Preliminary Thoughts and Observations on the Boston Marathon Bombings

Herman B. Leonard
Arnold M. Howitt

Faculty co-Directors
Program on Crisis Leadership
John F. Kennedy School of Government
Harvard University
April 20, 2013

There is no doubt that the attack on the Boston Marathon, its runners, its fans, and its host city was a terror attack. By its nature – explosive devices specifically designed to maim and kill, placed in a crowd at a celebratory public event – it was clearly intended not only to inflict mass casualties, but also to instill fear in the minds of bystanders, witnesses, and the wider public. Currently available evidence suggests that the perpetrators were the two individuals now identified as Dzhokhar and Tamerlan Tsarnaev. What remains unclear (at this writing) is whether they acted by themselves, or whether there were others involved, or whether there was any organized group involved. That does, of course, matter greatly – and we will find out a good deal more in the days ahead about how and by whom this devastating attack was planned, organized, supported, and executed. But there are already a number of observations that can be made with reasonable assurance about this event that do not depend greatly on knowing more about its genesis. This essay outlines a few of the observations and conclusions that it already seems fair to reach.

Characteristics of the Attack

In spite of the grievous damage it inflicted, the Boston Marathon attack was a relatively low-tech and small-scale assault. Terrorism experts have long been concerned about such attacks, in part because the ingredients necessary to construct the kinds of devices that appear to have been used in this attack are widely available and easy to accumulate without much notice being taken (so long as different components are purchased in different locations). The bombs used

in this event illustrate, sadly, the terrible damage that can be caused by assembling a modest amount of low-power explosive material and some readily-available household items. Counter-terrorism experts have frequently observed that keeping an attack at a modest scale makes it dramatically more difficult to detect or interdict. The chance that some aspect of the preparations will be witnessed and noticed, and thus the chance that the process can be interdicted before the attack is completed, increases (1) as the amount of material that has to be assembled becomes larger; (2) as the time it has to be hidden from view becomes longer; (3) as the device that is being constructed becomes more complex; and (4) as the device when completed becomes heavier to move and put in place. The events of this week tragically demonstrate what terror experts have long known – that a relatively small attack with a limited number of devices that need not take very long to build and are easy to hide and to transport without drawing much attention can create terrible human loss, damage, grief – and fear.

Perpetrators

We don't yet know for sure who all of the perpetrators were, but it seems very likely that the two brothers who have been identified committed this heinous crime, and they could well have acted without any additional accomplices or logistical support from others. If that is so, then this event appears to be "home grown" in the sense that whatever purposes or motivations generated it were formed in this country by people who were legal residents during the time they planned and executed their crimes.[1]

Assuming that these terrorists did indeed develop their intentions and motivations here, that would imply that this is an example of a kind of attack that is one of the major concerns in the minds of many crisis management and counter-terrorism experts. Domestically-produced attacks (especially those of small scale) are significantly more difficult to detect than the kinds of events more likely to be perpetrated by people entering the country with hostile intent.

As counter-terror experts point out, those who form terrorist attack plans offshore face a number of hurdles in carrying out their schemes. First, they have to enter the country, generally through a border station in which they pass through customs and immigration processes, raising the possibility of detection. Given the elevated level of risk that this implies, they may plan a larger-scale and more complex attack, which again raises the probability of

[1] It is in principle possible, but it seems very unlikely, that either brother was radicalized before coming here, and thus came with a formed idea to conduct a terror attack years later. It seems much more likely that the motivations, whatever they may have been, were developed while the brothers were legal residents of the U.S. One or both may, of course, have been influenced by people or ideas from abroad, but their ideas, whatever they were, appear to have been developed while they were U.S. residents.

detection. The desire to carry off a larger-scale event may also imply the necessity for materials that are more difficult to obtain – for example, it may require access to high-explosives. These obstacles are certainly not insurmountable – and creating and maintaining and further raising those obstacles is thus appropriately a significant focus of operational and policy counter-terrorism work, and the possibility that the obstacles could be overcome is a source of concern and a reason for continuing vigilance. But smaller scale attacks by people already legally here who for one reason or another (or for many reasons) become extremists and develop the intention and motivation to inflict casualties are particularly difficult to detect and prevent.

Vulnerability and Targets

There are many different terrorists and terrorist groups, with many different agendas and purposes, and they choose a correspondingly wide array of modes of attack. One reasonably frequent choice among some terrorists is to target a large and dense gathering of members of the public at large, often at a noted public spectacle or event where in the aftermath of an attack there will be a great volume of vivid still and video imagery that will amplify the focus on and salience of the event in the minds of the wider public. In a free society that values and practices its freedoms of movement and association, there are many such events, and this is a vulnerability that has long been noted by security experts. Sports events in particular provide a setting where there are large numbers of people gathered at high density, often with great numbers of media and camera crews (as well as the increasingly large numbers of still and video cameras in the hands of individual people in the crowds). The Boston Marathon, drawing runners from all over the world as well as spectators from far and wide, obviously provides these features in abundance.

