

Essentials of Terror Medicine

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Springer

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Dedication

Dedicated with love and gratitude to my parents Eli and Dora for teaching me the importance of education and modesty, to my wife Sarinha for ongoing support, and to my children Elad and Daniel for brightening my life.

Shmuel C. Shapira

Dedicated to the men and women on the front lines in the war on terror, who have sacrificed so much, both physically and emotionally, in the hopes that our children and grandchildren will not have to do so.

Jeffrey S. Hammond

Dedicated to the victims of terrorism and their loved ones, who, while suffering grievous injury and anguish, have strengthened the will of good people everywhere to defeat this wanton scourge.

Leonard A. Cole

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The health care concerns of terror medicine are far-reaching, as evidenced by the variety of backgrounds and expertise of the contributors to this volume. They include physicians, dentists, nurses, psychologists, scientists, policy planners, and more – all distinguished and all engaged with demanding responsibilities in their own fields. But while attending to their customary obligations they have also managed to write extraordinarily thoughtful and informative chapters, and for their efforts we are deeply grateful.

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Part I

INTRODUCTION

1

Introduction to Terror Medicine

SHMUEL C. SHAPIRA, JEFFREY S. HAMMOND, and LEONARD A. COLE

In this era of global terrorism, the medical community has had to confront new and difficult challenges. In some regions of the world, the nature of terror attacks and the effects on victims have prompted novel approaches to rescue operations, diagnosis, treatment, and coordination of services. These measures and others, which collectively may be described as terror medicine, are the subject of this book. Although distinctive in its own right, terror medicine is related to the fields of emergency and disaster medicine. The principal mission of emergency medicine, which has been recognized as a specialty since the late 1960s, includes the evaluation, management, treatment, and prevention of unexpected illness and injury.¹ Subsequently, in the 1990s, disaster medicine was also seen as bearing singular characteristics that relate to the prevention, immediate response, and rehabilitation of the health problems arising from disaster.² Now the proliferation of terrorist attacks during the past decade has produced an understanding of the distinctive features of medical evaluation, treatment, and management associated with these assaults.

Whether a society has experienced many terrorism incidents or few, no part of the world remains free from the threat. The 35 contributors to this volume, all eminent specialists in areas related to the subject, understand that reality. Each chapter details a particular aspect of terror medicine. Some perspectives are framed by the authors' own country, but all speak to the unique responsibility of healthcare providers in the face of a terror attack. Many of the authors have personally helped save the lives of victims of such attacks. Most medical issues associated with terrorism are explored here with the benefit of these authors' tested knowledge. Taken as a whole, this volume can equip medical practitioners with a base of information that could prove invaluable in the event of an attack.

Role of the Medical Community

Emergency responders, physicians, nurses, and other health professionals are bound to serve in lead positions during and after a terror event. Engagement begins when paramedics and ambulances arrive at a scene and continues through the periods of acute and long-term care for victims and their families. Advance knowledge and preparation by providers are indispensable to highly effective medical responses.

Every member of the healthcare community, from hospital director to psychological counselor, could play a crucial part during an event, and all have a responsibility to understand what their roles would be.

While certain principles about preparedness are universal, medical responses will vary according to the type of weapon used and the nature of injury. It is incumbent on practitioners to recognize the circumstances that would require their particular expertise. Thus, if a terrorist's weapons are conventional explosives, trauma surgeons and anesthesiologists are likely to be called to service. If chemical or radiological agents are dispersed, toxicologists, radiologists, and pulmonologists might be engaged. If biological agents are released, specialists in infectious disease and dermatology could be essential.

Beyond treating specific forms of injury, responders and emergency medicine physicians should anticipate handling large numbers of patients with multiple impairments. Victims of a suicide bombing may suffer from penetration wounds, inhalation injuries, blunt trauma, crush injuries, blast injuries, or burns. Under other conditions, combinations of these wounds are rarely seen in one patient, yet after a close-proximity terror bombing, scores of individuals often suffer from some or all of these injuries. Rapid determination of which injuries require priority attention can be a matter of life or death. Frequent experience with these attacks, most recently in Afghanistan and Iraq, but also for a longer period in Israel, has enabled medical personnel in those locations to respond with increased effectiveness. Clearly, there are lessons to be learned from those who have experience.

