Emergency Preparedness in Mass Events

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Medical Director Bank of America Chicago Marathon/Shamrock Shuffle
Team Physician, US Soccer, Chicago Blackhawks
My Roots

- Gargaliani Messinia
- Nestani Arcadia
Objectives-20 minutes

- Scale of Event-Issues expected
- Mass Event preparedness
- Unified Command Structure
- Innovative educational tools for Emergency Communication
- Runner Tracking
- How we have adapted and applied EMS philosophies in the arena of sport
- Lessons Learned
In preparing for medical coverage of a mass participation event such as a marathon, race directors and their medical staff members need to account for the unexpected. Extremes in weather as well as the potential for outside threats need to be given consideration before race day in order to adequately prepare. Through the recruitment of local expertise from various agencies in one's community during both the planning stages, and on race day, the added stressors of such extremes will be minimized, if not eliminated. This article will provide concrete examples of how the Chicago Marathon has used its own experiences with such extremes. Readers will be given useful tools to implement in their own marathons or other mass participation events-planning to equip them better for the unexpected surge.
Disasters

- What types of disasters can happen in Chicago?
Mass Events “Headlines”

- 2007 Heat Shuts Down Chicago Marathon
- 2012 Boston Marathon “more than 100 runners to hospital due to heat”
- 2012 Hurricane Sandy- New York
- **Pittsburgh Marathon Bomb: Explosive Device Found On Course Of ...**
Boston 2013- Game Changer
2nd Largest marathon in the World
Field Composition

• Elite Men:
• Elite Women:
• Countries Represented: 113
• International Participants: 8,100
• Domestic Participants: 36,900
• First Time Chicago Marathon Participants: 31,500
• Debut Marathoners: 17,500
• Veteran Participants: 13,500
• Charity Runners: 12,100
• Male Participants: 54.9%
• Female Participants: 45.1%

Top 5 States Represented

Top 5 Countries Represented
## Medical Metrics

<table>
<thead>
<tr>
<th>METRIC DESCRIPTION</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature (°F) – 8 AM / 2 PM</td>
<td>52 / 57</td>
<td>40 / 43</td>
<td>74 / 88</td>
<td>64 / 83</td>
<td>32 / 43</td>
<td>69 / 82</td>
<td>60 / 79</td>
</tr>
<tr>
<td>Humidity (%) – 8 AM / 2 PM</td>
<td>74 / 64</td>
<td>85 / 64</td>
<td>80 / 47</td>
<td>75 / 41</td>
<td>66 / 37</td>
<td>50 / 36</td>
<td>67 / 34</td>
</tr>
<tr>
<td>Event EMS Transports (TOTAL)</td>
<td>88</td>
<td>78</td>
<td>182</td>
<td>155</td>
<td>78</td>
<td>220</td>
<td>135</td>
</tr>
<tr>
<td>Event EMS Transports to Med Tents</td>
<td>59</td>
<td>63</td>
<td>108</td>
<td>70</td>
<td>57</td>
<td>120</td>
<td>75</td>
</tr>
<tr>
<td>Event EMS Transports to Hospitals</td>
<td>29</td>
<td>15</td>
<td>74</td>
<td>85</td>
<td>19</td>
<td>100</td>
<td>60</td>
</tr>
<tr>
<td>CFD EMS Transports (runners) to Hosp.</td>
<td>0</td>
<td>0</td>
<td>50+</td>
<td>0</td>
<td>0</td>
<td>8-9</td>
<td>5</td>
</tr>
<tr>
<td>Runners in Finish Medical Tents</td>
<td>459</td>
<td>266</td>
<td>515</td>
<td>458</td>
<td>293</td>
<td>711</td>
<td>414</td>
</tr>
</tbody>
</table>
Medical Issues—"Normal Issues"

- Exercise Assoc Collapse
- Heat Illness
- Cold Illness
- MSK Injuries
- Cardiac
- Medication/Stimulant use
- Hyponatremia
- Underlying medical issues

