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Boston Marathon Bombings: Medical Response Activities at the Incident Site

SUMMARY

Each year, the Boston metropolitan area emergency management and response communities plan and train extensively for a mass casualty response at the Boston Marathon. In addition, these agencies conduct joint exercises to validate existing plans and systematically test local capacities and capabilities. These multi-agency, multi-disciplinary, and multi-jurisdictional activities ensured that emergency personnel at the marathon finish line had the knowledge and expertise needed to respond to the April 15, 2013, bombings in an exemplary manner and save lives.

DESCRIPTION

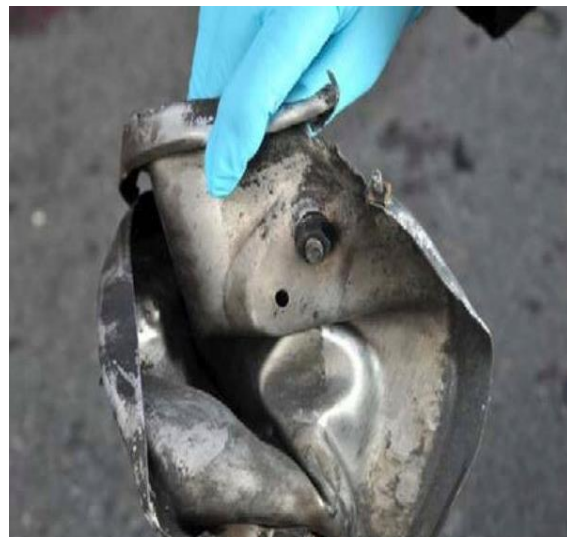
On April 15, 2013, two improvised explosive devices (IEDs) detonated near the finish line of the 117th Boston Marathon, approximately three hours after the winners completed the course. The first IED explosion occurred at 2:49 pm Eastern Daylight Time and the second took place 13 seconds later.

Both IEDs consisted of pressure cookers concealed in backpacks with low grade explosive and nails, shards of metal, and BBs as shrapnel. The devices were placed 200 yards apart, near the metal barriers that separated the spectators from the runners.

At the time of the explosions, approximately 17,000 runners had completed the race while 5,700 more were still heading towards the finish line. Marathon officials stopped the marathon and quickly rerouted runners to a pre-identified community meeting area.

The IED blasts blew out windows, but did not cause any structural damage to buildings adjacent to the blast sites. However, the explosions occurred in the last 225 yards of the course, where a large number of spectators were gathered. As a result, 264 people were injured and three were killed during the attacks. Many victims required amputations or suffered traumatic amputations as a result of these blasts.

The [Boston Athletic Association](http://www.baa.org) (B.A.A.) has managed the Boston Marathon since 1897, when the first marathon took place. The Boston Marathon ranks as the world's oldest annual marathon and as the largest single day sporting event in the world after the Super Bowl. Each year, more than 1,100 media members receive credentials and approximately 500,000 spectators and 20,000 registered runners participate in this event.



Remains of Pressure Cooker used in Boston (Source: FBI/DHS Intelligence Bulletin)

Boston Marathon Preparedness Activities

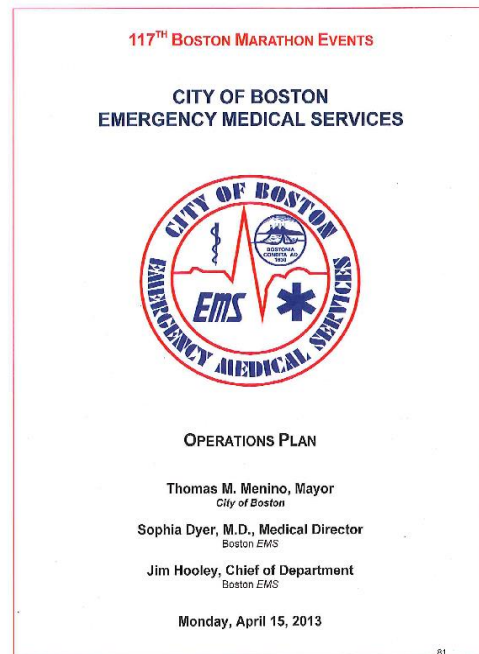
Each year, Boston emergency management and response agencies conduct extensive medical planning to prepare for the Boston Marathon. In January 2013, the Massachusetts Emergency Management Agency (MEMA) convened a multi-agency, multidisciplinary team to develop all the plans for the 117th Boston Marathon. This team spent 3 months generating the operational and coordination plans for this event. In addition, state and local personnel periodically met with B.A.A. officials to plan for and coordinate emergency response procedures following a potential large-scale, mass casualty event.

