on the COMFORT. If a patient arrives by helo, and needs triage, decontamination, emergency care, an operation and then recovery, what areas of the ship would he pass through to accomplish all this? List and diagram below:

See AMSUS slide #6 for a diagram of patient flow:

Helo→ elevators to CASREC (60 seconds)→ Casualty Receiving→ [Radiology, if needed, including CT]→ OR→ Recovery→ ICU, if necessary, directly across from recovery. If not, then to second deck; the farther you go down the less ill they should be.