



Special Analysis

Responding to Terrorist Attacks *Trends in European Response Scenarios* INFORMATION CUTOFF DATE: October 6, 2008

NYPD
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EXECUTIVE SUMMARY

This paper analyzes three high-profile European case studies of post-9/11 terrorist attacks (Istanbul [2003], Madrid [2004], and London [2005]). It also examines targeting and tactical information gleaned from several failed/foiled plots in Europe. Although the general findings of this paper can be applied to any type of large scale terrorist attack, this study focuses on those attacks perpetrated by Muslim extremists since this subset currently constitutes the most prominent terrorist threat to the U.S.

The objectives of this paper are to:

- Concisely present the major challenges that European emergency responders faced following significant acts of terrorism in the post-9/11 era;
- Assess how those challenges hindered response and rescue operations;
- Identify ways in which emergency responders reacted to these challenges, both expected and unforeseen;
- Utilize case studies of several foiled/failed plots in Europe to assess burgeoning operational risks to emergency responders;
- Highlight implications of these trends for domestic security, particularly New York City

This paper seeks to analyze trends in the responses to major terrorist attacks in the post-9/11 era in cities similar to New York City. The cities analyzed in this report are comparable in numerous ways, but the most important similarity is that the attack scenario with which each city was confronted could conceivably be replicated in American cities in general and in New York City in particular. These cities also have long histories of dealing with terrorism and their respective emergency responder communities feature seasoned personnel familiar with post-attack scenarios caused by terrorist bombings.¹ Therefore, the ways in which these responders were challenged –

¹ In Turkey, terrorist attacks are believed to have accounted for an estimated 30,000 to 35,000 deaths between 1984 and October 2003. In Spain, ETA is believed to be responsible for more than 800 deaths in

despite having experience responding to terrorist bombings – would likely provide useful information for New York City emergency responders who may one day find themselves in similar situations.

Some of the challenges described in this report are common to almost every terrorist attack. Nevertheless, it is useful to examine how expected challenges are dealt with by peers abroad, if only to identify ways to better prepare for such inevitabilities domestically. For example, British authorities anticipated that there would be severe traffic congestion following a significant terrorist attack in London. They therefore planned for this and, following the 7/7 attacks, had protocols already in place to transport medics and doctors to incident sites via bicycles and helicopters. Other items highlighted in this report demonstrate the capability of foreign emergency responders to improvise when confronted with unanticipated situations. On 3/11 in Madrid, responders at the Santa Eugenia train station were forced to rip benches from the ground to use as stretchers because they did not have sufficient supplies on-hand for such a mass casualty event.

In addition to analyzing past attacks, this paper presents several foiled/failed plots that could prove helpful in further illuminating relevant tactics and targeting preferences for terrorists operating in the West. Anecdotal evidence indicates that these operatives are increasingly interested in emergency responders in terms of thwarting their post-attack response efforts, as well as potentially targeting them outright. Although this does not constitute a new terrorist tactic, it was only until recently that Muslim extremists began demonstrating such targeting preferences in the West.

INTRODUCTION

It is critical to study past terrorist attacks in order to develop lessons learned/best practices that might help in responding to future attacks. The three case studies analyzed in this report were mass casualty events motivated by Islamic extremism. In each case, the *modus operandi* emphasized multiple, simultaneous attacks to provoke mass panic, maximize subsequent carnage/damage, and generate significant media attention. These attacks were also largely static, lacking dynamic elements such as escalating fires, successfully detonated secondary devices, and unconventional weapons (chemical, biological, or radiological substances). This report identifies three broad challenge areas for emergency responders to consider following a terrorist attack:

- Establishing security and control over an incident site
- Effectively using emergency resources
- Communications, both tactically and with the general public

These challenge areas are common to most mass casualty events, including terrorist attacks, but it is nevertheless important to understand how each set of emergency responders dealt with expected and unexpected challenges. In essence, the objective of

its decades-old separatist conflict in northern Spain and southwest France. In the United Kingdom, more than 3,500 deaths resulted from the conflict with the IRA in Northern Ireland.

this report is to contextualize what happens when training, planning and experience collide with the realities of an attack. Additionally, history has shown that terrorists will continue to adapt their tactics to exploit perceived Western vulnerabilities, including ways in which to frustrate the efforts of emergency responders following an attack.

CASE STUDY 1: ISTANBUL

Attack Summary

A terrorist cell with links to al-Qaeda (AQ) used ammonium-nitrate-based vehicle-borne improvised explosive devices (VBIEDs) to kill at least 57 people and wound an estimated 700 others in Istanbul, Turkey.² Two simultaneous suicide attacks against synagogues occurred on November 15, 2003, and were followed by two more near-simultaneous suicide attacks against British targets on November 20, 2003 (see Figure 1 for a map depicting attack times and locations). The exact size of the bombs is unclear, but most estimates tend to range between 500 and 850 pounds per vehicle.³ Members of this cell attended terrorist training camps and participated in foreign jihads.

At 0929 on Saturday, November 15, a suicide VBIED was detonated in front of the Neve Shalom synagogue – Istanbul’s largest – located in the Beyoglu district.⁴ The building’s façade was completely destroyed and its foyer was littered with twisted metal and shattered glass.⁵ A crater roughly 6 ½ feet deep was left in front of the synagogue, body parts were scattered throughout the streets, windows were smashed within a 656-foot radius, and side streets hundreds of feet away were damaged. In total, 70 buildings were seriously damaged and another 16 sustained moderate damage. The next blast occurred at 0930 at the Beth Israel synagogue, where an estimated 300 worshippers were in attendance.⁶ Beth Israel is approximately three miles from Neve Shalom, in the Sisli district. The explosion left a large crater in the street and shattered the windows of surrounding buildings.⁷ At least 27 people died and another 300 were injured in both of these explosions, but only 6 immediate deaths were reported inside the synagogues because worshippers were largely protected by the structures’ walls. Instead, most of the casualties were Muslims outside of the synagogues, many of whom were killed or injured by flying glass, masonry and car fragments.⁸

² The casualty estimates have varied over time and depend on the source of information. The deaths resulting from the attacks have been estimated to be as high as 70, with another 750 injured.

³ 500 pounds – 850 pounds: IRS Gruen conversation with Turkish National Police (TNP) official on February 20, 2005 and meeting attended by IRS Gruen with TNP in February 2004.

⁴ Beyoglu is one of Turkey’s oldest districts, and Buyuk Hendek Street is narrow and filled with small electrical goods and computer shops.

⁵ Yigal Schleifer, “Bombers Kill 20 in Attacks on Synagogues,” *Telegraph*, November 16, 2003.

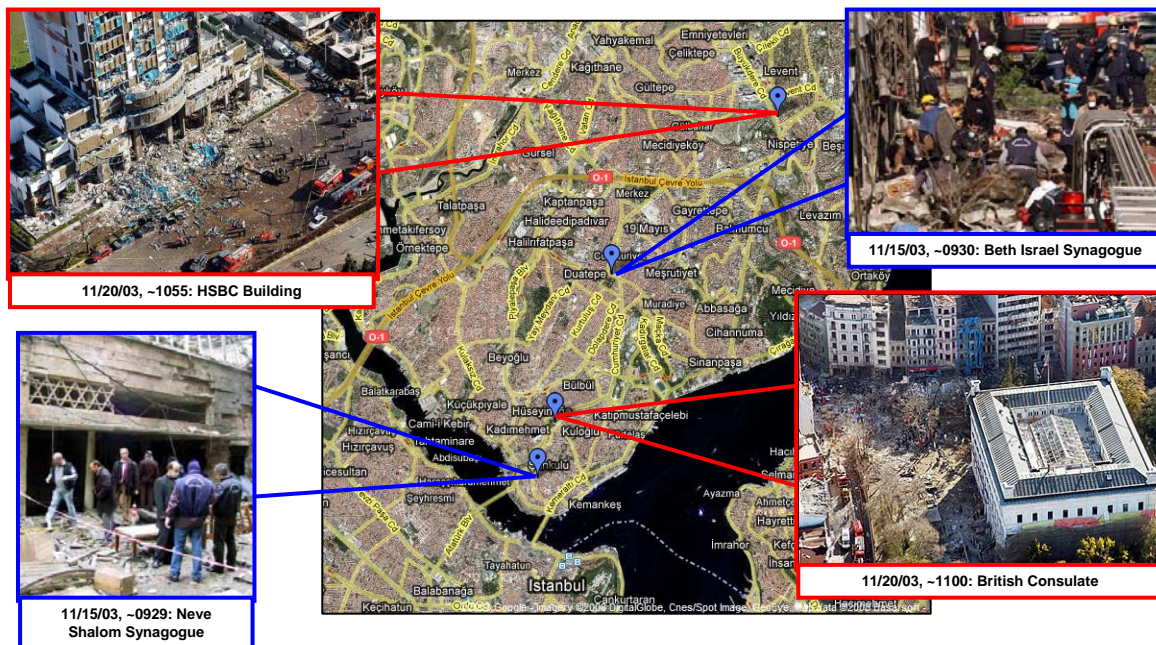
⁶ *Ibid*; Ulkumen Rodoplu, Jeffrey L. Arnold, Rifat Tokyay, Gurkan Ersoy, Serkan Certiner, “Mass-Casualty Terrorist Bombings in Istanbul, Turkey, November 2003: Report of the Events and the Prehospital Emergency Response,” *Prehospital and Disaster Medicine*, vol. 19 no. 2, April – June 2004, p. 137.

⁷ Ulkumen Rodoplu, Jeffrey L. Arnold, Rifat Tokyay, Gurkan Ersoy, Serkan Certiner, “Mass-Casualty Terrorist Bombings in Istanbul, Turkey, November 2003: Report of the Events and the Prehospital Emergency Response,” *Prehospital and Disaster Medicine*, vol. 19 no. 2, April – June 2004, p. 137.

⁸ *Ibid*, p. 137.