Some forms of terrorism pose particularly difficult challenges, including recognizing when biological or chemical weapons have been launched. Detection devices can sense the presence of some agents, though not all. Moreover, the apparatus would need to have been in the vicinity of a release. In fact, physicians are often better positioned than anyone else to make a determination. Whether diagnosing an individual case of anthrax, plague, or smallpox (all potentially caused by a bioattack), or through syndromic surveillance that identifies outbreaks of more familiar ailments, the role of the health professional can be pivotal. The difficulty in identifying such modes of attack is evident from past experience. Recognition that biological or chemical agents were deliberately released has often come long after the fact. In 1984, an outbreak of salmonella poisoning in Oregon was initially attributed to unsanitary food handling in some restaurants. But nearly a year later, Rajneesh cult members confessed to having laced local salad bars with salmonella bacteria.³

In 1994, seven people in Matsumoto, Japan, died, presumably from accidental exposure to an unidentified toxic material. The following year, Aum Shinrikyo cult members released sarin nerve agent in the Tokyo subway and later admitted having dispersed that same lethal agent in Matsumoto.⁴ Similarly, in the fall of 2001, letters containing anthrax spores were leaking the deadly bacteria throughout the US postal system. Early victims of the disease were unaware that they had been exposed to the organisms, nor did their doctors realize their illness was due to anthrax bacteria. Widespread contamination of buildings with spores was not recognized until a month after the mailings had begun.⁵ The perpetrator of the anthrax attacks was not identified until seven years later.

In all three cases, physicians were among the first professionals to see the victims. Although some were suspicious of the cause of illness, most were oblivious to the possibility of any connection to terrorism. Had they been aware of the causal mechanisms, symptoms, and relationship to terrorism of agents like these, medical responses could have been quicker and lives might have been saved. While biological and chemical attacks have been infrequent, their potential to cause great damage cannot be ignored. Concerns about their threat can only be heightened by the fact that Al-Qaeda and other terrorist organizations have sought to develop and use such weapons.⁶

Terrorism and Medicine

Terrorism has been variously defined, but it commonly refers to deliberate violence against innocent individuals to instill fear and influence political outcomes.⁷ Murderous attacks against innocent people, especially by suicide bombers, increased dramatically toward the end of the twentieth century and into the twenty-first. The targets were in countries with diverse populations and political systems including Egypt, India, Indonesia, Iraq, Israel, Kenya, Pakistan, Russia, Saudi Arabia, Spain, Sri Lanka, Tanzania, Turkey, the United Kingdom, and the United States.⁸

Repeated terror attacks in India, Russia, Sri Lanka, and Turkey have cumulatively resulted in thousands of casualties. The jetliner assaults on the World Trade Center and the Pentagon in the United States on September 11, 2001, killed nearly 3,000 people. In the West, subsequent terror bombings were launched on a Madrid train in 2004 and in the London metro in 2005, though they caused fewer fatalities than in the US incident. Meanwhile, between 2000 and 2006, Palestinians attempted some 20,000 terror attacks against Israelis.⁹ More than 95% of these efforts were thwarted; still, about 1,100 Israelis were killed and 6,500 injured during that period. Israel's response and medical systems were sometimes strained, but the repeated attacks, including 150 suicide bombings, enabled Israelis to continually improve their techniques of rescue and treatment. Several concepts of terror medicine arose from Israel's experiences and the remainder of this introductory chapter makes reference to a number of them. Not all Israeli medical practices may be applicable elsewhere, but many are. The distinctive qualities of terror medicine, burnished by the Israeli experience, lie in four broad areas: preparedness, incident management, mechanisms of injuries and responses, and psychological consequences.

Preparedness^{10*}

Preparedness ranges from the development of standard operating procedures to the stockpiling of supplies in accessible locations. These stored materials should match the needs of casualties, not only casualties caused by explosives but also those caused

* The following discussion derives in part from Ref. 10.

by other potential weapons including chemical, biological, and radiological agents. These include smallpox vaccine and the antibiotics ciprofloxacin and doxycycline to treat anthrax and other illnesses associated with select biological agents; atropine and pyridostigmine bromide to counter the effects of sarin or soman nerve agents; and potassium iodide to mitigate damage from exposure to certain types of radiation.¹¹

The United States is well positioned in this regard. Its Strategic National Stockpile (formerly called the National Pharmaceutical Stockpile) includes 50-ton packets of medical supplies and equipment stored at eight secret locations around the country. Within 12 hours, a packet can be flown to any site in the country to enhance local stockpiles.¹²

In addition to drug supplies, preparedness requires quick access by hospitals to equipment such as extra ventilators, vital-sign monitors, emergency mobile carts, communications apparatus like portable radios and walkie-talkies, and decontamination and toxic sewage facilities.¹³ Hospitals commonly have shower facilities available for decontamination, but they should also have reserve wash-down capabilities in case of mass exposures to chemical or radiological materials.