Exercises

In recent years, MA emergency medical personnel have regularly exercised communications, coordination, and response capacities and capabilities with police and fire departments, local businesses, and volunteer groups. For example:

- On March 14, 2013, the MA State Emergency Operations Center (SEOC) hosted the annual Pre-Boston Marathon Tabletop Exercise. Participants included personnel from the communities of Hopkinton, Ashland, Framingham, Natick, Newton, Brookline and Boston that host the race as well as staff from other Federal, state, safety, health, communication, transportation, and volunteer agencies and organizations. One of the exercise scenarios focused on an IED explosion.
- In November 2012, the Metro Boston Homeland Security Region (MBHSR) conducted [Urban Shield Boston](#), an annual, continuous 24-hour exercise, during which emergency personnel responded to various scenarios. This exercise involved approximately 50 agencies, including Boston EMS, the Conference of Boston Teaching Hospitals, and UMass Boston.

The 2012 exercise evaluated specific public safety capabilities developed or enhanced with funds from the Department of Homeland Security through the Urban Areas Security Initiative grant program. Specifically, medical personnel at eight Boston hospitals conducted mass decontamination, triage, and



Source: Presentation of Kurt Schwartz, Undersecretary for Homeland Security and Director of MEMA Executive Office of Public Safety & Security at May 2013 Conference



Remains of Backpack Used to Carry the IEDs (Source: FBI/DHS Intelligence Bulletin)

management of victims.

In past years, MBHSR also used some of the Urban Areas Security Initiative grant funds to acquire and deploy medical supply trailers and equipment to fourteen major trauma hospitals in the region. As of 2013, each hospital has medical assets needed to support a surge of twenty-five medical staff, which can result in an increased medical surge capacity of 350 patients throughout the MBHSR.

According to MEMA Director Kurt Schwartz, "The speed with which Boston, supported by the Massachusetts State Police, the National Guard, the Transit Police and dozens of local, regional, state and federal law enforcement agencies and other first responders, evacuated the wounded to hospitals, took control of the crime scene, established a large security perimeter, and established communication with the public, is a testament to homeland security spending and investments in preparedness, training and exercises..."

"The investments that have been made in preparedness since 911 paid off for us. We all knew each other first of all, we all are people who work together, train together, and see each other on a very regular basis – all of the principals in this. The training that we do to prepare for these types of incidents – something called Urban Shield, some other trainings that have come out of DHS – have forced us to think about this, to think about the unthinkable."

[Statement](#) of Boston Police Commissioner Edward Davis

April 15th Preparedness Activities EMS and Medical Coordination

On April 15, MEMA activated the Multi-Agency Coordination Center (MACC) in the MEMA Emergency Operations Center (EOC) at 7:00 am. Personnel from a variety of agencies and organizations deployed to the MACC, including EMS, police, fire, and public safety personnel from Boston and the other seven cities and towns along the Marathon course. In addition, state and federal personnel from the Massachusetts State Police, National Guard, Commonwealth Fusion Center, FBI, FAA, Coast Guard, and B.A.A. deployed to the MACC.

Boston Medical Intelligence

In 2009, Boston EMS established the [Stephen M. Lawlor Medical Intelligence Center](#) (MIC). The MIC coordinates operations for public health and healthcare organizations of Boston and the surrounding areas. Following a major disaster, MIC personnel provide virtual and face-to-face coordination and management to public health and medical services entities part of Emergency Support Function 8. The center is housed in a 1,200-square-foot room with a 62-seat capacity at the BPHC. According to Barbara Ferrer, BPHC Executive Director, the MIC is "the one place in the city where you know you can call" following a disaster.

Throughout the race, MACC personnel remained connected to the eight cities and towns' EOCs. In addition, MACC maintained communications and shared information with the [Boston Medical Intelligence Center](#), the [Boston Public Health Commission](#) (BPHC) Department Operations Center (DOC), and the [Boston Emergency Medical Services \(EMS\) Dispatch Operations Center](#). Further, personnel along the course used interoperable channels on portable radios to maintain effective communications.

Medical Assets

Over the years, Boston EMS and other medical personnel have managed the Boston Marathon



**Boston EMS at the 117th Marathon
(Source: City of Boston EMS)**

and other large events as mass casualty events. As a result, at the time of the attacks all the equipment and staff needed to respond to a mass casualty event were available at or near the blast sites. In particular, on the day of the Marathon:

- More than 800 medical volunteers and staff were deployed to provide assistance to runners and bystanders. These personnel staffed 26 medical tents—which included 10 enhanced tents with ambulance support—16 first aid stations, and 49 hydration stations along the 26.2-mile course.