At 1055 on November 20, terrorists from the same cell detonated a VBIED in front of the HSBC building located in Istanbul's Levent district.⁹ The bomber parked in front of the building and reportedly waited for cars to come to a stop at the traffic light before detonating the VBIED.¹⁰ The explosion destroyed the façade and first two floors, shattered windows both in the HSBC building and in nearby structures, caused a localized fire in the HSBC building, and left a crater almost ten feet deep in the street.¹¹ At 1100, another bomber attacked the British Consulate, which is located about five miles from the HSBC building and less than a quarter of a mile from the Neve Shalom synagogue. The bomber rammed his truck – reportedly disguised as a food delivery vehicle – through the Consulate's gates. Although the Consulate's outer wall absorbed much of the blast, two gatehouses were completely destroyed. The explosion destroyed at least 6 buildings, damaged another 38 to some degree, and left a crater 10 feet deep. Electrical and telephone lines were also downed throughout the area. Both bombings killed at least 30 and wounded another 400.¹²

Figure 1: Time and Locations of Attacks in Istanbul



⁹ This attack occurred on a busy street lined with stores, restaurants, and offices, and the HSBC is close to the Metro City Shopping Center. Also, the exact time of this attack is unclear, with some newspaper accounts putting the time closer to 1110, with the British Consulate attack following approximately 2 minutes afterwards. See: "Istanbul Rocked by Double Bombing," *BBC News*, November 20, 2003. Reputable sources also differ on the height of the HSBC building, placing it at either 12 or 15 stories tall.

¹⁰ "Istanbul Rocked by Double Bombing," *BBC*, November 20, 2003.

¹¹ Ulkumen Rodoplu, Jeffrey L. Arnold, Rifat Tokyay, Gurkan Ersoy, Serkan Certiner, "Mass-Casualty Terrorist Bombings in Istanbul, Turkey, November 2003: Report of the Events and the Prehospital Emergency Response," *Prehospital and Disaster Medicine*, vol. 19 no. 2, April – June 2004, p. 140.

¹² *Ibid*, p. 140.

Response Summary

Before November 2003, the worst terrorist attack perpetrated on Turkish soil was the July 1993 arson attack on the Hotel Madimak by Islamist radicals, which resulted in 37 deaths and 56 injuries.¹³ Before the November 2003 attacks, it was generally believed that terrorist attacks in Turkey would usually require only a local response capability. The November 2003 attacks, however, generated hundreds of casualties, marking a deadly evolution in the carnage of terrorist attacks in Turkey. They also presented serious logistical challenges for Turkish emergency responders in terms of the temporal and geographic proximity of the attacks to one another.

Some of these targets had been on high alert for some time. Security had been high at Turkey's synagogues since a 1986 attack on the Neve Shalom synagogue that caused 22 deaths. Synagogue security consisted of 24-hour police protection that was augmented by a private security force hired by the Turkish Jewish community. Jewish community officials had also been on heightened alert for potential terrorist activity in the three months preceding the attacks.¹⁴

Controlling and Securing the Incident Sites

Immediately following both sets of attacks, bystanders reportedly began searching for injured survivors trapped in the rubble. Minutes later, firefighters and police officers arrived at each site to join the rescue effort.¹⁵ It has been reported that Istanbul police did not begin to establish a security perimeter at any of the incident sites until at least 15 minutes after the attacks began on both days. During these intervals, many "walking wounded" left the scenes on their own to seek medical assistance at local hospitals and clinics without being documented or giving statements.

Volunteers, onlookers, and the media were also able to move through incident sites, complicating the already difficult situations. Finally, at least one report indicates that emergency responders entered all four incident sites without wearing personal protective equipment – despite the strong smell of ammonia in the air – and without conducting robust security sweeps for secondary devices.¹⁶



Emergency responders at incident site

¹³ Ulkumen Rodoplu, Jeffrey Arnold, Gurkan Ersoy, "Special Report: Terrorism in Turkey," *Prehospital and Disaster Medicine*, vol. 18, no. 2, April – June 2003, p. 156.

¹⁴ Yigal Schleifer, "Bombers Kill 20 in Attacks on Synagogues," *Telegraph*, November 16, 2003.

¹⁵ Keith Dovkants, Hugh Dougherty, "Terrorists' Key Aim was to Kill the British Consul," *Evening Standard [London]*, November 21, 2003.

¹⁶ "Walking Wounded" refers to victims with relatively minor injuries. Ulkumen Rodoplu, Jeffrey L. Arnold, Rifat Tokyay, Gurkan Ersoy, Serkan Certiner, "Mass-Casualty Terrorist Bombings in Istanbul, Turkey, November 2003: Report of the Events and the Prehospital Emergency Response," *Prehospital and Disaster Medicine*, vol. 19 no. 2, April – June 2004, pp. 137, 140 & 142.

There were, however, a variety of reasons that explain why the police had difficulty securing the areas. Widespread communications outages prompted members of the public to drive to the incident sites to search for loved ones, increasing the numbers of people and cars at or near the sites. The streets around these attack sites, particularly the two synagogues, served as bottlenecks, which prevented police from quickly gaining access. Pre-existing traffic conditions on Thursday, November 20 also contributed to emergency responder difficulties in reaching the sites in a timely manner.¹⁷ Additionally, the police response could have been partially affected by recent bureaucratic turnover in which experienced senior police officers had been replaced, thereby removing institutional knowledge on how to effectively respond to mass casualty events.¹⁸ Finally, the concept of establishing Incident Command Posts was still relatively new in Istanbul during this time, which complicated the joint response effort.¹⁹

Use of Emergency Resources

Overall, the majority of injured survivors experienced secondary blast injuries resulting from flying debris, with only a small number having primary blast injuries. Additionally, the simultaneity of the attacks severely strained Istanbul's pre-hospital emergency response system, resulting in patient distribution issues to area hospitals on both days. One of the main causes for these distribution issues appears to have been that little triaging occurred at the blast sites, resulting in victims being transported to at least 24 medical facilities regardless of clinical priority. It has also been reported that Istanbul's Emergency Medical Service (EMS) did not use a comprehensive tagging system at the time of the bombings, making it more difficult for them to coordinate the effective distribution of victims with local hospitals. Unsurprisingly, hospitals close to the bombing sites were overloaded with victims in a very short time, whereas hospitals further away remained mostly under-utilized. At least one hospital, however, served as a notable exception following the November 20 attacks. Within five minutes of receiving notification of the new round of attacks, personnel at the Taksim Education and Research State Hospital (TERSH) – the closest to the British Consulate – began evacuating the first three floors in order to treat incoming victims.²⁰



Photographs of injuries sustained by victims during the Istanbul attacks

¹⁷ "Istanbul Rocked by Double Bombing," *BBC*, November 20, 2003.

¹⁸ Ulkumen Rodoplu, Jeffrey L. Arnold, Rifat Tokyay, Gurkan Ersoy, Serkan Certiner, "Mass-Casualty Terrorist Bombings in Istanbul, Turkey, November 2003: Report of the Events and the Prehospital Emergency Response," *Prehospital and Disaster Medicine*, vol. 19 no. 2, April – June 2004, p. 142.

¹⁹ Nihan Erdogan, Hikmet Iskender, "4 Years After: Terrorist Attacks in Turkey and the Challenges for the Future," *Safety & Security International*, VI/07, October 2007, p. 4.

²⁰ Ulkumen Rodoplu, Jeffrey L. Arnold, Rifat Tokyay, Gurkan Ersoy, Serkan Certiner, "Mass-Casualty Terrorist Bombings in Istanbul, Turkey, November 2003: Report of the Events and the Prehospital

Victims also appear to have been distributed to government hospitals more than other types of medical facilities. One possible reason is that government hospitals in Istanbul were known to have more emergency department beds, making them better equipped to deal with a mass casualty incident. Also, non-government hospitals in Turkey at that time charged for emergency services, whereas the government offered free emergency medical care at its designated hospitals. In fact, this trend so alarmed government medical officials that they announced after the November 15 attacks that the government would pay for emergency medical care at all hospitals in any future disasters, but this did little to alter similar patterns on November 20.²¹

Following the synagogue bombings, EMS reportedly dispatched every available ambulance to the incident sites. According to one study, 26 ambulances were present at both sites by 0944; by 1029, 50 ambulances with 170 personnel were reported at both sites. Following the bombings of the British targets, EMS immediately dispatched 50 ambulances to both scenes. It has been reported, however, that this many ambulances were not required and their presence may have complicated the coordination of on-scene resources, adding to the overall chaos and leaving large parts of the city without EMS service for several hours.²² Had another incident occurred elsewhere in the city, EMS would likely have had difficulty responding effectively. Furthermore, Istanbul's EMS responders and supplies were also exposed to potential secondary devices in the vicinities of the incident sites that could have seriously compromised the city's emergency care capabilities.

Communications

In addition to patient distribution issues between hospitals and EMS, the government appears to have had difficulty coordinating the flow of information to the public regarding both sets of attacks. For instance, hospitals had trouble identifying the dead, many of whom lost their identification cards during the attacks. Following the second day of bombings, hospitals began posting lists of casualties outside of their gates. In many cases, only descriptions of the casualties were made available to the public because many had lost their identification documents in the blasts.²³ Additionally, most of the information about both sets of attacks was being disseminated primarily by media outlets, some of which had established their field headquarters in



**Lists of Victims Posted Outside of
an Istanbul Hospital**

Emergency Response," *Prehospital and Disaster Medicine*, vol. 19 no. 2, April – June 2004, pp. 137, 140-142.

²¹ One anomaly in this pattern was observed following the synagogue attacks, when the private American Hospital received the greatest number of injured survivors even though it was 6 kilometers from the blast sites, whereas the TERSH (a government hospital located only 1 kilometer from the sites) received 21 less injured survivors and the private German Hospital (equidistant from the blast sites relative to the American Hospital) received only four. It is believed that the reason for this anomaly was the victims' personal preferences in going to a specific, personal physician via ambulance and non-ambulance means of transportation. *Ibid*, p. 142.

²² *Ibid*, p. 142.

²³ *Ibid*, p. 141.

close proximity to the incident sites and were broadcasting graphic images live from the scene. Less than three hours after the Consulate bombing, the government banned on-scene media broadcasts and witness interviews in order to better control the flow of information and prevent a public panic.²⁴ This move, however, risked severing an important information conduit to the public, opening the possibility for even greater panic due to constricted information flows.