Preparedness requires the ability to address sharp increases in the number of casualties. The government of Israel mandates that every hospital be able to handle at least 20% more emergencies than its usual capacity. Several Israeli hospitals have developed surge capacities that greatly exceed the minimal requirement. In 2005, a newly built Center for Emergency Medicine was opened at Hadassah University Hospital in Jerusalem. In minutes, the emergency bed capacity can be doubled to more than 100. The center's 4-ft-thick stone and cement walls can withstand massive explosive impact. Two sets of shatterproof glass for each window can prevent outside air from entering the hospital. A room adjacent to the emergency area is filled with ducts and filters that can recirculate the indoor air. This self-contained system can function for more than a week.

Other hospitals, including Tel Hashomer in Tel Aviv and the Western Galilee Hospital in Nahariya, have large underground rooms with hundreds of empty beds and IV stands at the ready. During the summer of 2006, Hezbollah militants in Lebanon launched 4,000 missiles into northern Israel. At the outset of the month-long conflict, every patient in the Western Galilee Hospital was moved underground. As a result, a missile that later destroyed the fourth floor ophthalmology department failed to cause even one human casualty.

Finally, preparedness requires educating healthcare workers about the various conventional and nonconventional agents, their clinical effects, and their implications for medical and administrative management. This is accomplished through lectures, seminars, and simulation exercises. Hospitals should participate in periodic citywide and regional exercises that build on lessons from actual events. A practice drill may involve hundreds of mock "casualties" from a variety of weapons.¹⁴ In the end, drills and exercises that simulate conditions of an actual event are indispensable to proper preparedness.

Incident Management

A second defining area of terror medicine relates to incident management. Distinctive procedures begin when emergency medical responders arrive at a scene and a pre-

assigned triage commander assesses the condition of individual victims. Since the modus operandi is *scoop and run*, only minimal treatment is provided at the attack site: maintenance of an airway, needle drainage of tension pneumothorax, and local pressure to stop external bleeding. The most severely injured survivors are triaged to a “level 1 trauma center,” a hospital with advanced equipment and special expertise in trauma therapy. The less seriously injured may be sent to level 2 or 3 trauma centers with efforts not to overload any single hospital. On the basis of the experience of recent years, Israeli ambulances begin to arrive at hospitals within minutes of an attack. By the end of the first hour, 90% of the victims are in a hospital.¹⁵

A second triage occurs at each hospital where patients may be arriving as often as one every 20 seconds. At the emergency area entrance, the designated surgeon-in-charge assesses each new patient. Patients are triaged to one of three admission sites according to severity of injury: (1) severe and critical, (2) moderate, and (3) mild. The frequency of recent events has prompted hospitals to refine triage and hasten the admissions process.¹⁶

Incident management also includes wariness that a second attack may be attempted soon after the first. Thus, *scoop and run* means not only quicker hospital care for victims, but a rapid clearing of the target area, which simplifies the security efforts at that location. Massive numbers of casualties could also prompt another deviation from conventional rescue. Rather than trying to provide optimal care for each patient, the philosophy shifts to providing help to those most likely to benefit. Thus, if resources are limited, priority attention goes not necessarily to those most gravely ill, but to those with the best chance of recovery if given timely care.

Protocols should also be in place for a variety of communication requirements that connect hospitals with each other and with law enforcement authorities and inquiring families. With computer assistance, hospitals should be able to quickly share information about their patients so that family members can find each other.¹⁷ This need was highlighted by news reports in August 2003, when a young mother and her baby were among scores of victims of a suicide bombing of a Jerusalem bus. She was pulled from the carnage and awoke in Shaare Zedick Hospital without her baby. At first frantic, her distress was eased after hospital-to-hospital inquiries located the unidentified baby at Hadassah, where he was being treated for noncritical injuries.¹⁸

Terrorists have also sought to exploit the medical system. Since the discovery in 2003 of weapons and gunmen in some Palestinian ambulances that were ostensibly carrying patients, all ambulances, even if conveying critically injured victims, must pause for brief inspection at the perimeter of a hospital’s ground.¹⁹

Injuries and Responses

The third area of terror medicine encompasses the nature of injuries and manner of treatment. The worldwide spate of attacks with explosives has signaled the need for physicians and other healthcare providers to become familiar with the effects of blast devices.^{20–22} Analysts have divided the cumulative information about blast

effects into four categories.²³ Primary blast injuries arise from rapid changes in air pressure that can rupture the tympanic membrane (ear drum) and severely disrupt the lungs and other organs. Secondary blast injuries include penetrating wounds from fragments and other uneven projectiles. Tertiary blast injuries arise from compression caused by the collapse of buildings and the hurling of victims or surrounding objects. The quaternary category covers all other injuries from blast, including burns, crush injuries, and damage from the inhalation of toxic particles.