Many sporting events take place in fixed venues around which a perimeter is placed to limit entry – and, not incidentally, this makes it possible (at least in principle) to screen or search people and their bags as they enter. Most such venues have relatively short restricted perimeters that can be secured reasonably easily with some reliability.

By contrast, marathons have a roughly *55 mile* perimeter, virtually none of which can be engineered to reliably limit access – nor is it generally seen as desirable to limit access. The essence of marathon events is that they are participated in by thousands of ordinary people who are either running or watching. Turnstiles and hard boundaries would be very difficult to arrange and would fundamentally and undesirably alter the character of the event.

Implications for our Posture Going Forward

We observe, then, that if we wish to maintain our free and open society and wish to continue to have open-access events like the Boston Marathon – which is by its fundamental design and character intrinsically vulnerable in the modern environment – then we will be at risk for damage from small-scale, low-tech attacks by terrorists who are legal residents … like the attack that we have been living through this week. What does this imply about what we should do going forward?

First and foremost, it is painfully clear that we cannot prevent every possible attack of this kind on our homeland – nor rely on prevention as our only strategy. Of course, we can and should continue to figure out better means of prevention. But we also need to prepare ourselves – and this means both to prepare ourselves to respond in the moment and to recover swiftly and surely after any attack.

We have elsewhere summarized what we see as the standard analytical approach (developed as the product of many hands) to managing risk. Our summary of this consensus view, which we call the "Comprehensive Risk Management Framework," emphasizes that we can intervene to manage risks (1) by preventing them or by reducing the damage they create if they occur, (2) by preparing to respond, (3) by responding effectively when they occur, (4) by preparing to recover, and (5) by recovering as swiftly as possible after an event.[2] What are the lessons from the Boston Marathon Bombing in each of these risk management domains?

Prevention

Extensive efforts to provide security and reduce the likelihood of an attack on the Boston Marathon were undertaken in the months before, and right down to the minutes before, the event itself. As an example, law enforcement officials indicated this week that bomb-sniffing dogs swept the area near the finish line (where the explosions eventually took place) in the morning before the race began and again in the afternoon when the lengthy process of finishing was beginning. Security personnel were stationed all along the route, and various other security precautions were in place. Obviously, the efforts to prevent an attack were not successful, but this does not imply that they were not appropriate given the perceived level of threat to the event. Closer analysis in the coming months will give us a better idea of whether

[2] Herman B. Leonard and Arnold M. Howitt, "Acting in Time Against Disasters: A Comprehensive Risk Management Framework," Chapter 2 in Howard Kunreuther and Michael Useem, eds, *Learning from Catastrophes: Strategies for Reaction and Response,* Wharton School Press, 2009

there are additional measures that should perhaps have been taken before this event and will suggest additional measures that should be taken before future events – but the fact that this event took place does not by itself imply that the risk was higher than had been perceived nor does it indicate that the risk is now higher than it was before this attack took place (with the exception of possible copy-cat attempts that might take place). Experts have long acknowledged that there is a low but non-negligible risk of an attack of this form. We need to bear in mind that, given the intrinsic and desired features of the Boston Marathon, there is no foolproof method for providing complete protection and prevention. No doubt there will be changes made for next year's and subsequent races – but, unless there emerges some significant and obvious failure of intelligence or preparation that should have allowed us to prevent this attack, we need to be careful not to engage in 20/20 hindsight. This implies that, no matter what preventive measures we have in place, prevention activities must be only a part of our overall comprehensive risk management planning.

Preparation for and Execution of the Medical Response in the Boston Marathon Bombings

One of the notable phenomena we witnessed in this event was that Boston appears to have been well prepared to respond medically to this event. The immediate response appears to have been swift and sure. The video of the bomb near the finish line clearly shows that people were instantly pushed away from the impact zone by the blast wave itself … but, literally in split seconds, began to run back toward the blast area to render help. The number of people who climbed over barricades, tore barricades down to allow others to enter, and rendered aid with whatever means available shows us as a city and as a society at our very best – in our moment of need, people spontaneously helped each other, across cultures and ethnicities and nationalities.