In addition, planners deployed Disaster Management Administrative Teams tents at three strategic locations to offer a higher level of care to runners in need. Medical sweeps busses and ambulances staffed by medical volunteers also provided first aid and transported athletes in need along the course. Finally, planners positioned Mass Casualty Incident trailers in mid-course.



**Boston EMS and other Personnel at Medical Tent
(Source: City of Boston)**

- A large number of medical teams were positioned between mile 20 and the finish line, where runners were the most likely to need medical assistance. For instance, Boston EMS deployed more than 90 personnel from the city limit to the finish line on Boylston Street. This included ambulances at intersections as well as EMTs and Paramedics on bicycles and golf carts along the route.

All these personnel were equipped with “jump bags” that included tourniquets, medical supplies, defibrillators, oxygen, and other equipment.

- Finally, medical personnel staffed Medical Tent A at the finish line and Medical Tent B, two blocks away along the recovery zone. These medical tents are air-conditioned structures with televisions, hundreds of cots, laboratory sections, and a variety of other resources. According to [Boston EMS Chief James Hooley](#), tent A “...is laid out very well for the dehydration, for people cramping up. There are areas for rapidly cool people, there are areas for rapidly warm people, there is an ICU set aside, there is an asthma bay. It is made mostly to manage what we typically see in this event.”

Post-Explosions Operations Coordination

Immediately following the explosions, EMS personnel employed the Metro-Boston Central Medical Emergency Direction (CMED) system to notify Boston hospitals of a mass casualty situation and to expect multiple trauma

Boston EMS operates the [CMED](#) system. This system provides coordination between EMS field providers and area hospitals throughout the 62 cities and towns in the metropolitan Boston area. Boston EMS staffs the CMED Center 24-hours a day. These personnel are tasked with linking field providers to hospitals, managing EMS channel usage, providing EMS resource information, and offering command and control assistance during mass casualty incidents in coordination with on-scene commanders.

patients. In addition, EMS alerted medical personnel and volunteers staffing Medical Tent A to start preparing for multiple casualties.

Medical Operations at the Blast Sites

On-site personnel quickly reorganized Medical Tent A, turning it into a mass triage and trauma unit. These personnel used black markers and blankets to create signs for treatment area "Red" (critical patients with life threatening injuries), "Yellow" (delayed, non-life threatening injuries), and "Green" (minor or no injuries). In addition, personnel designated a morgue area for deceased victims. Within minutes, Tent A medical personnel started receiving victims, many of which had suffered traumatic amputations and were severely injured.



**Boston Medical Team Assists Victim
(Source: FEMA)**

Volunteers and bystanders used over 100 wheelchairs and stretchers positioned around the finish line to transport victims into the medical tent. Triage personnel at the entrance assessed victims upon arrival and directed them to the appropriate section of the tent. These personnel also moved the most severely injured victims to the back of the tent, where ambulances were available to immediately transport victims to area hospitals. The deployment of these ambulances allowed medical personnel to direct victims to appropriate hospitals and prevented an uncoordinated evacuation of victims by civilian vehicles.

Boston EMS was able to transport 30 "red tag" patients to area hospitals within 18 minutes of the explosions and all other patients within 45 minutes. These patients were distributed among hospitals in an effective manner, which resulted in no hospital being overwhelmed. According to [EMS Captain Bob Haley](#), "This was the perfect storm for us. It was almost an assembly line as they came through the medical tent."

Outcomes

Medical response at the Boston Marathon finish line after the explosions was extremely successful. Responders had spent months preparing for this event, agencies and resources were staged at strategic locations, and personnel had worked together and knew each other. According to Boston Police Commissioner Edward Davis, "The medical people who staffed the tents at the finish line were there to treat runners with blisters and exhaustion. Instead, they ended up being thrown into a battlefield