Accepted forms of treatment for each type of injury generally predated contemporary terrorism. But novel features of terror attacks include their frequency, the likelihood of finding multiple mechanisms of injury, the deliberate targeting of children and other innocents, and the consequent need for treatment strategies to address these conditions. A close-quarter bombing generates a combination of injuries that is otherwise rarely seen in a single individual: numerous penetration wounds from small projectiles (nails, screws, etc.) that damage soft tissues and vital organs; fractured bone and severed arteries and nerves; blast effects on the lungs, the tympanic membrane, and other organs; and severe burns.

This expansive list of injuries suffered by large numbers of victims prompted Israeli trauma surgeons to modify their response protocols. For example, multiple penetration wounds are now simply packed to avoid excessive loss of blood and loss of heat, while the patient is operated on for more serious injuries. Experience also showed that patients who seemed stable were in fact suffering from severe injury that was not initially obvious, such as internal bleeding from a severed blood vessel. Thus, repeated reassessments are warranted, which increases the likelihood of discovering critical injuries that were not first apparent.²⁴

Beyond injuries generated by explosives, terror medicine includes effects of nonconventional agents—chemical, biological, radiological, and nuclear. If recognized in time, infection from bacterial agents like *Bacillus anthracis* and *Yersinia pestis* (the cause of plague) can be treated with antibiotics. In the case of smallpox, vaccination may offer protection even if administered a few days after exposure to the virus. Similarly, antidotes, if administered in time, can neutralize the effects of certain chemical agents and some forms of radiation. Terrorist groups have shown interest in delivering lethal combinations of conventional and nonconventional agents. Organizations including Hamas and al-Fatah sought to detonate explosives mixed with the anticoagulant rat poison warfarin, with AIDS-tainted blood, and with the chemical hydrogen cyanide.^{25–27}

Psychological Consequences

The fourth component of terror medicine relates to the psychological effects of terror assaults. Terror incidents are recognized as a new kind of traumatic event that combines features of criminal assaults, disasters, acts of war, homicide, and political violence. As manifested by survivors of the 9/11 jetliner attacks, the sense of rage, grief, and despair becomes compounded.²⁸ Experience elsewhere has also shown that initial psychological reactions after a terror attack are more intense than from other traumatic events like road accidents. Accordingly, early psychological

intervention is essential. If not appropriately treated during the first 6 months after an incident, patients may suffer irreversible stress disorders.^{29–31}

Israelis have undertaken a community response to the psychological effects of terrorism. Teams of psychologists and social workers visit day-care centers and schools to interview teachers about the behavior of youngsters in their care. They have been able to identify and help children who have been traumatized by terror incidents but whose parents had not previously sought psychological assistance for them.^{32,33}

The psychological aspects of terror medicine also encompass the heightened emotional effects prompted by certain weapons. Biological weapons in particular can generate frightening reactions. People experiencing common forms of attack, such as the bombing of a bus or building, tend to act rationally because their sensory cues enable them to assess the threat and plan the rescue. But lethal bacteria and viruses might not produce symptoms for days or weeks after exposure. The insidiousness of a bioattack and the extended period of uncertainty after exposure can elevate anxiety. Treatment of these heightened emotional states can be more difficult.³⁴

The anthrax attacks in the United States in the fall of 2001 underscored the widespread anxiety that can be caused by a bioattack. Perhaps a half-dozen letters containing spores of *B. anthracis* were mailed to government and media offices. Because of leakage from the letters, some 30,000 people were considered at risk of exposure and were treated with prophylactic antibiotics. But anxiety reached far beyond those directly at risk. Pharmacists and physicians were inundated by demands for antibiotics by fearful customers and patients who were in no particular danger. People in all parts of the country became afraid to open mail.³⁵

Stress in the general population prompted by the anthrax attacks may have exceeded that generated by the jetliner attacks on September 11, 2001. One study suggested that the more time a person spent watching television coverage of the jetliner attacks, the more likely he was to have a stress reaction.³⁶ But another study found that media exposure to the anthrax attacks predicted distress, while media exposure to 9/11 did not.³⁷ The particularly stressful effect of deliberately released biological agents is attributable to their being invisible, potentially lethal, and hard to avoid and control. Addressing the emotional reaction to such events may be enhanced through an understanding of “terror management theory,” which includes consideration of an individual’s worldview and awareness of one’s own mortality.³⁸

Conclusion

The constellation of medical issues related to terror attacks can be understood as comprising terror medicine. Although aspects of terror medicine overlap with emergency and disaster medicine, several characteristics, as shown here, are distinctive. Besides preparedness, management, nature of injuries, and psychological effects, these include the intentionality behind an attack, the threat to healthcare providers,

and the need for special security measures. The uniqueness of terror medicine as a field derives from features beyond the usual scope of trauma surgery, clinical microbiology, infectious disease, internal medicine, and psychotherapy. The field integrates knowledge relevant to the medical management of terror victims and the spectrum and pattern of their injuries. It serves as a basis for developing curricula and standard operating procedures toward prevention, treatment, and rehabilitation both of individuals and of communities.