Moreover, the *medical* response – trained responders at the scene, aided by "civilians," who together placed tourniquets, held pressure, and transported survivors to the medical tents and on to the ambulances beyond, and then teams of doctors, nurses, and clinical staff at hospitals – was immediate and skilled. A very large number of the grievous wounds from the blast and shrapnel would in almost any other circumstances have proved fatal – but here, it appears that *every person who was alive when definitive medical help was applied – in most cases, within minutes of the blast – is still alive today.* This is a largely unprecedented level of success in providing care to gravely wounded blast and shrapnel survivors. We identify nine main factors contributing to the swift application of medical training, knowledge, and technology that undoubtedly literally saved dozens of lives:

(1) The response by survivors themselves and by bystanders was nearly instantaneous. The high density of the crowd contributed to the large number of injuries – but it also meant that there were many people immediately available to render aid … and that is what they began to do, within seconds;

(2) There were literally hundreds of medically-trained personnel located near where the bombs went off. This was the result of detailed centralized and coordinated planning in advance of the event, and learning based on many previous Boston Marathons and other events. With thousands of runners coming off the course in an ordinary year with medical needs ranging from blister care to heatstroke to possible cardiac problems, a wide range of medical services were pre-arranged and pre-positioned. While they were not specifically designed to render aid to bomb victims, the array of capabilities that had been arranged through careful centralized planning was broad enough, and the personnel on the scene adaptable enough, to deploy that set of capabilities effectively to stabilize bomb survivors;

(3) The centralized planning for this event drew on a strong culture of preparing for large "fixed" events (events whose time and location are known well in advance) across multiple disciplines (police, fire, EMS, …). In the aftermath of 9/11, when Boston faced the challenge of preparing for a "National Special Security Event" – the 2004 Democratic National Convention – it formed a multi-agency, multi-jurisdictional, multi-level planning group. Out of this (generally successful) effort grew many lessons for future collaboration – and an emphasis on the importance of joint planning for such events. Large-scale events – from First Night to the July 4 Esplanade celebration to the arrival of Tall Ships to parades for national champion baseball, football, basketball, and hockey teams – are recurrent in the Boston Metropolitan Area, and a strong pattern of collaborative planning for such events has become routine;

(4) Significant changes from previously established medical practices for treatment of blast and shrapnel trauma victims, developed in bitter experience in Iraq and Afghanistan, had made their way into equipment and practices for trauma response on the home front. In particular, the use of tourniquets to staunch blood loss from major injuries to extremities was shown in battlefield experience to save lives, and tourniquets are therefore now recommended in cases like the many grievous injuries to extremities inflicted by this attack. This change in doctrine – accompanied by the deployment of tourniquets in the equipment of EMS personnel – allowed rapid application of life-saving means at the site of the blasts.

(5) The bomb blasts did not themselves directly degrade the medical capabilities on the scene. In the immediate aftermath of the blast, the medical personnel and equipment were almost fully intact, allowing for rapid application of what was immediately needed by survivors. By contrast, for example, in the Haiti earthquake most of the immediate response capability in Port-au-Prince was destroyed by the earthquake in the same moment that it came to be needed. (In the Boston Marathon case, this was in part a matter of good fortune, but it has implications for future planning with regard to the concentration of response resources.)

(6) Boston has an extremely high concentration of tertiary medical facilities – technology, together with highly trained people – with five of the nation's leading teaching hospitals and one of the nation's leading children's hospitals, each with an emergency room and major trauma unit and with extensive state of the art advanced medical services available in many relevant specialties (orthopedics, vascular surgery, neurosurgery, …). Five of these six facilities are located within 2 miles of the bomb blast. This permitted definitive in-hospital care to begin within less than half an hour for a number of critically-injured patients, saving many who would otherwise have perished.

(7) Those medical facilities had specifically engaged in extensive planning, practice, and training for "mass casualty" events – events like a plane crash that might suddenly produce a rapid influx of seriously wounded patients. While much of this was not specifically oriented to casualties from a bomb attack, MGH had actually consulted with experts from Israel about how to handle a sudden flow of blast and shrapnel survivors – and the emphasis on the possibility of having rapidly to handle massive numbers of casualties had prepared trauma teams throughout the city for what they had to do during this event;

(8) The medical teams in the emergency rooms throughout the city found resources they did not know they had when they suddenly needed to. The surge of patients they faced on Monday afternoon was beyond their experience, planning, and established capacity – but instead of being overwhelmed they met the surge of patients with a surge of resources and resourcefulness, coping as effectively as they could. We will know more when we've had a chance to debrief participants in detail, but it seems reasonable to suppose that the teams showed a good deal of improvisation and creativity in handling the unprecedented demands they confronted; and