- 2-10% Medical Encounters (45,000 runners)
Agencies Involved

- Police
- Fire
- Hospitals
- Department of Health
- Traffic Management
- Streets and Sanitation
- Federal Agents
- DHS
- IEMA
- Private Ambulance Service
History: Incident Command/Unified Command Structure-Evolution
Formally Begun 2008

- National Incident Management System (NIMS) [www.nims.com](http://www.nims.com)
- Incident Command Structure ICS-management system designed to enable effective and efficient incident management by combining facilities, equipment, personnel, procedures and communication in one organized structure=Unified Command
Enhancing Community Disaster Resilience Through Mass Sporting Events

Danielle M. McCarthy, MD; George T. Chiampas, DO; Sanjeev Malik, MD; Kendra Cole, MD; Patricia Lindeman, RN, MBA; James G. Adams, MD

ABSTRACT

Disaster response requires rapid, complex action by multiple agencies that may rarely interact during nondisaster periods. Failures in communication and coordination between agencies have been pitfalls in the advancement of disaster preparedness. Recommendations of the Federal Emergency Management Agency address these needs and demonstrate commitment to successful disaster management, but they are challenging for communities to ensure. In this article we describe the application of Federal Emergency Management Agency guidelines to the 2008 and 2009 Chicago Marathon and discuss the details of our implementation strategy with a focus on optimizing communication. We believe that it is possible to enhance community disaster preparedness through practical application during mass sporting events.

(Disaster Med Public Health Preparedness. 2011;5:310-315)

Key Words: marathon, communication, disaster preparedness
Map

Zones

Diversions

Aid Station Captains

- Pat Crimmins
- Susan May
- Danell Yake
- Tricia Deen
- John Jones
- Melissa Savage
- Mark Colpoy
- Nancy Fiskicz
- Jim MacFeder
- Billy Pope-Harris
- Roy Walker
- David Boyles
- Ken Steve Zelke
- Nick Bensen

Zone Managers
- Tim Beamer
- David Puskaric
- Matt Biancotto
- Jack Biancotto
Forward Command

• Unified and coordinated communications center for mass gathering
Unified Command

• Visual of Course/Resources
Developed to more effectively organize and operate events such as marathons or other mass participation events

Bring together all major organizations (e.g., race organizers, fire and police departments, emergency management, Red Cross) to coordinate preparation and response for the event and surrounding areas impacted by the event

Integrated organizational structure is complemented by a comprehensive medical tracking system which allows users to monitor medical coverage in real time during the event

The information system allows Incident Commanders to access key data fields in real time to assist in decision making

Since 2008, used at the Chicago Marathon and the Shamrock Shuffle

Adopted by similar events in other cities
Event Alert System-Communications
Communicates status of course conditions to key staff, volunteers, general public and participants leading up to and on race day
Based on a variety of factors, including weather conditions

Severe Weather/Lightning
Meteorology monitoring via Forward Command Center
Lightning Plan in development

Start/Finish Evacuation
Evacuate Grant Park to the west to seek shelter in hotels, parking garages, etc.