Efforts to discourage and prevent terrorist attacks should be among a society's highest priorities. No less important are the requirements to prepare for, respond to, and recover from these events. Not only do these capabilities enhance the rates of survival, but they also strengthen a society's overall resilience and ability to cope. Describing the features of terror medicine broadens understanding of the subject and can help develop its systematic study. The more that individuals and institutions become familiar with the essentials of terror medicine, the greater the protection they can provide to others.

The vast majority of physicians, nurses, and other health practitioners in the United States and elsewhere have had no exposure to terror medicine. The purpose of this book is to provide a coherent structure to the lessons both from past experiences and those posed by anticipated future events.

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2

Terrorism in the Twenty-First Century

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Terrorism is not a new phenomenon; it has long been a method of violent action by organizations and individuals attempting to achieve political goals. Indeed, terrorism is not an end but rather a *modus operandi*. According to Bruce Hoffman, all terrorists share one common denominator: they “live” in the future, and are convinced that they will defeat their enemies and achieve their political goals.¹

There are perhaps hundreds of different definitions of terrorism, all of which tend to reflect the political world-view of the definer. The same act of violence can be classified differently, depending on the identities of the perpetrators. Groups that engage in identical behavior might be considered by their sympathizers as *freedom fighters*, and by their enemies as *terrorists*. For the purposes of this chapter, the working assumption is that terrorism is a *modus operandi* in which deliberate violence against civilians is used for the purpose of achieving political goals. In this respect, it is the intentional harming of civilians, which is at the core of terrorism, that makes this *modus operandi* illegitimate, even if it is meant, *prima facie*, to achieve justified objectives. This definition makes a distinction between an action intended to harm civilians and one intended to harm military and security personnel. The latter is defined as a guerilla or insurgency action, even though the perpetrator might use the same *modus operandi* (shooting, suicide bombing, or rocket fire). Thus, in seeking to achieve the same political objectives, an organization or perpetrator might carry out a “terrorist” attack on one occasion and a “guerilla” attack on another. Furthermore, even the political goal of an organization may change as it engages in acts of terrorism or guerilla warfare. Sometimes attacks are executed for the purpose of achieving social, economic, or national goals, such as a separate state or national liberation.

In yet other contexts, attacks are carried out in the service of a certain extreme ideology, such as communism, fascism, and anarchism. However, it is when terrorists are motivated by what they identify as a religious mission – when they regard themselves as the messengers of god – that the highest level of danger is introduced. When motivated by a religious purpose, such terrorist operatives do not perceive room for compromise; their objective is served only by an all-out war. At most, cease-fire agreements can be negotiated for limited time periods.

Modern Terrorism

Modern history has seen the rise of terrorist organizations, diverse in their political objectives and geographic origins. All these organizations, however, share one, unifying variable – their reliance on the use of violence against civilians to achieve their goals. The decision to embrace terrorism as their preferred *modus operandi* is the outcome of a rational decision-making process, based on a cost–benefit analysis that leaves terrorism outweighing any other alternative. The decision to conduct a terrorist act does not necessarily mean that the perpetrators are “abnormal” or that they suffer from severe personality disorders. Rather, a rational calculation of the costs and benefits leads them to adopt the *modus operandi*,² which they perceive as being the most effective method to achieve their political objectives and make a mark in their theater of operations.³

The dynamic nature of terrorism further exacerbates the threat such actors pose to security officials. Even if they achieve success in foiling terrorist plots, security agencies cannot rest on their accomplishments as terrorist organizations constantly change their tactics, organizational structure, and even their tactical objectives. As such, terrorist groups and those who work to counter them are constantly competing strategically in an attempt to stay one step ahead of each other, whether via new technologies or operational tactics. In this manner, the phenomenon of terrorism has evolved over the years, with each stage emerging more dangerous and lethal than the preceding stage.