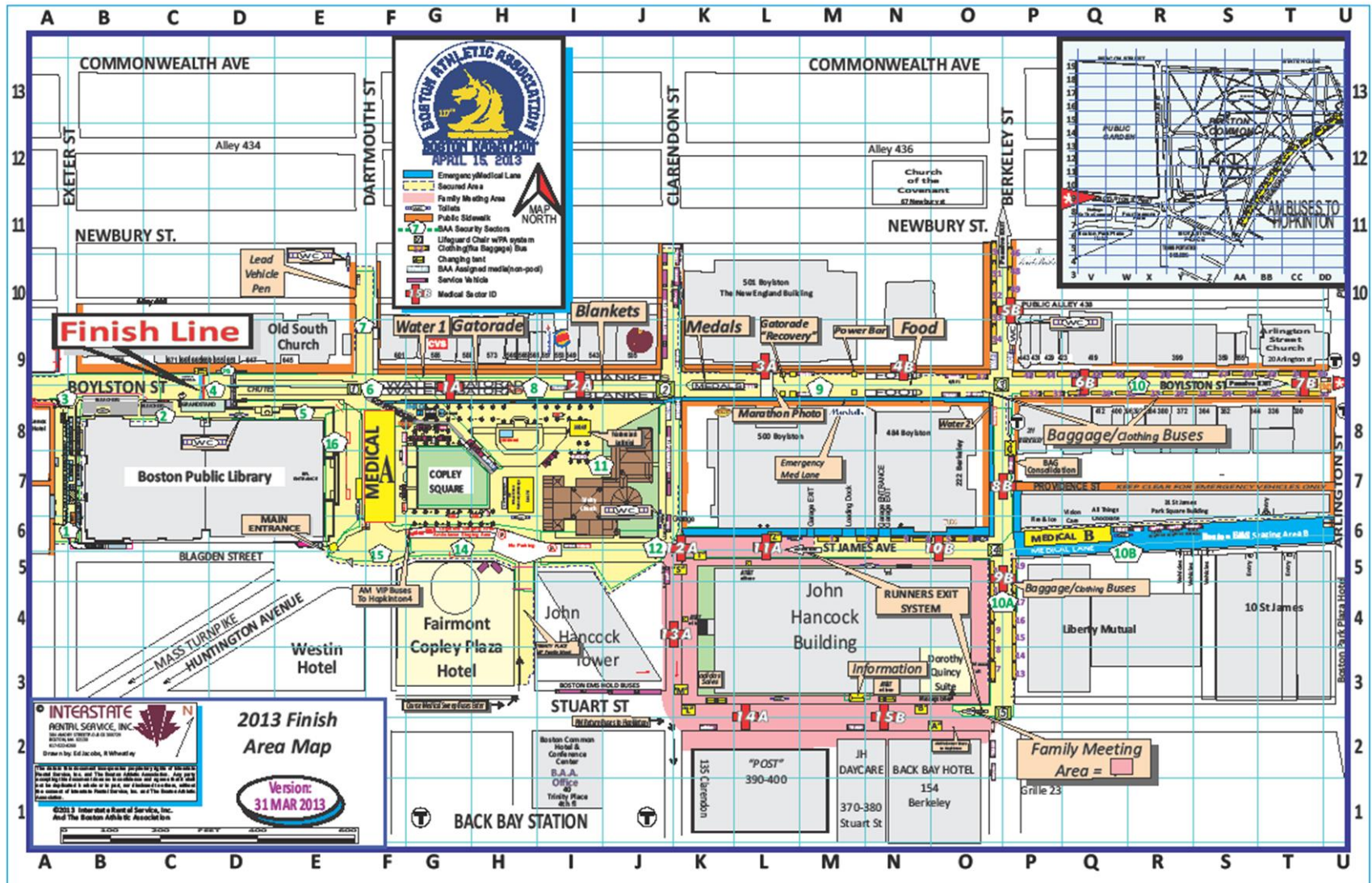
At the time of the explosions, "I was not actually in the Emergency Department, so my department paged it out to me. I looked at my pager and it said 'multiple explosions at the marathon finish line' and I have to say that I did not really believe it; it is one of those things that you don't expect to actually see for real and it took me a second to read it again and confirm that that was the text that I was given."

[Statement](#) of Paul Biddinger, Chief, Division of Emergency Preparedness, Massachusetts General Hospital.

"Then the disaster radio went off in the ED, saying that there was an explosion that happened around 2:50 or 2:51 PM. In my head I'm thinking, 'Why would they be doing a drill during the marathon? That's so weird.' Then they followed it up by asking, 'How many people can you take?' and we realized it was real."

[Statement](#) of Julia Compton, Registered Nurse, Emergency Department, Tufts Medical Center, Boston, Massachusetts.

scenario, treating injuries that were horrendous. If it wasn't for the actions of my police officers, firefighters, EMS people who responded to the scene and those medical people from the tents who run down the street, the death toll would be much higher."



Boston Marathon 2013 Finish Area Map
 (Source: Presentation of Kurt Schwartz, Undersecretary for Homeland Security and Director of MEMA Executive Office of Public Safety & Security at May 2013 Conference)

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