Emergency Course Shelters
Shelters identified along course route and near Aid Stations
<table>
<thead>
<tr>
<th>ALERT LEVEL</th>
<th>EVENT CONDITIONS</th>
<th>RECOMMENDED ACTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>EXTREME</td>
<td>EVENT CANCELLED/EXTREME AND DANGEROUS CONDITIONS</td>
<td>PARTICIPATION STOPPED/FOLLOW EVENT OFFICIAL INSTRUCTION</td>
</tr>
<tr>
<td>HIGH</td>
<td>POTENTIALLY DANGEROUS CONDITIONS</td>
<td>SLOW DOWN/OBSERVE COURSE CHANGES/FOLLOW EVENT OFFICIAL INSTRUCTION/CONSIDER STOPPING</td>
</tr>
<tr>
<td>MODERATE</td>
<td>LESS THAN IDEAL CONDITIONS</td>
<td>SLOW DOWN/BE PREPARED FOR WORSENING CONDITIONS</td>
</tr>
<tr>
<td>LOW</td>
<td>GOOD CONDITIONS</td>
<td>ENJOY THE EVENT/BE ALERT</td>
</tr>
<tr>
<td></td>
<td>Expo</td>
<td>Start/Finish</td>
</tr>
<tr>
<td>------------------</td>
<td>-----------------------------</td>
<td>----------------------------------</td>
</tr>
<tr>
<td><strong>Flyers</strong></td>
<td>Exhibitors</td>
<td>Info Towers</td>
</tr>
<tr>
<td></td>
<td>Participants &amp; Volunteers</td>
<td>VMS Boards</td>
</tr>
<tr>
<td><strong>Signage</strong></td>
<td>Information Towers</td>
<td></td>
</tr>
<tr>
<td><strong>EAS Flags</strong></td>
<td>Throughout hall</td>
<td>Start Line, Info Tents</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Gear Check</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Volunteer Compound</td>
</tr>
<tr>
<td><strong>Credentials</strong></td>
<td>Volunteers</td>
<td>Volunteers</td>
</tr>
<tr>
<td></td>
<td>Staff</td>
<td>Staff</td>
</tr>
<tr>
<td></td>
<td>Exhibitors</td>
<td></td>
</tr>
<tr>
<td><strong>P.A. Scripts</strong></td>
<td>Main Stage</td>
<td>Start/Finish Line,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Post Race Party, Charity Villages</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Volunteer Compound</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Gear Check Tents</td>
</tr>
<tr>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
Communication tools
Treatment/EHS

- Prompt recognition is key
- Morbidity directly related to duration core temp >40.5C
- ACSM and NATA guidelines recommend cooling below 40 C within 30 min preferably below 38 C
Event Alert System
Diversion or Cancelation response

• Aid Station Response
  - DJ pre-written announcements (audio)
  - Police communication
  - All Volunteers
  - Message Via EAS flags and visual display boards (visual)

• Diversion Areas
  - Police block off course
  - EMS with immediate staging area of personnel and resources
  - Medical volunteers transported to assist in diversion area
  - Increase Runner dropout buses
  - Supply Trucks (fluids etc) open and distribute
Incident Response: Course Zones

• Course Zones/Hospitals
  • Zone A (Aid 7-9): Norwegian, St. Mary’s, IL Masonic
  • Zone B (Aid1-6): Thorek, St. Joe, Weiss, IL Masonic, NW
  • Zone C (Aid 16-21): Mercy, UofC, NW, St. Bernard’s
  • Zone D (Aid 10-15): Stroger, UIC, Rush, St. Anthony, Mt. Sinai