As opposed to targeting state leaders or political rivals for assassination, modern terrorism does not necessarily aim to change a political reality through the direct removal of a leader. Instead, terrorists seek to achieve their political goals indirectly, using psychological warfare as their weapon. The anxiety that terrorism creates in the target population translates into political pressure, intended to coerce decision-makers into changing their policies according to the interests of the terrorist organization.

As the term implies, terrorism does in fact aim to “terrorize” its target population. While terrorist attacks are ordinarily limited in terms of resulting fatalities, their effect does not stop with the physically harmed crowd.⁴ A message of intimidation and fear is passed to the general public through the terrorist act itself and the resulting media coverage. Video cassettes edited by terrorist organizations, false alarms of possible follow-up attacks, and other methods adopted by terrorist groups, all contribute to a general sense of anxiety and fear.

One of the most crucial elements in this campaign of psychological warfare is mass media. Terrorist groups rely on mass media to transfer their messages of fear and intimidation to the public.^{5,6} This fear can be understood in two different spheres: rational fear and irrational anxiety. Rational fear is a natural response to the perceived risk of getting physically injured in a terrorist attack, no matter how remote the probability. To a certain degree, such “rational fear” is actually positive in that it encourages public vigilance and awareness of one’s immediate surroundings, thus allowing citizens themselves to help in thwarting attacks.⁷ A vigilant civilian is an important arm of the security apparatus.

However, modern terrorism is aimed primarily at heightening the public's fear of terrorism to a level of irrational and uncontrolled anxiety. The random nature of terrorist attacks actually personalizes the threat: anybody, including one's self or a loved one, could be the next victim. Such irrational fear translates into political pressure on leaders to fulfill terrorist demands, as people feel they must do whatever it takes to halt a terrorist campaign. This is essentially the method of modern terrorism, which has come to characterize the activities of all terrorist organizations in the second half of the twentieth century and the beginning of the twenty-first century.

Modern Terrorism at the End of the Twentieth Century

Modern terrorism became common toward the end of the twentieth century due to, among other things, advances in technology, the development of new weapons, and the activities of some governments after World War II. In the period of the cold war and nuclear deterrence, the phenomenon of state-sponsored terrorism developed as an alternative to traditional warfare. Terrorist organizations were utilized within a framework of local conflicts and used as tools to expand the global influence of a superpower, for example, the Soviets.

While terrorism sponsored by states such as Libya, Syria, Iraq, and Sudan decreased at the end of the twentieth century, other states, including Afghanistan and Pakistan, became more involved with terrorist groups.

The intervention of "big powers" in regional disputes, as in Bosnia, Kosovo, Chechnya, and the Gulf War, may have led sub-state groups and third world countries to turn to terrorism or other low intensity measures as a means of fighting for their causes in the face of disproportionate military power. In the past, political goals could be achieved only through the use of armies in a conventional war setting; today, it requires only a handful of determined individuals. By engaging in terrorist activities, these attackers can achieve the same aims without putting the burden of blame on a state sponsor. Examples can be drawn from attacks executed in Dhahran in Saudi Arabia in June 1996 and against the American military training facility in Riyadh in November 1995.

Terrorism is a form of asymmetric warfare in which a non-state actor fights a state. However, contrary to the popular understanding of the term, the balance of power between the two actors does not necessarily favor the state. Even though, *prima facie*, the state has stronger military, intelligence, and economic capabilities than the terrorist organization, a modern liberal-democratic state is subject to the rules of war and harboring of values, which, in effect, restrict its ability to operate and maneuver. A form of reverse asymmetry is established as a result: in a conflict portrayed as a war between David and Goliath, Goliath (the state) is bound hand and foot, while David (the sub-state actor) is exempt from all moral or legal restraints.

At the end of the twentieth century, the phenomenon of modern terrorism experienced another shift in terms of geography. Terrorist activity increased in central and south Asia, shifting focus from the traditional epicenter of the Middle

East. This shift can be largely attributed to the emergence of Wahhabist-Salafist fundamentalist terrorist groups founded by Afghan “veterans.” Afghanistan had additionally become the central base for international terrorist organization training camps, headquarters, and offices, some of which had formerly been based in Lebanon.⁸

One of the most important developments in the 1990s was the creation in February 1998 of Osama Bin Laden’s “World Islamic Front for Jihad against the Jews and the Crusaders.”⁹ Bin Laden had identified terrorism as a tool for achieving the group’s goal of bringing Islamic rule to Muslim lands and “cleansing” them of Western influence and corruption. He established operational connections with Islamic fundamentalist groups in Egypt, Algeria, Yemen, Tunisia, Indonesia, Jordan, and other countries. He also inspired and instigated Islamist groups worldwide to wage war against their own governments and internationally against the United States and its allies.¹⁰

When Bin Laden initiated his “World Islamic Front for Jihad against the Jews and Crusaders,” he issued a Fatwa (Islamic legal ruling) proclaiming it a religious duty for all Muslims to wage war on US citizens, whether military personnel or civilians, anywhere in the world. Soon after, his organization took responsibility for the violent terrorist attacks against the US embassies in Kenya and Tanzania.