The likely reason for this communications gap was that the government's emergency managers apparently did not have adequate outlets of providing the public with accurate details about the attacks. This lack of public notification caused many people to converge on the scenes and at the hospitals to seek accurate information about missing loved ones, further complicating response efforts.²⁵ This was not helped by the fact that almost immediately following both sets of attacks, phone networks were overloaded by people trying to call loved ones and emergency contact numbers. One consequence on November 15 was that the public could not access the emergency phone system for an estimated six to eight hours. On November 20th, another factor tying up telecommunications use was rumors that additional attacks were imminent.²⁶ The rumors of follow-on attacks, however, were well-founded: a post-attack police investigation led to the discovery of more than 1,100 pounds of explosives in Istanbul for use in a new wave of attacks.²⁷

CASE STUDY 2: MADRID

Attack Summary

On March 11, 2004, a group of Muslim extremists influenced by AQ's ideology detonated ten bombs on four commuter trains in Madrid, Spain. The attacks occurred during the morning rush hour, between 0737 and 0742, killing 191 people and injuring at least 1,900 others. In addition to the ten successfully detonated bombs, three other devices failed to detonate.²⁸ The devices were pre-positioned on the trains and placed in sports bags and backpacks. They consisted of 22 pounds of an explosive used in commercial mining known as Goma-2, and were detonated by the alarms of attached cell phones that were set to coincide with the times at which the trains would be in-station.²⁹ It is not believed that this group had traditional training in terrorist camps abroad.



²⁴ *Ibid*, pp. 140-141.

²⁵ *Ibid*, pp. 142-143.

²⁶ *Ibid*, pp. 139-141.

²⁷ "Turkey Seizes Explosives Linked to Terror Plot," *New York Times*, December 26, 2003.

²⁸ There are conflicting reports as to when the attacks were actually initiated (0737 or 0739) and how long it took all ten bombs to detonate (3 minutes or 15 minutes). Also, some reports indicate that there were four unexploded devices discovered by authorities.

²⁹ Had the second train not been delayed, the bombs would have detonated while the train was in Atocha station. Department of Homeland Security, "Special Assessment: Lessons Learned from the Madrid Train Bombing," April 20, 2004, p. 4.

Response Summary

The attacks came on the eve of a national election that authorities viewed as a high threat event, particularly in terms of attacks by Basque separatists affiliated with ETA. Authorities had also been aware of the activity of Islamic militants within Spain for some time, and AQ leaders had singled Spain out for attack in past media releases.³⁰ The scale of the attacks, however, was unlike anything Spain had previously experienced. It required the mobilization of resources from several municipalities in the region, which resulted in the first-ever activation of both the regional and national command systems.³¹ Table 1 presents a timeline of key emergency response actions taken by authorities.³²



Table 1: Key Emergency Response Actions following Madrid Attacks

Time	Action
0800	Spanish police implement “Operacion Jaula” (Cage Operation)
0830	Emergency Response Regional Command Center opens in Madrid
0845	Renfe (Spanish railway operator) shuts down all rail traffic into and out of Madrid, including all commuter, regional, intercity, and international trains
0856	Police seal off the streets around the incident sites and re-route or stop incoming/departing traffic in those and other strategic parts of the city
1017	All of the injured are removed from the incident sites
1400	All unclaimed belongings are moved from Ifema to a police station, where they are subjected to further investigation
1940	The alarm for an overlooked explosive device concealed in a sports bag rings but fails to detonate the bomb while it is in a police station

Similar to the Istanbul bombings, emergency responders in Madrid were challenged by the simultaneity of the explosions and their geographic proximity to one another: the Telez blasts occurred only 500 yards from Atocha station, and El Pozo and Santa Eugenia stations were only six and nine miles, respectively, from Atocha. See Figure 2 for the locations of the attacks.

Controlling and Securing the Incident Sites

Authorities implemented a Cage Operation³³ at 0800 and it is estimated to have reduced traffic in Madrid by half between 1100 and 1700, enabling officials to more effectively

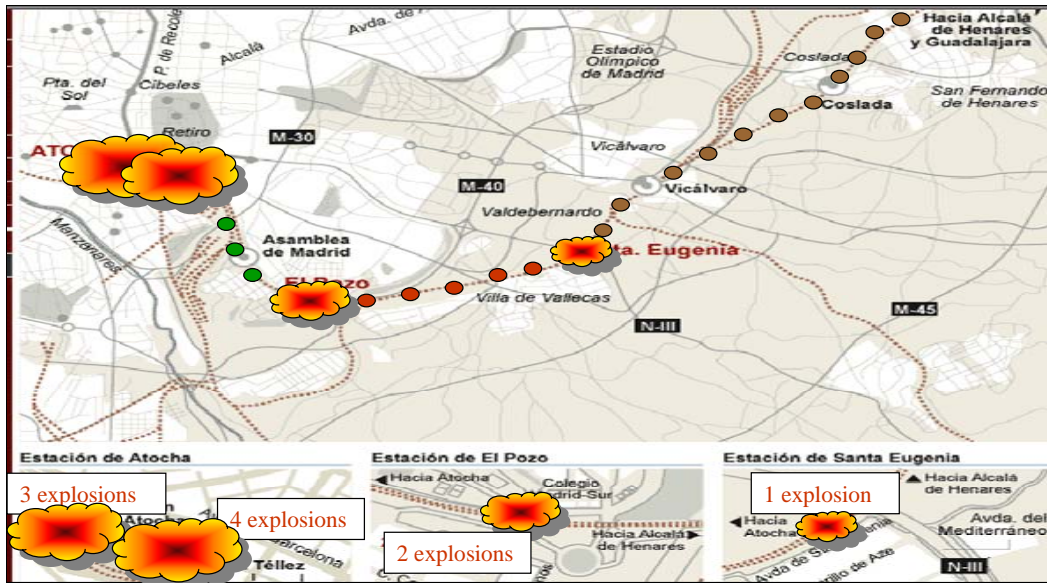
³⁰ *Ibid*, p. 1.

³¹ Roger Bolling, Ylva Ehrlin, Rebecca Forsberg, Anders Ruter, Vivian Soest, Tore Vikstrom, Per Ortenwall, Helge Brandstrom (ed.), “KAMEDO Report 90: Terrorist Attacks in Madrid, Spain, 2004,” *Prehospital and Disaster Medicine*, vol. 22 no. 3, May – June 2007, p. 252.

³² Department of Homeland Security, “Terrorist Incident Response: Cordoning a Large Metropolitan Area,” Lessons Learned Information Sharing, undated.

³³ A Cage Operation is designed to prevent terrorists from fleeing cities or regions after an attack by controlling transportation in, out, and around the city. In effect, it could be considered a citywide security perimeter to better allow authorities to control an emergency response.

Figure 2: Locations of Madrid Attacks



manage logistical priorities and access incident sites. The police placed roadblocks at strategic points throughout the city and systematically stopped vehicles and people to identify and search them. The Spanish railway operator Renfe also organized alternative commuter transportation and re-routed traffic, resulting in 3,000 stranded passengers being moved by road throughout the day.³⁴ Emergency response personnel arrived at the incident sites within minutes of the blasts and swept for additional devices, though this was likely a time consuming process since there were many bags reportedly abandoned at the incident sites. Within 30 minutes of the first alarm, hospital tents were set up as collection points at all 4 incident sites. That said, at least one of the locations had a tent set up in direct proximity to a demolished railway car, placing it within the risk zone for possible secondary explosions.³⁵ It remains unclear when these scenes were rendered safe from secondary devices but, within two hours of the blasts, bomb disposal technicians retrieved and destroyed two unexploded devices.³⁶

As rescue operations proceeded, volunteers collected victims' personal belongings at the sites and moved them to the Ifema convention center. Ifema was also used as a temporary mortuary where bodies could be identified and as a location where people could receive emergency psychological care. From Ifema, unclaimed belongings were moved to a police station where, at 1940, a cell phone alarm failed to detonate an explosive device. It is suspected that the bomb failed to detonate either because of

³⁴ Department of Homeland Security, "Terrorist Incident Response: Cordoning a Large Metropolitan Area," Lessons Learned Information Sharing, undated.

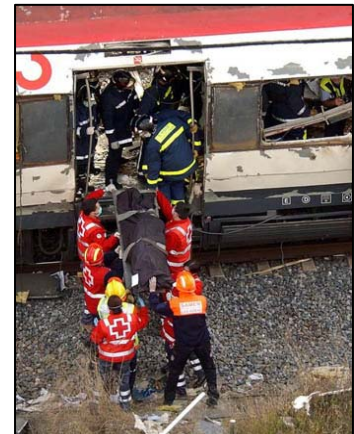
³⁵ Roger Bolling, Ylva Ehrlin, Rebecca Forsberg, Anders Ruter, Vivian Soest, Tore Vikstrom, Per Ortenwall, Helge Brandstrom (ed.), "KAMEDO Report 90: Terrorist Attacks in Madrid, Spain, 2004," *Prehospital and Disaster Medicine*, vol. 22 no. 3, May – June 2007, p. 253.

³⁶ Department of Homeland Security, "Secondary Attacks: Failure to Perform Adequate Site Inspection Procedures," *Lessons Learned Information Sharing*, undated.

insufficient battery charge or incorrectly connected cables.³⁷ It is also unclear if the AM and PM setting was incorrectly entered. Nevertheless, this device posed significant risks to those at Ifema and at the police station, and a successful detonation could have caused many more casualties.