• Aid Station Locations
• Main Medical Facilities
• Mile Markers
• Course Diversions
<table>
<thead>
<tr>
<th>Name</th>
<th>Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grant Park Garage South</td>
<td>325 South Michigan Avenue</td>
</tr>
<tr>
<td>Grant Park Garage North</td>
<td>25 North Michigan Avenue</td>
</tr>
<tr>
<td>Millennium/East Monroe Garage</td>
<td>5 South Columbus Drive</td>
</tr>
<tr>
<td>Lower Columbus Underpass</td>
<td>150 North Columbus</td>
</tr>
<tr>
<td>Harold Washington College</td>
<td>30 East Lake</td>
</tr>
<tr>
<td>Latin School</td>
<td>59 West North Bl</td>
</tr>
<tr>
<td>Palmer House</td>
<td>17 East Monroe</td>
</tr>
<tr>
<td>Moody Bible Institute</td>
<td>820 North LaSalle</td>
</tr>
<tr>
<td>Chicago History Museum</td>
<td>1601 North Clark</td>
</tr>
<tr>
<td>Peggy Notebaert Nature Museum</td>
<td>2430 North Cannon</td>
</tr>
<tr>
<td>Resurrection Health Parking Garage</td>
<td>2913 North Commonwealth</td>
</tr>
<tr>
<td>Nettlehorst School</td>
<td>3252 North Broadway</td>
</tr>
<tr>
<td>Francis W. Parker School</td>
<td>330 West Webster</td>
</tr>
<tr>
<td>Piper's Alley Parking Garage</td>
<td>210 West North Avenue</td>
</tr>
<tr>
<td>East Bank Club</td>
<td>550 North Kingsbury</td>
</tr>
<tr>
<td>Merchandise Mart</td>
<td>222 Merchandise Mart Plaza</td>
</tr>
<tr>
<td>Union Station</td>
<td>225 South Canal</td>
</tr>
<tr>
<td>Ogilvie Station</td>
<td>504 West Madison</td>
</tr>
<tr>
<td>Whitney Young High School</td>
<td>211 South Laflin</td>
</tr>
<tr>
<td>Malcolm X</td>
<td>1900 West Van Buren</td>
</tr>
<tr>
<td>United Center</td>
<td>1901 West Madison</td>
</tr>
<tr>
<td>UIC Rec Center</td>
<td>799 West Polk</td>
</tr>
<tr>
<td>St Ignatius Gym</td>
<td>1076 West Roosevelt</td>
</tr>
<tr>
<td>Rush Parking Garage</td>
<td>1630 West Taylor</td>
</tr>
<tr>
<td>Perez School</td>
<td>2001 South Throop</td>
</tr>
<tr>
<td>Walsh School</td>
<td>2031 South Peoria</td>
</tr>
<tr>
<td>Joseph Jungman School</td>
<td>174A South Miller</td>
</tr>
<tr>
<td>Connie's Pizza</td>
<td>2373 South Archer</td>
</tr>
<tr>
<td>Post Office/Library Parking Garage</td>
<td>2345 South Wentworth</td>
</tr>
<tr>
<td>De La Salle Institute</td>
<td>3455 South Wabash</td>
</tr>
<tr>
<td>U.S. Cellular Field</td>
<td>333 West 35th Street</td>
</tr>
<tr>
<td>McCormick Place</td>
<td>2301 South Lake Shore Drive</td>
</tr>
<tr>
<td>Soldier Field Parking Garage</td>
<td>1410 South Museum Campus</td>
</tr>
<tr>
<td>Harold Washington Library</td>
<td>400 South State Street</td>
</tr>
</tbody>
</table>
# Shelters

## Grant Park Shelters

<table>
<thead>
<tr>
<th>Shelter Name</th>
<th>Address</th>
<th>Contact Name</th>
<th>Contact Number</th>
<th>Contact Email</th>
<th>Grant Park Zone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hilton Chicago Hotel</td>
<td>720 South Michigan Ave</td>
<td>John Beers Ray Sanders</td>
<td>(C) 312-446-2278 (C) 312-617-7269</td>
<td><a href="mailto:John_beers@hilton.com">John_beers@hilton.com</a> <a href="mailto:Ray.sanders@hilton.com">Ray.sanders@hilton.com</a></td>
<td>2, 5</td>
</tr>
<tr>
<td>Palmer House Hilton</td>
<td>17 East Monroe St</td>
<td>James Reynolds</td>
<td>(C) 312-6217347</td>
<td><a href="mailto:James.reynolds@hilton.com">James.reynolds@hilton.com</a></td>
<td>4</td>
</tr>
<tr>
<td>Conrad Hotel</td>
<td>521 N. Rush Street</td>
<td>Chris Hansen</td>
<td>(C) 312-446-0794</td>
<td><a href="mailto:Chris.hansen@hilton.com">Chris.hansen@hilton.com</a></td>
<td></td>
</tr>
</tbody>
</table>