One of the most important terrorist events at the end of the twentieth century was the chemical attack by the Japanese cult Aum Shinrikyo in Tokyo in 1995. Aum members released the nerve agent sarin in the Tokyo subway with the aim of inflicting mass casualties. That attack resulted in 12 deaths and a limited number of injured. The organization’s earlier releases of anthrax from the roof of its headquarters building failed to cause any casualties.¹¹ In the wake of the sarin attack, the Japanese government initiated a severe crackdown on the doomsday cult, which was founded on a fusion of religious, spiritual, and supernatural doctrines. Amidst increasing public pressure, the government established legal restrictions against Aum Shinrikyo.

Even so, security officials and academics warned that Aum Shinrikyo’s introduction of unconventional weapons into the arena of terrorism was a kind of “crossing the Rubicon,” and would be followed by similar attempts at causing mass casualties. After the attack in Tokyo and the cult’s attempted biological assaults, other terrorist organizations were expected to follow the lead of the Japanese group. This prediction, however, is yet to be realized.

Terrorism at the Beginning of the Twenty-First Century

Instead, on September 11, 2001, the world awakened to a new danger – global jihadi terrorism of unanticipated magnitude. The attacks represented a transformation in international terrorism, both on the scale and the motive: these attacks were motivated by religious grievances. The message conveyed to the public through the attacks was that no place is safe. No state is immune – not even a superpower like the United States.

The September 11 attacks represented a new reality in international terrorism. The world community, in the wake of these attacks, found itself seemingly in unprecedented peril. The face of international terrorism had changed. But the phenomenon of global jihadi terrorism has roots and ramifications that reach back several years.

Before 9/11, it was convenient for many states and world leaders to turn a blind eye to the unfolding threat, as long as they were not its direct victims or its central focus. Indeed, the radical Islamic movement originally focused not on attacking western targets, but on conquering the hearts and minds of Muslim communities all over the world through educational, religious, and welfare activities, known as “*dawah*” activities. These activities were based on the dogmatic radical perspectives of the movement, which praised the use of violence in “defense of Islam.” Still, in most cases, the principle remained theoretical, and the call to violence never manifested itself as a concrete act of violent terrorist activity. This made it possible – and even convenient – for world leaders to underestimate the threat. The death of nearly 3,000 civilians, the collapse of the World Trade Center buildings, and the destruction of parts of the Pentagon building on September 11th, forced the international community – and especially the American people and US administration – to acknowledge the imminent threat of terrorism.¹²

Since then, members of the global jihadi network have not hesitated to utilize a method of modern terrorism that has proved more effective than any other, namely, suicide attacks.

The Suicide Attack Phenomenon

A suicide attack is an “operational method in which the very act of the attack is dependent upon the death of the perpetrator.”¹³ A suicide attack is carried out by a terrorist operative who activates explosives worn or carried in the form of a portable explosive device, or planted in a vehicle he is driving. The terrorist is fully aware that if he does not kill himself, the planned attack will not be successful.

The suicide attack phenomenon is spreading; more and more terrorist organizations, primarily radical Islamic in nature, are finding this *modus operandi* very productive. Since a bomber can choose the time and place to launch the attack, and can consider the circumstances he encounters, suicide attacks maximize potential casualties and cause extensive damage. Other techniques, such as a timer-activated bomb or even a remote-controlled explosive, can be deactivated by security forces before causing any damage. But a suicide bomber is an unusually sophisticated smart bomb – a carrier who brings the explosive device to the right location and detonates it at the right time.

Because of the high number of casualties these cause, suicide attacks generally attract wide media coverage. A suicide attack is of news interest because it demonstrates extraordinary determination and self-sacrifice on the part of the terrorists. It is extremely difficult to thwart a suicide attack once the terrorist is on his way to the target location. Even if security forces succeed in stopping him before he

reaches the intended target, he can still activate the explosive device and cause damage. Such attributes have made suicide attacks a very appealing option for jihadi organizations.