(9) The response by medical personnel at the site of the blast and in the hospitals was almost completely without need of direction. Doctors and nurses with relevant medical skills converged on the emergency rooms of their hospitals without having to be called; as ambulances delivered patients groups of clinicians self-organized into trauma teams and undertook the work without having to be instructed or be given directions. Several of the emergency room "incident commanders" commented that they had to give but few instructions, because the people who came to the task brought experience, skill, and knowledge and could figure out on their own what to do … and had for the most part already done so before any instructions could be issued. In one emergency room, people who were not needed to provide direct care realized that there was a congestion problem, and self-organized themselves, moving to a side room from which they could be called as their particular skills were needed. "Commanders" became *coordinators*, helping to move resources as necessary within the bigger picture. One emergency room director said "everybody spontaneously knew their dance moves."[3]

The apparent success of this effort was aided by the good fortune of having leading medical facilities close at hand, and by the fact that the on-site medical capabilities were immediately outside the blast zone – and was thus a product of a combination of highly centralized planning and pre-positioning, followed by decentralized adaptive response at every scene (both in the immediate area of the blast and in the hospital emergency rooms where survivors were transported).

In spite of the fortunate apparent success of the medical effort, we need to be careful not to be too complacent about the level of preparations in place going forward. Skillful action and a self-organized surge of medical resources beyond what had been planned kept the flow of severely injured patients from completely overwhelming the medical response capability. But even as we appreciate that the medical system managed to handle the needs of blast survivors as well as it did, we need to be mindful that a larger attack could well have produced enough additional casualties to overstretch even the expanded capacities that the medical system found in itself. Terrible as this attack was, we need to recognize that approximately 180 surviving casualties is not by any means the largest mass casualty event that our system may be called upon to address.

[3] Richard Wolfe, director of the emergency room at the Beth Israel Deaconess Medical Center, quoted in Atul Gawande, "Why Boston's Hospitals Were Ready," The New Yorker, April 17, 2013. Gawande gives an excellent description of the self-organizing that took place in various emergency rooms as the event unfolded. In the same article he indicates that every person who survived long enough for definitive medical help to be provided is still alive.

Law Enforcement in the Response and Recovery

One part of both response and recovery is the law enforcement action to identify and render harmless the direct perpetrators of this event and anyone who may have aided and abetted them. (This is at once part of response – since it begins in the moment of the attack – and part of recovery, and also part of prevention of what otherwise might be the next event … especially in this case, where the principal suspects had several other explosive devices already in hand.) As with the medical response, the actions by law enforcement in this event have by all indications to date been both swift and highly effective. One of the key features of these actions, widely displayed on the streets and in press briefings, has been a high degree of collaboration among a variety of law enforcement agencies – federal, state, and local. A related feature has been a high degree of cooperation by the public and integration of information provided by the public into the investigation. No one agency had the range, manpower, or combination of national assets and boots on the ground to carry out the wide array of activities that resulted in the identification and apprehension of the two principal suspects. Only a massively collaborative effort, drawing on the torrent of information provided by the public, could have had access to the range of skills, databases, intelligence, technology, capabilities, and personnel needed to accomplish the many law enforcement tasks we have witnessed – and the myriad of tasks that were conducted behind the scene. Past efforts have frequently been hampered by a lack of cooperation and aggregation of efforts; we will no doubt learn more in detail about how well the law enforcement teams worked together in the last week, but by all reports and appearances to date this effort has demonstrated that great progress has been made in providing the relationships and infrastructure that allow agencies to work effectively together.

For example, agencies were quickly able to aggregate photographic evidence from (public and private) surveillance cameras, from mainstream news media, and from spectators to specifically identify the principal suspects. By publicizing some of the video showing the suspects, the public could be enlisted in rapidly identifying them. The rapid movement toward identification, triggered Thursday evening with the release of the video and still photos showing the suspects near the scene of the blasts, may have contributed to their apparent dash, resulting in a police pursuit, gunfight, lockdown, and search that also demonstrated the capacity of law enforcement agencies to work together. And the deployment of a large number of tactical teams during the Watertown search, and of both robotic and heat-sensing technology in the endgame leading to the capture of the second principal suspect in a Watertown backyard, suggests the utility of some of the investments that have been made in equipment, training, and technology to equip law enforcement with capabilities that proved consequential in this event.

Like the medical response, the capability of law enforcement agencies swiftly to form a highly collaborative coordinated response drew on the strong culture of multi-agency planning for large-scale events – itself a product of planning efforts for many prior major events, in which law enforcement had played a major role. Moreover, much of the federal funding for drills, exercises, and law enforcement training in the last decade have required that exercises be regional and multi-agency, so that the process of collaboration has regularly been practiced. The results were very much on display during last week.