Use of Emergency Resources

The task confronting first responders was very challenging in terms of logistical, organizational, and emotional tolls. For instance, it was the responsibility of firefighters to extract corpses and body parts from the trains. At the El Pozo station, where two devices exploded, they reported 70 bodies lying along the platforms. Corpses were also entangled in the metal wreckage and the recovery effort was made more difficult by the multitude of body parts scattered throughout the vicinity of El Pozo.³⁸ Forty coroners also worked on-scene to identify the remains of the dead.³⁹ At Santa Eugenia, rescue crews had to detach benches from the waiting area to use as stretchers, and buses were used to transport victims to hospitals. Seven hours after the attacks, emergency responders were still extracting bodies from the wreckage at the four sites.⁴⁰



**Fire/EMS Recovering
Victims' Bodies**

Even though all of the injured had been removed from the incident sites by 1017, the prompt evacuation of survivors resulted in an influx of patients to area hospitals, with the least injured often arriving first. A triage tracking system does not appear to have been implemented to monitor the clinical prioritization of injured victims at the casualty collection points, which likely contributed to patient distribution challenges. Additionally, even though patients were stabilized on-scene, it has been noted that on-scene responders did not have access to a cohesive distribution system to receive status updates on hospital availability. In all, 927 injured people (165 of whom were in serious condition) were reportedly sent to at least 15 different hospitals and clinics in Madrid within a period of 2 ½ hours, with more than 270 arriving at Gregorio Maranon University General Hospital alone. In fact, the management at Gregorio Maranon Hospital opted to postpone all of the operations planned for that day after the initial alarm, effectively opening 22 operating rooms and, within 2 hours, making 161 beds available (438 beds available within 6 hours). This



191 People Killed in the Attacks

³⁷ Department of Homeland Security, "Secondary Attacks: Failure to Perform Adequate Site Inspection Procedures," *Lessons Learned Information Sharing*, undated.

³⁸ Giles Tremlett, John Hooper, Jane Walker, Owen Bowcott, and Sam Jones; "It Looked like the Platform of Death. I've Never Seen Anything like It," *Guardian*, March 12, 2004.

³⁹ Mar Roman, "Rescue Workers Overwhelmed as 190 People Killed in Madrid Explosions," *Associated Press* as found on *EMSResponder.com*, March 12, 2004.

⁴⁰ Lawrence Wright, "The Terror Web," *The New Yorker*, August 2, 2004, p. 2; Giles Tremlett, John Hooper, Jane Walker, Owen Bowcott, and Sam Jones; "It Looked like the Platform of Death. I've Never Seen Anything like It," *Guardian*, March 12, 2004.

decision is similar to the actions taken by TERSH in Istanbul following the November 20 attack wave.⁴¹

Communications

Telecommunications systems were overloaded and largely unserviceable, causing information dispersion difficulties. During the first 16 hours, more than 22,000 incoming calls were processed by the Madrid Emergency Service Center in connection with the attacks. Staffing the center was reportedly not a problem, however, since the shift that was about to go off duty was ordered to remain following the attacks. Additionally, the Center served as an information hub throughout the day, which meant that authorities and family members could call for updates about victim transfers to area hospitals. The hospitals also worked to provide accurate information to the media in order to control the spread of rumors as much as possible.⁴²

It was reported that friends and family of missing persons wandered between hospitals to review casualty lists and hear updates.⁴³ For instance, hours after the attacks, more than 600 relatives had gathered at the accident and emergency ward at Gregorio Maranon Hospital, where they were taken to a large assembly hall in which a list of injured patients was read aloud every 30 minutes (overriding a Spanish law concerning patient confidentiality). The psychological care of the injured and their relatives associated with such a mass casualty incident had not been anticipated in Gregorio Maranon Hospital's disaster plans, but administrators opted to mitigate further psychological stress.⁴⁴

CASE STUDY 3: LONDON

Attack Summary

On July 7, 2005, four suicide bombers detonated man-portable explosive devices between 0850 and 0947 on three underground trains and a commuter bus in central London. The three train explosions occurred in a very short timeframe at the following sites: an eastbound Circle Line train traveling from Liverpool Street to Aldgate station (0850); a westbound Circle Line train leaving Edgware Road station for Paddington station (0851); and a southbound Piccadilly Line train traveling between King's Cross and Russell Square stations (0853). The bus attack occurred on the top deck of a double-decker bus at Tavistock Square (0947). The attacks resulted in 52 people dead and another 700

⁴¹ Roger Bolling, Ylva Ehrlin, Rebecca Forsberg, Anders Ruter, Vivian Soest, Tore Vikstrom, Per Ortenwall, Helge Brandstrom (ed.), "KAMEDO Report 90: Terrorist Attacks in Madrid, Spain, 2004," *Prehospital and Disaster Medicine*, vol. 22 no. 3, May – June 2007, pp. 253, 255. U.S. House of Representatives Committee on Oversight and Government Reform, "Hospital Emergency Surge Capacity: Not Ready for the 'Predictable Surprise'," May 2008, p. 1.

⁴² Roger Bolling, Ylva Ehrlin, Rebecca Forsberg, Anders Ruter, Vivian Soest, Tore Vikstrom, Per Ortenwall, Helge Brandstrom (ed.), "KAMEDO Report 90: Terrorist Attacks in Madrid, Spain, 2004," *Prehospital and Disaster Medicine*, vol. 22 no. 3, May – June 2007, p. 253.

⁴³ Giles Tremlett, John Hooper, Jane Walker, Owen Bowcott, and Sam Jones; "It Looked like the Platform of Death. I've Never Seen Anything like It," *Guardian*, March 12, 2004.

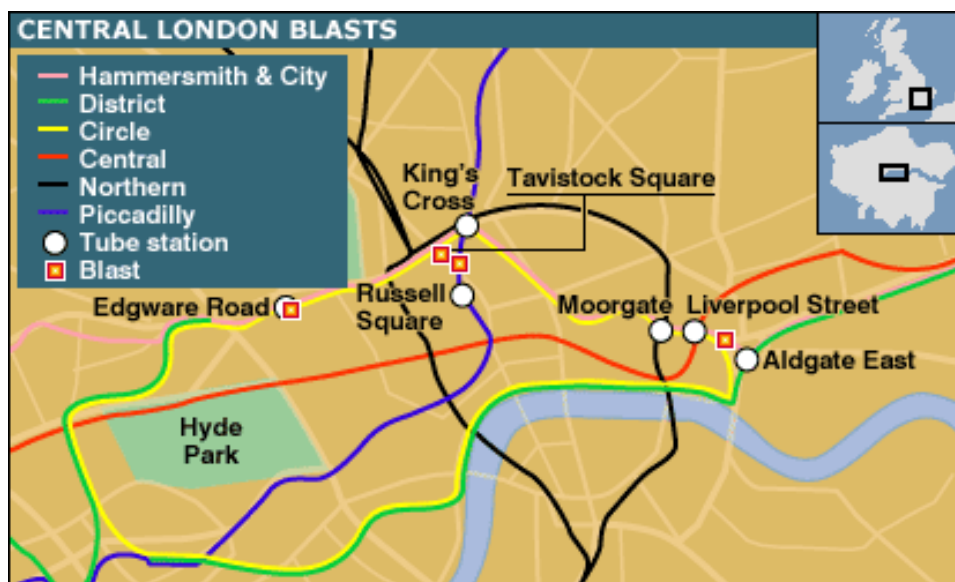
⁴⁴ Roger Bolling, Ylva Ehrlin, Rebecca Forsberg, Anders Ruter, Vivian Soest, Tore Vikstrom, Per Ortenwall, Helge Brandstrom (ed.), "KAMEDO Report 90: Terrorist Attacks in Madrid, Spain, 2004," *Prehospital and Disaster Medicine*, vol. 22 no. 3, May – June 2007, pp. 253-254.

injured.⁴⁵ The bombers used homemade peroxide-based explosives that were hidden in backpacks. Members of this cell received training in terrorist camps abroad and cell members had links to other terrorists operating in Britain.

Response Summary

Following the 2004 attacks in Madrid, British counterterrorism authorities viewed a major terrorist attack on London as a near certainty, and had prepared for such an event. In fact, Gold Command had just completed an emergency response exercise the previous month at the Tower Gateway station, not far from Aldgate.⁴⁶ Similar to the Istanbul and

Figure 3: Locations of London Attacks



Madrid attacks, however, the near-simultaneous detonation of explosive devices at multiple locations clustered close to one another severely strained London's emergency services. See Figure 3 for a map of where the bombings occurred.

Emergency responders had to operate in dangerous underground tunnels that were difficult to access and typically required specific training and capabilities, such as extrication skills. Other complicating factors included poor ventilation, high

⁴⁵ Please note that other times have been reported by other sources, but they all generally fit into a relatively short timeframe. It should also be noted that some reports indicate 56 deaths, though this number could also include the bombers. "Report of the 7 July Review Committee," London Assembly, June 2006, p. 12.

⁴⁶ Gold Command is where emergency responders coordinate to develop and implement a strategy for addressing an incident. It is under the command of the Commissioner of the Metropolitan Police, reporting to the Cabinet Official Briefing Room A (COBRA) Committee, which is chaired by the Prime Minister and includes MI5. Glen M. Segell, "Terrorism: London Public Transport – July 7, 2005," *Strategic Insights*, Vol. IV Issue 8, August 2005, p. 3.

temperatures, and problematic lighting.⁴⁷ Information on specific incident sites is presented in Table 2.

Table 2: Incident Site Details following London Attacks

Location	Details
Aldgate Station	656 feet from the Aldgate Station platform; 10 fire/rescue vehicles with 50 firefighters worked onsite ⁴⁸ ; patients triaged in field and then transported by ambulance and 3 buses to hospital. ⁴⁹
Edgware Road Station	Device placed on floor of 2 nd car, near 1 st set of double doors; ⁵⁰ blast penetrated a tunnel wall, hitting a 2 nd train on an adjoining platform; 12 fire/rescue vehicles with 60 firefighters onsite ⁵¹ ; at least 80 casualties triaged in field. ⁵²
King's Cross	Almost 70 feet below ground, explosive device detonated in the first car, near the first set of double doors; 12 fire/rescue units with 60 firefighters worked onsite, ⁵³ as well as the London Underground's emergency rescue unit. Wounded evacuated through both stations, but some were stranded in tunnel for hours because of depth and structural integrity concerns. ⁵⁴
Tavistock Square	Device placed at bomber's feet on upper deck of double-decker bus exploded, tearing roof off and damaging nearby cars. 4 units with 20 firefighters worked onsite, as well as 14 doctors from the nearby headquarters of the British Medical Association. ⁵⁵

Immediately following the attacks, personnel at the London Underground Network Control Center mistakenly believed that the sudden loss of power and reports of explosions were caused by power surges in the tunnels. Partially because of this initial confusion, all trains on the network were not moved to platform until 0915, and not evacuated until 0930.⁵⁶ Also, five distinct explosions were reported in the tunnels, causing emergency responders to initially deploy to five different locations.⁵⁷ Nevertheless, the London Underground's Network Control Centre alerted all emergency services at 0859 to attend incidents at Edgware Road, King's Cross, and Aldgate stations.