### Grant Park / Millennium Park Shelter Locations Parking Garages (See Map)

<table>
<thead>
<tr>
<th>Parking Garage</th>
<th>Location</th>
<th>Location</th>
<th>Grant Park Zone</th>
</tr>
</thead>
<tbody>
<tr>
<td>East Monroe Street Garage</td>
<td>Intersection of Columbus and Monroe</td>
<td>3 Entrances on Columbus for vehicles, pedestrian entrances east of Columbus on Monroe</td>
<td>1, 3</td>
</tr>
<tr>
<td>Grant Park South Garage</td>
<td>Intersection of Michigan and East Congress</td>
<td>1 entrance on Michigan south of Congress</td>
<td>2, 4, 5, 6</td>
</tr>
<tr>
<td>Grant Park North</td>
<td>Intersection of Michigan and East Madison</td>
<td>1 entrance on Michigan (West Side of Street) North of Madison 1 entrance through Park Grill Entrance East Side of Street</td>
<td>1, 3</td>
</tr>
</tbody>
</table>
Simulation Learning- How to Train your Medical Staff

The Collapsed Athlete

- Absent/Unstable Pulse and Resp
  - AED
    - Shockable Rhythm
      - Yes
        - VFib/Vtach
          - CPR Transport
        - No
          - Other cardiac/resp causes
    - No
      - Collapse In-Exercise
      - Collapse Post-Exercise
      - Normal Mental Status
      - Stable Vitals
      - Abnormal Mental Status
        - Seizure
          - Tox CVA
          - Cardiac Heat Exhaustion
            - Illness specific treatment
          - Exercise Associated Collapse
            - Oral Fluids
              - Elevate Legs
          - Hypoglycemia
          - Exertional Heat Stroke
          - Hyponatremia
          - Hypothermia
Educational Interventions

• Interactive Power point
• Sent to all medical volunteers to review basic algorithm
• Formal study of Superior Ambulance personnel
Cardiac Arrests at Marathons

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Cardiac Arrest during Long-Distance Running Races

Jonathan H. Kim, M.D., Rajeev Malhotra, M.D., George Chiampas, D.O., Pierre d’Hemecourt, M.D., Chris Troyanos, A.T.C., John Cianca, M.D., Rex N. Smith, M.D., Thomas J. Wang, M.D., William O. Roberts, M.D., Paul D. Thompson, M.D., and Aaron L. Baggish, M.D., for the Race Associated Cardiac Arrest Event Registry (RACER) Study Group
New 2011- Community Outreach and Awareness-CPR Training

• Certified CPR/AED training for CARA and Nike Pacer Team leaders(400)- to begin in June
• Hands Only CPR message to all volunteers -12,000
• Hands Only message to all runners/volunteers –part of training tips.
• NBC5 Training tips
• Expo presence
• Chicago Police Department E-Learning training summer 2011-12,000 police officers

• Creates more first responders
2012 Marathon

- Mile 21
Red Cross Patient Connection “Runner Tracking”
MPTS Web Application – American Red Cross Runner Tracking

American red cross

- Contacted: 9/13/2012 8:23:35 AM
  - Contacted Note: D. Nishi

- Reunited: 9/13/2012 8:24:37 AM
  - Reunited Note: w/ Spouse

Patient Details

- Name: Mike Nishi
- Bib#: 2850
- Start Assigned: CORRAL B
- Charity: Teach For America
- Birth Date: 12/30/1993 12:00:00 AM
- Age: 18
- Gender: Male
- Primary Language: Japanese
- Emergency Contact Name: D
- Emergency Contact Relation: Nishi
- Emergency Phone Number: 888-888-8888

Check In Details

- Wrist Band: 4002
- Bed: Balbo Medical Tent - ICU
- Section: ICU-A
- Bed: ICU-1
- Note: Severe Dehydration and Muscle Cramps
- Check In Time: 9/13/2012 8:13:16 AM
- Check In Staff member: Suerte, Glen
- Needs Language Assistance: Y
- Inform Emergency Contact: Y