Providing Public Information

Starting only hours after the blast, the public was kept informed through press briefings given by a collection of public officials led by Massachusetts Governor Deval Patrick and generally including Boston Mayor Thomas Menino, the FBI's Boston Office Special Agent in Charge, Richard DesLauriers, Massachusetts State Police Superintendent Colonel Timothy Alben, Boston Police Commissioner Ed Davis, the US Attorney for Massachusetts, Carmen Ortiz, and the ATF Boston Field Division Special Agent in Charge, Guy Thomas, and drawing in other officials as relevant at particular points in the evolution of the events. The collaborative presentations across multiple agencies, levels of government, and jurisdictions presented a visual image of unified goals and coordinated actions that both reflected and encouraged the teamwork evident among the many organizations contributing to the effort.

The briefings were factual, avoided speculation, and emphasized both what was known and what was not known. They were presented directly, succinctly, and calmly. In a week of uncertainty and emotional turmoil, these briefings could not assuage all fears or provide all desired answers – but they were nonetheless a generally calming and grounding influence, helping the community develop a larger and more consistent and accurate set of shared facts. The one exception to this general pattern was perhaps the period of intensified anxiety on Wednesday as an expected press conference was delayed multiple times, heightening apprehensions – but for the most part the careful orchestration of the joint and collaborative presentation of factual information played a salutary role throughout the week.

Continuing Recovery

Now, it remains for us to continue to recover. This process began as soon as the blasts ended – recovery began with a strong medical response, saving many lives and thereby reducing the

damage from which we must recover. But the toll is nonetheless enormous – in the death of four people, in grievous injuries to the wounded, in the loss suffered by families and loved ones of those directly affected, in the loss of a senses of security by the wider community.

Given that events like the one we witnessed this week cannot completely be prevented, a part of our recovery must be the act of defiance and determination. As a society, we best honor the memory of those who died or were injured by refusing to be intimidated by those who murdered or maimed them – or by others who might attempt similar attacks in the future. Part of resilience is helping people to heal – but another part is a willingness to accept a certain level of risk in order to enjoy the freedoms of our way of life. Fortunately, these risks to date have been relatively small, but they certainly don't feel that way this week, and they have been and will remain material. It is sad that we must accommodate ourselves to them. But there are precedents from which we can draw courage and resolve. During the Battle of Britain in World War II, fire rained from the sky every night in London, and yet hundreds of thousands remained in the city to provide vital services and maintain war production. Formulated in that era was a poster that was held in secret to be released only if the nation was in dire distress, and that has only recently been rediscovered. Topped by the symbol of the Crown of England, it read, in simple block letters: Keep Calm and Carry On.

Heroes

The word "hero" means different things to different people. For some, it should be reserved only to those who risk their lives on behalf of others. For others, it includes those who engage in any act of significant bravery. Dictionary definitions include those who are admired for "outstanding qualities or achievements." Perhaps it is best simply to say that there are many different kinds of heroic acts, and, correspondingly, heroes of different types – and so, here, we will use the term more generally.

There are many heroes in the week just passed – from the bystanders and medical and law enforcement first responders who rushed back into the blast zone to render aid, to the medical teams that worked tirelessly on site and in hospitals to provide care, to the countless people in the investigation who pored over thousands of photos and thousands of hours of video searching for clues, to those on the front lines in the gunfights, to those who supported them, to those who led and coordinated them and who kept the public informed. The sacrifices and heroic efforts of all of these people, many of whom will never be identified or publicly celebrated, all contributed to making the response and the beginning of recovery efforts as good as they have been.

And there are more heroes ahead, many of whom will also be unsung. There is a great deal of hard work to be done in consoling the families of the fallen and in supporting and helping the injured as they regain their strength and move forward. There is work throughout our communities to help people deal with their anxieties, heightened by the frightening events of this week, which will recur episodically going forward.

But, for us, the greatest heroes of this event were its first – the people who were killed or injured in the attack. Like the other heroes of this event, they did not want to be, nor did they set out to become heroes when they left home on the morning of April 15. But they are now heroes, because they died or were injured while defending the American way of life – simply by participating in it at a joyous event on a beautiful New England spring day.

Literally thousands of people gathered at a funeral home on Sunday afternoon in Medford to pay their respects to Krystle Campbell, one of the three people who died in the attack, and to offer their condolences to her family. On the pillow, next to Krystle's head, someone had pinned a Purple Heart medal – presumably, a relative or friend who won it by being wounded in action in one of this nation's conflicts. Exactly right: Krystle, and the others who fell, and those who were wounded, are battlefield casualties in this low-grade war on the home front.