⁴⁷ Jim Ryan, Hugh Montgomery, "Terrorism and the Medical Response," *The New England Journal of Medicine*, August 11, 2005, p. 545.

⁴⁸ Gunnar J. Kuepper, "The London Bombing on July 7, 2005," *Emergency & Disaster Management, Inc.*, 2005, p. 1.

⁴⁹ Jim Ryan, Hugh Montgomery, "Terrorism and the Medical Response," *The New England Journal of Medicine*, August 11, 2005, p. 543.

⁵⁰ *Ibid.*, p. 543.

⁵¹ Gunnar J. Kuepper, "The London Bombing on July 7, 2005," *Emergency & Disaster Management, Inc.*, 2005, p. 2.

⁵² Jim Ryan, Hugh Montgomery, "Terrorism and the Medical Response," *The New England Journal of Medicine*, August 11, 2005, p. 543.

⁵³ Gunnar J. Kuepper, "The London Bombing on July 7, 2005," *Emergency & Disaster Management, Inc.*, 2005, p. 2.

⁵⁴ Glen M. Segell, "Terrorism: London Public Transport – July 7, 2005," *Strategic Insights*, Vol. IV Issue 8, August 2005, p. 2.

⁵⁵ Gunnar J. Kuepper, "The London Bombing on July 7, 2005," *Emergency & Disaster Management, Inc.*, 2005, p. 2.

⁵⁶ By 1616, all mainline railway stations apart from King's Cross had been re-opened and Network Rail urged commuters to begin going home. Glen M. Segell, "Terrorism: London Public Transport – July 7, 2005," *Strategic Insights*, Vol. IV Issue 8, August 2005, p. 2, 5.

⁵⁷ Department of Homeland Security, "Emergency Communications: Improving Special Frequency Radio Communications during a Mass Casualty Incident," *Lessons Learned Information Sharing*, undated.

Additionally, emergency responders successfully cleared all four incident sites within three hours. Still, there were some initial deployment discrepancies among responding agencies. Table 3 outlines the major actions taken by first responding agencies following each of the explosions.⁵⁸

Table 3: Key Emergency Response Actions following London Attacks

Aldgate Station Incident	
Time	Details
0851	1 st call about Aldgate made to British Transport Police (BTP) by an Underground staff member; London Ambulance Service (LAS) also receives a call about incident at Liverpool Street
0900	1 st fire engine on-scene; London Fire Brigade (LFB) mobilization message for explosion sent
0903	1 st LAS ambulance arrives at Liverpool Street
0905	LFB declares major incident
0908	BTP declares major incident due to train accident
0910	City of London declares major incident due to bomb explosion
0914	1 st ambulance arrives at Aldgate; crew reports explosion, requests 5 ambulances
Edgware Road Station Incident	
Time	Details
0858	1 st call received for fire and explosion at Praed Street
0858	BTP receives call reporting person under train and train collision with wall
0904	LFB units arrive at Praed Street; LFB call Metropolitan Police Service (MPS)
0914	LAS ambulance crew on-scene reports explosion with up to 1,000 casualties
0932	MPS declares major incident at Edgware Road Station
0934	LFB declares major incident at Edgware Road Station
0937	Fire rescue unit initially sent to Praed Street is re-deployed to Edgware Road
King's Cross Station Incident	
Time	Details
0856	MPS 1 st alerted to incident by CCTV station footage
0902	LFB received 1 st call reporting smoke
0904	LFB mobilized using "Split Attendance," with 3 fire engines deployed to Euston Square and 1 to King's Cross; passengers did not exit from Euston Square
0915	MPS declares major incident at King's Cross
0919	1 st ambulance arrives at King's Cross
0921	LAS declares major incident at King's Cross
0938	LAS declares major incident at Russell Square
Tavistock Square Bus Incident	
Time	Details
0947	1 st call received, 12 more received before 0956
*A major incident was not declared at this site.	

Controlling and Securing the Incident Sites

Shortly after the attacks, British authorities activated Gold Command. At each of the incident sites, police facilitated ambulance access to and from all incident sites and hospitals, and there were no reports of ambulances being blocked in by police or fire vehicles at any scenes.⁵⁹ Emergency responding agencies appear to have taken control of the respective scenes shortly after the blasts, which benefited the subsequent forensic and

⁵⁸ "Report of the 7 July Review Committee," London Assembly, June 2006, pp. 29, 49.

⁵⁹ "Bombs Under London: the EMS Response Plan that Worked," *Journal of Emergency Medical Services*, August 2005, pp. 60-62.

police investigations. For instance, scientists were quickly able to gather clues about the source and intensity of the explosions from the ways in which objects had been deformed.⁶⁰

Nevertheless, the official London Assembly report on the attacks found that “there was no systematic establishment of survivor reception areas on 7 July. As a result, many survivors simply left the scenes of the explosions, without having given their personal details to anyone or received any advice or support.”⁶¹ Furthermore,

although the incident scenes underwent quick and basic assessments for radiological and chemical contamination, it was acknowledged that unexploded secondary devices remained a risk that made rescue operations potentially dangerous and time sensitive.⁶²



Inside of one of the Trains (above);
Double-decker Bus (right)

Use of Emergency Resources

The initial deployments of emergency responders and equipment appears to have been problematic at multiple sites. For instance, the London Fire Brigade’s (LFB) initial deployment to Praed Street diverted resources from the actual incident site, explaining why the first fire engine did not arrive at Edgware Road until 0918. The London Ambulance Service (LAS) received its first emergency call at 0851 from the British Transport Police (BTP),⁶³ but subsequent calls caused it to deploy ambulances to as many as 7 different sites.⁶⁴ More specifically, it took LAS 23 minutes to dispatch an ambulance to Aldgate, possibly because of the initial confusion on deploying to Liverpool Street. Additionally, even though the LFB ordered a split attendance for the King’s Cross incident, it mistakenly deployed resources to Euston Square instead of Russell Square. Incident Commanders (ICs) also did not initially know how many explosions had occurred and had difficulty receiving instructions as to which hospitals were still receiving patients. Many of their requests for additional ambulances, supplies, and equipment either did not arrive at LAS headquarters or took longer than necessary to reach LAS responders.⁶⁵

⁶⁰ Glen M. Segell, “Terrorism: London Public Transport – July 7, 2005,” *Strategic Insights*, Vol. IV Issue 8, August 2005, p. 6.

⁶¹ “Report of the 7 July Review Committee,” London Assembly, June 2006, p. 69.

⁶² Julian Redhead, Patricia Ward, and Nicola Batrick, “Prehospital and Hospital Care,” *The New England Journal of Medicine*, August 11, 2005, p. 546.

⁶³ “Bombs Under London: the EMS Response Plan that Worked,” *Journal of Emergency Medical Services*, August 2005, p. 60.

⁶⁴ Department of Homeland Security, “Emergency Communications: Improving Special Frequency Radio Communications during a Mass Casualty Incident,” *Lessons Learned Information Sharing*, undated.

⁶⁵ *Ibid.*

Effective triaging was performed in field, and patients with minor injuries were only transported to area hospitals when required and via small vans and buses.⁶⁶ Also, five of the six LAS command and control vehicles were deployed to the incidents, while one was held in reserve in case any other incidents occurred. Mutual aid was also called upon from neighboring ambulance services and voluntary agencies, which were staged at previously agreed upon locations. Some of the mutual aid vehicles were also used to backfill areas depleted by resources that were deployed to the blast sites. The National Health Service (NHS) quickly alerted all designated receiving hospitals in London to increase their state of readiness following the attacks in order to treat incoming victims from the incident sites. The NHS was successful in clearing 1,200 hospital beds within 3 hours for incoming patients, but did not formally notify specialist and non-acute care hospitals near the incident sites because they were not on the official receiving hospitals list.⁶⁷ The LAS Emergency Planning manager also advised the Central Ambulance Control to put hospitals on major incident standby, identify safe areas to assemble in case of a hazardous materials risk, and mobilize equipment vehicles.⁶⁸

Police were eventually able to establish priority transport routes, but traffic immediately following the blasts made responding to the incident sites very difficult. This was partially overcome, however, by pre-attack planning that called for the LAS deployment of medical crews on bicycles.⁶⁹ Emergency medical helicopters also flew more than 25 sorties to medical practitioners and their equipment to the incident sites.⁷⁰ Additionally, LAS allocated a Parking Officer at each of the sites following the attacks to ensure the most expedient movement of casualties from the sites.⁷¹ In all, LAS deployed approximately 100 ambulances and transported at least 45 patients with serious or critical injuries – including burns, amputations, chest or glass injuries, and fractured limbs – in addition to at least 300 more patients who were treated and transported to area hospitals.⁷²



Emergency responders accessing a scene

Communications

Responding agencies had trouble communicating within their own command structures, between agencies, and with victims trapped in underground tunnels. Emergency responder agencies relied, to varying degrees, on mobile phones to communicate between

⁶⁶ “Bombs Under London: the EMS Response Plan that Worked,” *Journal of Emergency Medical Services*, August 2005, pp. 61-62.

⁶⁷ Department of Homeland Security, “Incident Management: Alerting Hospitals in Close Proximity to a Mass Casualty Incident,” *Lessons Learned Information Sharing*, undated.

⁶⁸ “Report of the 7 July Review Committee,” London Assembly, June 2006, p. 25.

⁶⁹ Jim Ryan, Hugh Montgomery, “Terrorism and the Medical Response,” *The New England Journal of Medicine*, August 11, 2005, p. 545.

⁷⁰ Julian Redhead, Patricia Ward, and Nicola Batrick, “Prehospital and Hospital Care,” *The New England Journal of Medicine*, August 11, 2005, p. 546.

⁷¹ “Bombs Under London: the EMS Response Plan that Worked,” *Journal of Emergency Medical Services*, August 2005, pp. 61-62.