Check Out Details

- Status: 2
- Note: Patient is feeling better
- Check Out Time: 9/13/2012 8:20:19 AM
- Check In Stuff: Suerte, Glen

Diagnoses Details

- Dehydration
- Muscle Cramps
MPTS Web Application – Occupancy “Runner Tracking”
# MPTS Web Application – Summary “Runner Tracking”

## Medical Course Tent
### General Care
- **Total Beds**: 16
- **Available Beds**: 16
- **Admitted**: 0 (0 %)
- **Average duration**: 40 min
- **Discharged**: 0
- **Waiting for Transport**: 0
- **Transported**: 0
- **Transferred**: 0
- **Refused Care**: 0

### Diagnosis Details
- **Asthma / Respiratory**: 0 (0 %)
- **Dehydration**: 0 (0 %)
- **Exercise Assoc. Collapse**: 0 (0 %)
- **GI**: 0 (0 %)
- **Hypothermic**: 0 (0 %)
- **Hypoglycemia**: 0 (0 %)
- **Hypoproteinemia**: 0 (0 %)
- **Hypothermic**: 0 (0 %)
- **Other**: 0 (0 %)

### Medical Course Tent
### ICU
- **Total Beds**: 20
- **Available Beds**: 20
- **Admitted**: 0 (0 %)
- **Average duration**: 40 min
- **Discharged**: 0
- **Waiting for Transport**: 0
- **Transported**: 0
- **Transferred**: 0
- **Refused Care**: 0

### Diagnosis Details
- **Asthma / Respiratory**: 1 (5 %)
- **Dehydration**: 3 (15 %)
- **Exercise Assoc. Collapse**: 1 (5 %)
- **GI**: 1 (5 %)
- **Hypothermic**: 5 (25 %)
- **Hypoproteinemia**: 1 (5 %)
- **Hypothermic**: 1 (5 %)
- **Laceration**: 1 (5 %)
- **Muscle Cramps**: 2 (10 %)

## Aid Station 4
### General Care
- **Total Beds**: 47
- **Available Beds**: 47
- **Admitted**: 0 (0 %)
- **Average duration**: 3 min
- **Discharged**: 0
- **Waiting for Transport**: 0
- **Transported**: 0
- **Transferred**: 0
- **Refused Care**: 0

### Diagnosis Details
- **Dehydration**: 1 (13 %)
- **GI**: 1 (13 %)
- **Other**: 0 (0 %)

## Aid Station 7
### General Care
- **Total Beds**: 16
- **Available Beds**: 16
- **Admitted**: 0 (0 %)
- **Average duration**: 24 min
- **Discharged**: 0
- **Waiting for Transport**: 0
- **Transported**: 0
- **Transferred**: 0
- **Refused Care**: 0

### Diagnosis Details
- **Dehydration**: 1 (50 %)
- **Hypoglycemia**: 1 (50 %)

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[Open details in new page]
Security Measures- How much is too much?? Runner Experience
Security
The IIRM Mission Statement

The mission of the World Road Race Medical Society is to promote the health and safety of participants in road race endurance events through research, communication, education, and the development of medical standards that can be utilized by all involved.

- Promote the sharing of information as it pertains to all medical aspects of running and endurance events.
- Promote research and improvements in clinical care for participants in road races and mass participation running events.
- Develop collaborative relationships with public safety groups.
- Establish reliable logistical matrices that can be followed by events of all sizes.
- Provide event safety recommendations to event medical teams and race administrators.
- Establish liaisons to various groups, corporations and organizations that will help promote our mission.
Athens-Chicago Sister City

• For the youth-athletics
Emergency Preparedness Summary

- Understand your event and potential casualties and types
- Unified Command Approach - Event Operations Center - Preparedness
- Communication Tools
- Innovative Staff Education
- Plans for Response
- Patient/Participant Tracking Systems
- Security measures appropriate to your event
Questions-