In addition, it is not only terrorist organizations that find suicide attacks appealing. The suicide attackers themselves also believe they will benefit personally by committing the “*istishad*” (martyrdom operation). Their extreme religious beliefs make them aspire to become “shahids” (martyrs), and they are thus happy to die for their cause. In fact, they believe that they will not really die at all, but will instead be guaranteed eternal life in paradise. In most cases of Muslim suicide bombers, among the perceived benefits are eternal life in paradise, the permission to see the face of Allah, and the loving kindness of 72 young virgins who will serve them in heaven. The *shahid* also takes altruistic motives into consideration: by committing a suicide attack, he earns the privilege to promise life in heaven to 70 of his relatives and friends.

All these factors create a substantial incentive for fundamentalist believers to adopt suicide attack tactics. As such, the growing phenomenon of suicide terrorism and the use of suicide attacks by global jihadi terrorists such as Al-Qaida should be considered a result of a rational decision-making process. It is a rational choice both by the terrorist organization that initiates, plans, prepares, and executes the attack; and by the perpetrators – the shahids – since, in their eyes, the benefits exceed all possible costs.

Global jihadi suicide attacks have proved to be the most effective and deadly method of modern terrorism. The only exception may be unconventional, CBRN (Chemical, Biological, Radiological, and Nuclear) terrorism.

Unconventional Terrorism

Despite some unsuccessful earlier attempts by terrorists to use unconventional weapons, the revival of international terrorism in the radical Islamic arena under the direction of Al-Qaida has renewed the threat of unconventional terrorism in the twenty-first century.

To determine what conditions must be in place for a terrorist organization to choose unconventional weapons, it is helpful to categorize the types of possible unconventional terrorism attacks. While it is customary to base such distinctions on the substance used – be it chemical, biological, nuclear, or radiological – one can also classify attacks by their intended result. One important distinction is that attacks using unconventional means can be “limited” or “unlimited” in nature.¹⁴

A limited unconventional attack differs from the standard terrorist bombing only in the means used. As in the case of a conventional assault, a limited unconventional attack aims to achieve political goals with both direct and indirect effects. By causing multiple casualties at the site of the attack it incites fear and anxiety among the larger public. A limited unconventional terrorist attack could be carried out by dispersing a chemical substance in an enclosed space, or by using explosives to disperse a radiological agent at a selected location. Another example of a limited

unconventional attack would be a destructive assault on a facility containing dangerous substances, such as a military or industrial facility. In all these examples, the damage is of limited scope, although potentially more serious than a conventional attack on the same target.

As opposed to limited assaults, unlimited attacks are meant to cause damage or carnage not merely in a specific public area. Rather, they are designed to cause mass casualties in large areas (a town, a city, a specific geographical area, etc.). The conceptual basis of these two categories differs: while tactical, or limited, unconventional terrorism serves as leverage in altering a political reality indirectly through the use of intimidation, unlimited unconventional terrorism strives to change the political reality directly by annihilating large populations or contaminating extensive geographical regions. This type of attack may have a severe psychological impact on public morale. It may, in fact, completely undermine the population's confidence in government institutions and their values. Even without this effect though, the unlimited unconventional attack causes grave and prolonged damage to the target area.

In general, chemical attacks are mostly limited in scope, while biological attacks can be unlimited, especially if the bioagents are contagious. Nuclear attacks are unlimited, with far-reaching ecological impact, while radiological attacks are likely to be limited in scope. "The dirty bomb," for example, is an explosive device in the immediate vicinity of radiological material. When the explosives are detonated, the radiological material is spread across the target area.

By classifying unconventional terrorist attacks as limited or unlimited, counter-terrorism experts and officials are better equipped to determine whether such attacks will likely be perpetrated in the foreseeable future. In general, the launching of "limited" unconventional terrorist attacks is within the capability of many organizations, but "unlimited" unconventional terrorism is less likely in the near future. As long as conventional, or limited unconventional, terrorist attacks remain an effective tactic of modern terrorist strategy – including the spread of fear and anxiety – terrorist groups are less likely to turn to the more extreme alternative of an unlimited unconventional attack, based on their rational calculation of cost and benefit. The extra costs, or challenges, associated with an unconventional attack – such as difficulty in obtaining materials, severe global reaction and response, justifying the act to their constituency, or the possibility of harming members of the population they identify with – may not be worth the perceived benefits – especially because fear and anxiety can effectively be created in the target population without engaging in an unlimited attack, which would cause more physical destruction.

Still, it is arguable that Islamic groups now active will usher in a new era in terrorism, launching a transition from conventional to unconventional terrorism. Organizations influenced or motivated by religious doctrine – a divine commandment, decree, or doomsday cult mentality – will calculate costs and benefits differently than their counterparts; their commands are nonnegotiable, influenced by an external force. Islamic radical spokesmen have already expressed their interest in using unconventional terrorism, and several plots have already been thwarted in