⁷² “Bombs Under London: the EMS Response Plan that Worked,” *Journal of Emergency Medical Services*, August 2005, p. 60.

incident sites and Gold commanders, the networks for which were overloaded following the attacks.⁷³ The LAS, LFB, Metropolitan Police, and BTP ICs also deployed responders into the train tunnels, but many could not communicate with the ICs who remained above ground because their radios did not have underground reception. The BTP was the only response service with radios equipped to work underground, but even those were not completely effective because the cable that allowed the radios to work had been damaged following the blasts. As a result, responders had to rely on runners to go into the tunnels to relay messages back to the ICs. This caused confusion and delayed requests for ambulances, supplies, and equipment during the first hour of operations.⁷⁴

There was also significant congestion on the LAS special frequency radio channels because the two VHF channels in use could not handle the high-volume of calls from LAS ICs to area ambulances and LAS headquarters, especially since only one operator was initially used to route both channels.⁷⁵ Dispatchers subsequently did not know how many ambulances were needed at the incident sites and had difficulty sending the required number of vehicles to most of the locations. This resulted in medical supply shortages and delayed transport of some victims to hospitals.⁷⁶ Similarly, the City of London Police was experiencing such severe communications difficulties at the Aldgate Station that they decided to activate the Access Overload Control (ACCOLC) system at noon for a one kilometer area around Aldgate until 1645. This decision, however, was executed outside the chain of command, with the onsite senior police officer apparently having been unaware of Gold Coordinating Group's decision not to activate ACCOLC.⁷⁷



Responding agencies had similar difficulties communicating amongst each other, and this is reflected in Table 3. For instance, LAS did not seem to be aware of LFB's assessment of an explosion at Aldgate station, and BTP was still declaring a train accident at 0908.⁷⁸ Communications between first responders also appear to have been an issue at Edgware Road, since the LFB major incident declaration happened 20 minutes after the LAS reported an explosion causing over 1,000 casualties.⁷⁹

Communications were particularly hampered, however, between responders above ground and victims below ground. For instance, many passengers trapped in the tunnels

⁷³ "Report of the 7 July Review Committee," London Assembly, June 2006, pp. 42-43, 51.

⁷⁴ Department of Homeland Security, "Emergency Communications: Improving Communications with Train Passengers Trapped Underground following a Mass Casualty Incident," *Lessons Learned Information Sharing*, undated.

⁷⁵ "Report of the 7 July Review Committee," London Assembly, June 2006, pp. 49-50.

⁷⁶ Department of Homeland Security, "Emergency Medical Services: Dispatching a Predetermined Number of Ambulances to Mass Casualty Incidents," *Lessons Learned Information Sharing*, undated.

⁷⁷ "Report of the 7 July Review Committee," London Assembly, June 2006, pp. 44-45.

⁷⁸ *Ibid.* p. 25.

⁷⁹ *Ibid.* p. 30.

did not receive critical information following the explosions because the blasts damaged the trains' internal communications systems. Most passengers also were not aware of what happened, if they were in danger, what they should do next, and if emergency responders were aware of their situations. Another complicating factor was damage to internal and emergency lighting systems within train compartments and tunnels, making it very difficult for passengers to see.⁸⁰ Even when help arrived, emergency responders found it difficult to provide first aid on-site.⁸¹ Train conductors themselves were not aware of what had transpired because they could not get in touch with passengers in the affected cars, and were unable to communicate with their line control managers due to damaged communications equipment.

It has also been reported that the general public responded well to official requests to not use the emergency phone system unless they required treatment for life-threatening illnesses or injuries. In fact, the number of calls was down for an average day.⁸² Other types of emergency communications outlets were, however, highly utilized. The Casualty Bureau, for instance, received 103,087 calls from the time it opened on July 7 to 0600 hours on July 8. Its high point was between 1500 and 1600 hours on July 7, when it received more than 42,000 calls. A staff of 200 from 21 different police forces around the country worked to answer phones around the clock.⁸³ The public also utilized the websites of emergency responding agencies: Transport for London recorded 600,000 visitors, as opposed to the usual number of 100,000; the Metropolitan Police updated its website 27 times throughout the day, receiving 1.5 million hits.⁸⁴

Finally, in an attempt to control the flow of information to the public as best as possible, the Gold Coordinating Group opened a media center at 1330. This was reported as being a success by emergency services, and media representatives found it useful to have centralized access to representatives from the key services.⁸⁵ Throughout the day, Metropolitan Police Commissioner Sir Ian Blair and his colleagues held frequent press conferences for local and foreign journalists at the QE2 Conference Centre, which were also broadcast live by BBC 24 news on digital TV and Internet Services.⁸⁶

FOILED/FAILED TERRORIST PLOTS IN EUROPE IN POST-9/11 ERA

In addition to assessing trends in the emergency response scenarios described in the case studies, it is also important to identify and examine recent foiled/failed terrorist attacks to

⁸⁰ Department of Homeland Security, "Emergency Communications: Improving Communications with Train Passengers Trapped Underground following a Mass Casualty Incident," *Lessons Learned Information Sharing*, undated.

⁸¹ "Report of the 7 July Review Committee," London Assembly, June 2006, p. 63.

⁸² "Bombs Under London: the EMS Response Plan that Worked," *Journal of Emergency Medical Services*, August 2005, pp. 63-64.

⁸³ Gunnar J. Kuepper, "The London Bombing on July 7, 2005," *Emergency & Disaster Management, Inc.*, 2005, p. 5.

⁸⁴ "Report of the 7 July Review Committee," London Assembly, June 2006, p. 94.

⁸⁵ *Ibid.* p. 92.

⁸⁶ Glen M. Segell, "Terrorism: London Public Transport – July 7, 2005," *Strategic Insights*, Vol. IV Issue 8, August 2005, p. 5.

uncover evolutions in targeting and tradecraft for Western settings. This is particularly important for assessing what response scenarios could look like following future attacks. The 2004 “gas limos project,” the 2008 foiled Barcelona plot, and the 2007 failed VBIED attacks in London all suggest that operatives in the West are increasingly scrutinizing first responder plans and capabilities in order to identify vulnerabilities that could be exploited to either slow them down or target them outright. This is a trend that has already taken hold in other parts of the world, especially in terms of terrorist operations in Iraq, Afghanistan, Pakistan and Yemen.

Gas Limos Project

Al-Qaeda operative Dhiren Barot’s notes on British and American targets – some of which were in the New York City area – focused on ways to maximize damage and carnage during a terrorist attack while eluding capture in all phases of the operation.⁸⁷ Although Barot researched numerous modes of attack, the centerpiece of his various attack scenarios appears to have been the “gas limos project,” which supposedly took him a year to plan. His notes acknowledge how risky it was to obtain conventional explosives in the West, which is why he instead chose to focus on gas-based devices placed in large vehicles such as limousines. He noted that the materials for gas-based devices are easy to procure, relatively safe to handle and – when properly constructed and deployed – could inflict mass carnage and destruction. He wrote that it is just a question of knowing and understanding the behavioral patterns of gas-based explosives in order to customize them for terrorist use.⁸⁸

Barot also proposed spray painting at least some of the gas canisters in each limo (he envisioned 12-13 for each of 3 limos) yellow to indicate toxic material. The goal of doing so was to “spread terror and chaos when the emergency service (HazMat) teams” arrived on scene in order to frustrate their efforts to expeditiously access the scene and treat/evacuate injured survivors. He also possessed full color codes for hazardous materials, which he offered to provide upon request by an interested reader.⁸⁹ Finally, other aspects of his notes also focused on first responder facilities that were in close proximity to a number of prospective targets, as well as nearby vehicular and pedestrian

⁸⁷ Dhiren Barot planned to launch coordinated, multiple attacks in Britain and the U.S. His cell was disrupted in August 2004, but authorities quickly ascertained the competency with which it was operating. Barot himself, also known as Esa al-Hindi, had fought in Kashmir in the 1990s and attended al-Qaeda terrorist training camps as both a student and an instructor. He led a highly specialized team of terrorists that included: Mohammed Naveed Bhatti, an engineer who also looked into jobs driving tanker trucks; Junade Feroze, the owner of a garage that provided him easy access to tires and gas canisters for use in the planned attacks; Zia ul Haq, a buildings expert who advised Barot on how to best facilitate structural collapse; Abdul Aziz Jalil, Barot’s minder who assisted with operational security and research into radioactive materials; Omar Rehman, who was working at a British hotel while researching ways to disable fire and/or security systems; and, Qaisar Shaffi and Nadeem Tarmohamed, both of whom traveled with Barot to the U.S. for reconnaissance missions.

⁸⁸ Dhiren Barot, “Rough Presentation for Gas Limos Project,” redacted version posted by NEFA Foundation at <http://www.nefafoundation.org/miscellaneous/Barot/GasLimos.pdf> and accessed on August 8, 2008, p. 1.

⁸⁹ *Ibid.* p. 26.

traffic patterns, both of which could be used for estimating casualties and determining obstacles to emergency responders accessing an incident site.⁹⁰

Barot's cell demonstrated advanced skills and abilities in plotting terrorist attacks in Western settings. They appear to have been a patient set of operatives who sought to exploit perceived weaknesses through the execution of relatively simple attack scenarios. Even though it does not appear he was looking to target emergency responders outright, his notes clearly demonstrate his determination to frustrate response efforts following a mass casualty event.

2008 Barcelona Plot

Similar objectives of frustrating emergency responders while planning a terrorist attack were observed in January 2008, when Spanish authorities disrupted a cell of foreign-born South Asian men operating in Barcelona. The Taliban Movement of Pakistan, led by warlord Baitullah Mehsud, subsequently claimed responsibility for training this cell. Their objective was to target NATO member states operating in Afghanistan, and a spokesman promised that other attack cells would follow.⁹¹ Mehsud's targeting preferences also went beyond continental Europe: "We want to eradicate Britain and America, and to shatter the arrogance and tyranny of the infidels. We pray that Allah will enable us to destroy the White House, New York, and London. We place our trust in Allah. Soon, we will witness the miracles of jihad."⁹²

Many questions remain about the details of this case, but open source literature indicates that this was a transnational plot that sought to target mass transit, and possibly other, facilities in Spain and other European countries. The Barcelona cell was penetrated by a French informant who himself was recruited to be one of the suicide bombers.⁹³ According to the informant, the members of the Barcelona cell expressed a clear interest in targeting the underground subway system. More specifically, the informant recalled one of the suspects saying: "if we attack the metro the emergency services can't get in there. Our preference is for public transport, especially the metro."⁹⁴ At least one report indicated that Spanish authorities believed that the suicide bombers were to be used in conjunction with pre-positioned devices placed throughout the Barcelona subway system, although this detail has not been confirmed.⁹⁵ What is known, however, is that all explosive devices were rigged to be remotely detonated.⁹⁶

⁹⁰ For access to other sets of Barot's redacted notes, please see <http://www.nefafoundation.org/documents-intlegal.html#barot>.

⁹¹ Marc Marginedas, "'Yes, We Trained Them', a Taliban Spokesman Acknowledges," *El Periodico*, February 11, 2008.

⁹² Al Jazeera Television Interview with Baitullah Mehsud, aired January 25, 2008.

⁹³ Jordi Corachan, Antonio Baquero, "Civil Guard Strengthens Its Forces in Barcelona to Find Fugitive Suicide Bombers," *El Periodico de Catalunya*, January 30, 2008.

⁹⁴ "Informer Details Preparations for Planned Al-Qaidah Attack in Spain," *El Pais*, January 26, 2008.

⁹⁵ Richard Esposito, Paco Medina, "Urgent Manhunt Across Europe for Terror Plotters," *ABC News*, January 25, 2008.

⁹⁶ Al Goodman, "Extremists Plotted Attacks Across Europe, Spanish Paper Says," *CNN*, January 27, 2008.

The small amounts of explosive materials seized during the raids suggest that the operatives were still in the preparation phase. Nevertheless, their reason for focusing on the subway system is noteworthy because it revolved around the abilities of emergency responders to easily access such sites following an attack. Moreover, the possibility that suicide bombers would be used in conjunction with pre-positioned devices suggests a secondary device threat to both civilians and emergency responders. Finally, the fact that all devices would have been designed to be remotely detonated indicates a centrally controlled operation aiming to maximize casualties and damage by minimizing the possibility of a suicide bomber backing out at the last minute.

2007 London VBIEDs Plot

In June 2007 in London, key parts of Barot's "gas limos plan" appeared to have been utilized by a terrorist cell consisting mostly of foreign-born medical professionals with strong ties to Britain's NHS. In the early morning hours of June 29, a stolen Mercedes was positioned in front of the entrance to the Tiger Tiger nightclub in Haymarket, which at that time was filled with hundreds of patrons. The car's interior contained gas canisters that were slowly leaking fumes through the partially open windows. The charge from an attached cell phone was meant to serve as the detonator, and the car contained additional canisters in the trunk and nails to serve as shrapnel. The charge from the cell phone, however, failed to trigger a conflagration, and an ambulance crew that was called to the club for unrelated reasons reported to their dispatcher a strong smell of gasoline in the area. Police officers arrived on-scene and deactivated the device. Had the VBIED detonated, it is believed that a fireball would have been funneled into the club.⁹⁷

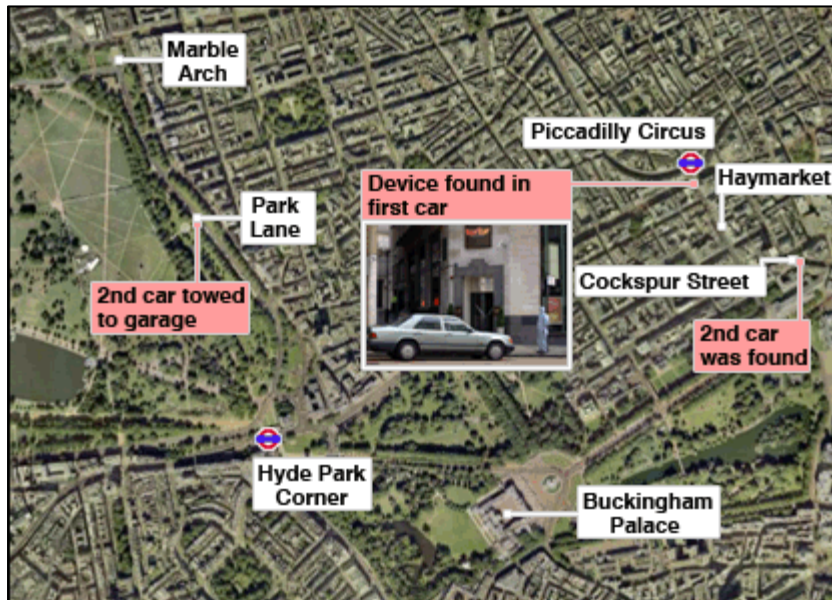
Less than 100 meters from the Tiger Tiger nightclub, another stolen Mercedes was illegally parked on Cockspur Street, near Trafalgar Square. It had been towed to an impound in Hyde Park, where staff noticed the strong smell of gasoline emanating from its partially opened windows. Upon further investigation, they discovered an explosive device similar to the one found in Haymarket just hours earlier. See Figure 4 for VBIED locations. There has been speculation among security experts that the two VBIEDs were meant to have been detonated within a few minutes of each other.⁹⁸ It has also been reported – though unconfirmed – that the original area from which the second VBIED had been towed was actually an assembly point for first responders in the case of an incident in Haymarket. According to that report, the VBIED was far enough to not raise suspicion, but close enough to be near ambulances, fire engines, and police cars responding to an attack in Haymarket.⁹⁹ If true, the cell members may have been aware of this site designation prior to positioning the VBIEDs.

⁹⁷ Richard Elias, "Terrorists Targeted Second Device to Strike Rescuers after London Nightclub Blast," *Scotland on Sunday [The Scotsman]*, July 2, 2007.

⁹⁸ Overseas Security Advisory Council, "Attempted Attacks in London and Glasgow," June 29-30, 2008, p. 8.

⁹⁹ Richard Elias, "Terrorists Targeted Second Device to Strike Rescuers after London Nightclub Blast," *Scotland on Sunday [The Scotsman]*, July 2, 2007.

Figure 4: Locations of VBIEDs in Failed London Attacks



As with the Barcelona foiled plot, much remains unclear about these failed attacks. The cell was composed of foreign-born medical practitioners that had been residing in Britain for a relatively short amount of time. It is not believed that any of these operatives had received training abroad, since at least one of them had conducted Internet research on bomb making techniques and, ultimately, the VBIEDs that they assembled failed to detonate. The takeaway for emergency responders, however, is that they were trying to emulate parts of Barot's "Gas Limos Project": acquire readily available gas-based components to facilitate an incendiary attack; use luxury vehicles for delivering the devices. Finally, it appears that they actively sought to utilize a secondary device in their attack scenario, possibly against emergency responders assembly points.

IMPLICATIONS

According to the publicly released July 2007 National Intelligence Estimate, AQ "has projected or regenerated key elements of its Homeland attack capabilities," and the group will intensify its efforts to position operatives in the U.S.¹⁰⁰ Furthermore, the Director of National Intelligence testified to the Senate on February 5, 2008 that AQ is most likely to use conventional explosives in an attack because its members are proficient with such materials and it has shown itself to be innovative at "creating capabilities and overcoming security obstacles."¹⁰¹

¹⁰⁰ National Intelligence Estimate, July 2007, p. 6, obtained at http://www.dni.gov/press_releases/20070717_release.pdf on October 6, 2008.

¹⁰¹ "Annual Threat Assessment of the Director of National Intelligence for the Senate Select Committee on Intelligence," February 5, 2008, p. 7, obtained at <http://intelligence.senate.gov/080205/mcconnell.pdf> on October 6, 2008.

The terrorist threat is continuously evolving, and even the most capably defended cities can be caught by surprise. The case studies attest to this: all three cities had significant experience dealing with terrorism and were on alert prior to being targeted. Although another attack scenario on the scale of 9/11 is certainly possible in a high-profile target like New York City, it is more probable that the next attack will resemble the successful attacks or foiled/failed plots that have been perpetrated in Europe since 2001.

The three case studies assessed in this Special Analysis provide general lessons learned that have applications for metropolises such as New York City. These lessons largely fall under the categories outlined in Table 4.

Table 4

<i>Controlling and Securing Incident Sites</i>		
Sweeping for secondary devices	Donning protective gear before entering an uncleared site	Accessing and controlling incident sites as soon as possible
<i>Use of Emergency Resources</i>		
Onsite triage and clinical prioritization of hospital-bound patients	Keep emergency response personnel in reserve to deal with additional incidents	Emergency plans at hospitals to make bed space in emergency departments quickly available
<i>Communications</i>		
Controlling information to the media and public to avoid rumors and panic	Dealing with telecommunications outages while responding to a crisis	Open and frequent communications between emergency responders

Many of these challenges are to be expected following a mass casualty attack and have been acknowledged by New York City's emergency responder community. These case studies, however, demonstrate the difficulties that tend to arise following large-scale terrorist attacks. As a result, vigilance vis-à-vis training and situational awareness, as well as adaptation following an attack, are key elements to preparing for future terrorist incidents in the U.S.

Similarities in Target Environments

The target environments presented in these case studies all have similarities with New York City, making them well-suited for comparative analyses. In terms of geographical layout, for example, Istanbul's narrow streets channeled the blast waves from the VBIEDs, casting fragments further from the points of detonation than would have happened if the explosions occurred in more open settings.¹⁰² A similar scenario can be easily imagined in New York City's financial district, which is one of the city's oldest areas and contains an ample supply of high-profile targets that are positioned on similarly narrow streets with minimal standoff distance. Indeed, al-Qaeda operative Dhiren Barot conducted detailed surveillance on the New York Stock Exchange before the 9/11 attacks.

¹⁰² Ulkumen Rodoplu, Jeffrey L. Arnold, Rifat Tokyay, Gurkan Ersoy, Serkan Certiner, "Mass-Casualty Terrorist Bombings in Istanbul, Turkey, November 2003: Report of the Events and the Prehospital Emergency Response," *Prehospital and Disaster Medicine*, vol. 19 no. 2, April – June 2004, p. 141.

The types of trains that were targeted in Madrid and London are used extensively throughout New York City and its surrounding areas. Mass transit has continually been a preferred targeting option for terrorists and many systems throughout the world have been attacked with varying degrees of success. Thus, it is safe to assume that New York's mass transit system – which itself has been targeted in the past – is at great risk for a future terrorist attack because it meets basic targeting criteria. Such an attack would be high-profile, have the potential to cause mass casualties, produce psychological and economic effects, and complicate site access for emergency responders.

Tactical Feasibility in the U.S.

It is also important to analyze the diverse logistical structures and tactics used in the case studies in order to contextualize the feasibility of their execution in New York City. All of the tactics employed in the three case studies constitute viable attack scenarios in New York City, albeit with varying degrees of difficulty. For instance, the type of device used in the London attacks – a peroxide-based homemade IED – is popular among Islamic terrorists throughout the world. For instance, Richard Reid attempted in December 2001 to detonate such explosives hidden in his shoes while traveling on a trans-Atlantic flight. More recently, in September 2007, authorities in Denmark and Germany disrupted two separate cells that were manufacturing peroxide-based explosives for use in local terrorist attacks. Although the destructive capacity of such devices is undeniable, there are significant difficulties in manufacturing them, which include obtaining/producing a highly concentrated hydrogen peroxide solution and successfully mixing the ingredients without causing a premature explosion. Due to their volatile composition, manufacturing peroxide-based explosives tends to require a level of hands-on training, usually in foreign conflict zones or terrorist training camps. Members of the London-based cell that carried out the 7/7 attacks received such training in the Pakistani tribal region from seasoned explosives experts linked to terrorist groups. Post-9/11 security upgrades in the U.S., however, have made it more difficult for U.S.-based terrorists to travel to such parts of the world without attracting attention. Similarly, it is harder now for foreign-based terrorists to enter the U.S. and conduct their operations (establishing a network, logistics, reconnaissance, etc) without attracting scrutiny.

Attacks scenarios similar to those carried out in the Istanbul attacks have occurred with significant consequences twice in the U.S. In February 1993, a terrorist cell led by Ramzi Yousef successfully detonated a nitrate-based VBIED in the underground parking garage of the World Trade Center. Although it failed to destroy the World Trade Center as Yousef intended, it resulted in six deaths and more than one thousand injuries. Two years later, Timothy McVeigh detonated a different type of nitrate-based VBIED in front of the Murrah Federal Building in Oklahoma City, killing 168 people and injuring over 800 others. Overall, nitrate-based devices pose a particular threat because of the destructive power of such materials, their relative stability in handling and transport, and the ease with which they can be obtained (fertilizer is a common source). In the post-9/11 era, however, vendors of such materials tend to be on alert for suspicious customer behavior, and have multiple outlets to report such behavior to authorities (regional Joint Terrorism Task Forces, Fusion Centers, local authorities, etc.). Moreover, the federal and state governments have taken steps to address this vulnerability. For example, on

December 26, 2007 the President signed the “Secure Handling of Ammonium Nitrate Act.” Nevertheless, many in the counterterrorism community remain concerned about legal loopholes and other vulnerabilities in regard to these powerful explosive materials.

Of the three case studies outlined in this report, the materials and *modus operandi* used in the Madrid attacks constitute the most immediate domestic concern because they consisted of small amounts of commercially available mining explosives (a category that includes nitrate-based materials) that required relatively minimal technical expertise to craft into an IED. Unlike the Istanbul and London attacks, there is currently no indication that members of the Madrid cell had significant connections to a larger terrorist network or attended terrorist training camps or foreign jihads. This has important homeland security implications, since this cell used relatively simple tactics that required little or no training to generate over 2,000 casualties. In the U.S., such explosives have numerous commercial uses and not all of them are as secure as counterterrorism officials would prefer. One glaring example that the NYPD has highlighted in the past is the multitude of unsecured or poorly secured explosive storage sheds throughout the country. It is certainly possible that all three attack methods could be executed in the U.S., but the simplicity of the Madrid attacks constitutes the core of the threat in terms of U.S. domestic security: small amounts of commercially available explosives that require little or no training to craft into an IED.

The “gas limos plot” and the 2007 failed London bombings offer a glimpse of what other types of terrorist threats could look like in the U.S. in the near future. Even though they are not as powerful as conventional types of explosive materials, gas-based explosives constitute a significant domestic threat, particularly in terms of the widespread availability and public use of key components. They are also relatively safe to handle and transport and their destructive potential – when manipulated for terrorist purposes – could be significant, especially if successfully deployed in a closed-off and/or high-crowd area.

Finally, despite the sheer carnage and destruction that resulted from each of the attacks analyzed in the case studies, the consequences could have been far worse if they featured dynamic attack elements such as successfully detonated secondary devices, escalating fires, or hazardous materials. As the foiled/failed plots demonstrate, however, such considerations might constitute a burgeoning threat to western emergency responders. Although other types of western terrorist movements have done this in the past, it was not until recently that Muslim extremists operating in the West exhibited such targeting preferences. Beyond the West, Muslim extremists have targeted emergency responders with secondary devices and attack waves with increasing regularity. The most recent high-profile event featuring this *modus operandi* occurred during the September 17, 2008 attack on the U.S. Embassy in Yemen, when snipers fired on emergency responders trying to access the incident site following the initial blasts.¹⁰³ History has shown that tactical innovations originally developed and refined in conflict zones are eventually imported by operatives in western settings. On the anecdotal level, the foiled/failed plots would suggest that this transfer of tactics and tradecraft from conflict zones to western

¹⁰³ “Car Bomb Hits U.S. Embassy In Yemen,” *CBS News*, September 17, 2008.

settings is occurring in terms of terrorist targeting of emergency responder capabilities and personnel.

New York City Response Capacity

Although New York City's capacity to respond to a terrorist attack has been greatly improved since 9/11, there remains an imperative for constant refinement on all levels of response scenarios. For instance, communications continue to be a point of concern for emergency responders, particularly in terms of coordinating an underground response effort. It is also anticipated that a mass casualty attack scenario would cause a significant spike in telecommunications usage, particularly in terms of 911 calls and cell phone use. The latter issue will likely mirror the situations that occurred in all three case studies, as well as what was witnessed during 9/11 and the August 2003 blackout. An attack would also produce mass traffic congestion in the vicinity of an incident site, making it more difficult for emergency responders to expeditiously access a location.

Additionally, the House of Representatives released a report on "Hospital Emergency Surge Capacity" in May 2008 that highlighted hospital gaps throughout the country in responding to a Madrid-type terrorist attack. The report noted that, even though "severely injured patients treated at hospitals with Level I trauma centers have a 25% lower risk of death than patients treated at a nontrauma center," none of the Level I trauma centers that participated in the study had sufficient capacity to respond to a Madrid-type event.¹⁰⁴ Furthermore, although New York City had the most available treatment spaces in the study, "there were no available spaces in 10 of the 16 Level I trauma centers surveyed" and there were only 56 available spaces in the remaining 6 Level I trauma centers.¹⁰⁵

For comparative purposes, the following are the surge rates to area hospitals following the attacks in Istanbul, Madrid, and London:

- **Istanbul:** The American Hospital in Istanbul received 69 emergency care patients on November 15, 2003, which was the most received by a hospital following that day's set of attacks. Of the 49 patients who received documented diagnoses, 42 suffered lacerations, of which 59% had multiple lacerations and 78% had lacerations to the face or scalp. TERSH received 184 patients within an hour of the second attack on November 20th, and 171 of those were reported as having secondary blast injuries.¹⁰⁶
- **Madrid:** More than 900 injured victims – 165 of whom were judged to be in serious condition – were taken to nearby hospitals in Madrid within 2 ½ hours of the attacks. Gregorio Maranon Hospital alone managed to make 161 beds available within 2 hours.

¹⁰⁴ U.S. House of Representatives Committee on Oversight and Government Reform, "Hospital Emergency Surge Capacity: Not Ready for the 'Predictable Surprise'," May 2008, pp. 2-3.

¹⁰⁵ *Ibid.*, p. 4.

¹⁰⁶ Ulkumen Rodoplu, Jeffrey L. Arnold, Rifat Tokyay, Gurkan Ersoy, Serkan Certiner, "Mass-Casualty Terrorist Bombings in Istanbul, Turkey, November 2003: Report of the Events and the Prehospital Emergency Response," *Prehospital and Disaster Medicine*, vol. 19 no. 2, April – June 2004, pp. 137-141.

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- **London:** The London attacks generated 45 critical injuries among survivors, as well as an additional 300 who were transported to area hospitals in the hours following the blasts. Furthermore, area hospitals were successful in clearing 1,200 hospital beds within 3 hours for incoming patients.¹⁰⁷

The instances of patient surge briefly described for these European case studies would challenge, and possibly overwhelm, the capacity described in the House report for select New York City hospitals. This indicates that similar terrorist attacks would constitute a significant challenge for area emergency medical practitioners and emergency departments.

CONCLUSION

The objective of this analysis was to highlight the response efforts to three major acts of post-9/11 terrorism in cities similar to New York City. Three general challenge areas were identified in these case studies, and they will most likely be obstacles to addressing similar attacks in New York City. Those challenge areas are: establishing security and control over an incident site; effectively using emergency resources; and communications, both tactically and with the general public. Emergency responders in these three cities encountered situations that were both expected and unanticipated, placing importance on both pre-attack planning and post-attack improvisation. The tradecraft employed to launch these three sets of attacks could also conceivably be implemented in the New York City operating environment with varying degrees of difficulty that are contingent upon organizational and logistical factors.

As previously noted, the post-attack response capacity of New York City's emergency responder community has been vastly relative to the pre-9/11 level. Much of this improvement is attributable to concise response plans such as the National and Citywide Incident Management Systems, interagency cooperation, and constant emergency response practice in the forms of drills, tabletops, and full scale exercises. The cities described in this report, however, had also spent years combating various types of terrorism and preparing for future attacks. Despite their preparation and experience, they seem to have been caught largely off-guard by highly adaptive assailants whose only goal was unmitigated carnage and destruction. With that in mind, it is crucial to know what challenges – both expected and not – confronted local emergency responders in each of those situations, and how that knowledge can be used to provide situational awareness to New York City's first responder community when facing current and future terrorist threats.

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¹⁰⁷ Department of Homeland Security, "Incident Management: Alerting Hospitals in Close Proximity to a Mass Casualty Incident," *Lessons Learned Information Sharing*, undated.