CHAPTER V

Cooperation Between Defense and Other Agencies

Introduction

Rear Admiral (Retired) John F. Sigler
Near East South Asia (NESA) Center for Strategic Studies
Moderator

As we move closer to the workshops that will build upon the work started in Oman in 2000, we have seen some common threads in our discussions so far on Environmental Security. First, events can occur in our environment, whether natural or man-made, that can have a significant impact upon national and regional security. Second, prior planning, preparation and information sharing are absolutely critical to having an adequate response. Finally, because of our unique capabilities, militaries have a valid role in preventing where possible, and responding where necessary, to environmental crises. Sometimes the military will be in charge, with multiple other agencies involved. Quite often the military will be supporting the other agencies, both governmental and non-governmental, that are responding to the crisis. This panel further addresses this last point. In prior planning, preparation and execution, coordination between military and civil organizations is critical.

Initial Reactions: Coordinating with the First Responders

Brigadier General Craig T. Boddington
United States Marine Corps
Commander,
Joint Task Force – Consequence Management, Kuwait

Thank you, Admiral. Good morning, ladies, gentlemen, and distinguished guests. It is a great honor and privilege for me to be here today, and I want to offer a special thanks to the many of you here that were involved in organizing and orchestrating this great conference, and especially our friends and colleagues from the Qatari Armed Forces. This is a wonderful opportunity for all of us.

This morning I am going to discuss how a nation might react to a chemical, biological, radiological, nuclear, or high explosive (CBRNE) incident, as well as how my task force might fit into the response. Consequence management is defined as, "the measures taken to protect public health and safety, restore essential government services, and provide emergency relief to governments and individuals affected by the consequences of a CBRNE incident," These are the functions that may have to be performed, depending on the nature of the event:

- Decontamination
- Emergency Medicine
- Fire Fighting
- Search and Rescue
- Food and Water
- Communications
- Transportation
- Healthcare Services
- Displaced Civilian Services
- Clothing and Shelter
- Information and Planning
- Public Information

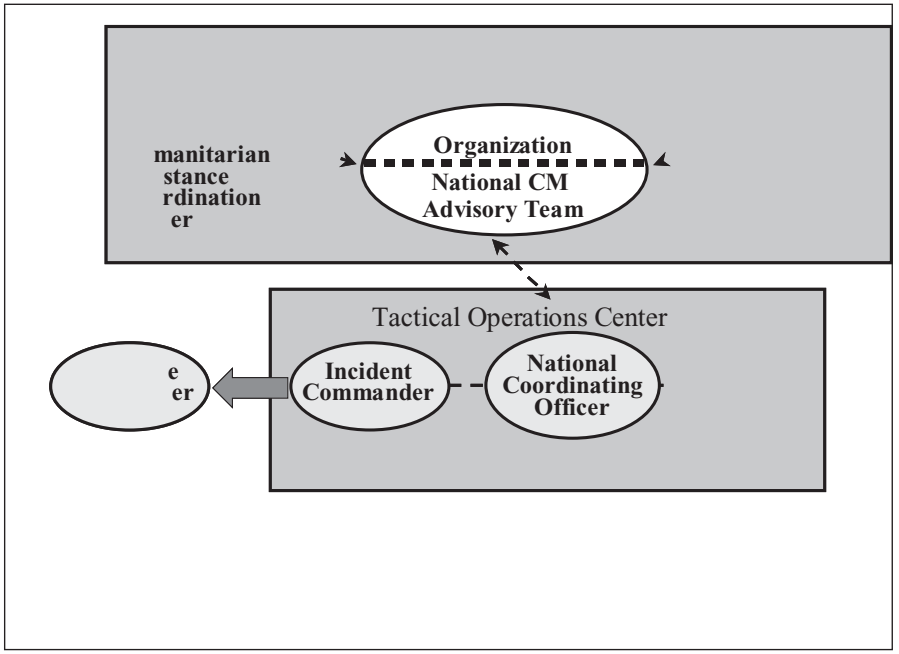

Figure 5-1: Typical Host Nation Response

These functions are essentially the affected nation's responsibility to solve. The answers are probably not going to be easy, and international assistance may and probably will be required. Every event is different. Host nation capabilities to handle the consequences of an event differ not only from country to country, but also from town to town. Ideally, these basic initial response tasks need to be accomplished as quickly as possible. But it is likely that, in many, and perhaps in most areas the local authorities will be quickly overwhelmed, and will require assistance.

This is a graphic illustration of a typical host nation response scene (figure 5-1). Every incident is different and what a given nation might call these entities is going to vary.

You are going to have some kind of an incident. The Police and Fire Department personnel are normally the first responders to an incident. The police will set up a command post and the fire department will establish an entry and exit control point to the site. Both departments will begin an initial assessment of the site. Based on the initial assessment, the Scene/Site Commander may pass command and control to a higher authority within

the host nation. If the site is contaminated, the reconnaissance team will establish hot and cold zones to prevent the spread of contamination. At this time, medical treatment and decontamination efforts begin to transport casualties and evacuate personnel from the incident site. Close by the incident itself, there will be a tactical operations center (TOC), with an incident commander, and a national coordinating officer who is going to work with the national government. For any incident, the press is going be there. So there is the need for an on-scene information center of some kind. At the national level, there is going to be a national operations center, with some kind of a consequence management national command group. Most countries will have a lead consequence management organization, perhaps one of the ministries or possibly another organization. Humanitarian assistance will be needed, so the TOC needs to establish a humanitarian assistance coordination center. Again, the press will be there. So you need a public affairs information center. And of course, this is going to vary from country to country.

Now let me talk about my organization. The Combined Joint Task Force Consequence Management (C/JTF-CM) is a U.S. Department of Defense organization, created by the U.S. Central Command (USCENTCOM), designed to reinforce a host nation's response. Although, we are a U.S. Department of Defense organization, the Department of Defense will probably not be the lead agency in most responses. The U.S. Department of State (DOS) will probably be the lead agency in most events of this nature. Now going back to the diagram that we looked at before, here is how we fit into the equation (figure 5-2). We reinforce a host nation's capability at the tactical level, and coordinate and assist at the national level. We will come in as the lead element of a U.S. Government response, with the U.S. Department of State as the lead agency.

What are our command relationships within USCENTCOM? The Joint Task Force works for the U.S. Marine Forces Central Command (MARCENT), who works for U.S. Central Command, and the JTF has a coordinating link to the U.S. Department of State in any given country. The Department of State has a consequence management (CM) support team that is tied in directly to the ambassador, with a coordinating link to us. I will talk a little about our capabilities. Right now, our coalition partners, the Federal Republic of Germany and the Czech Republic,

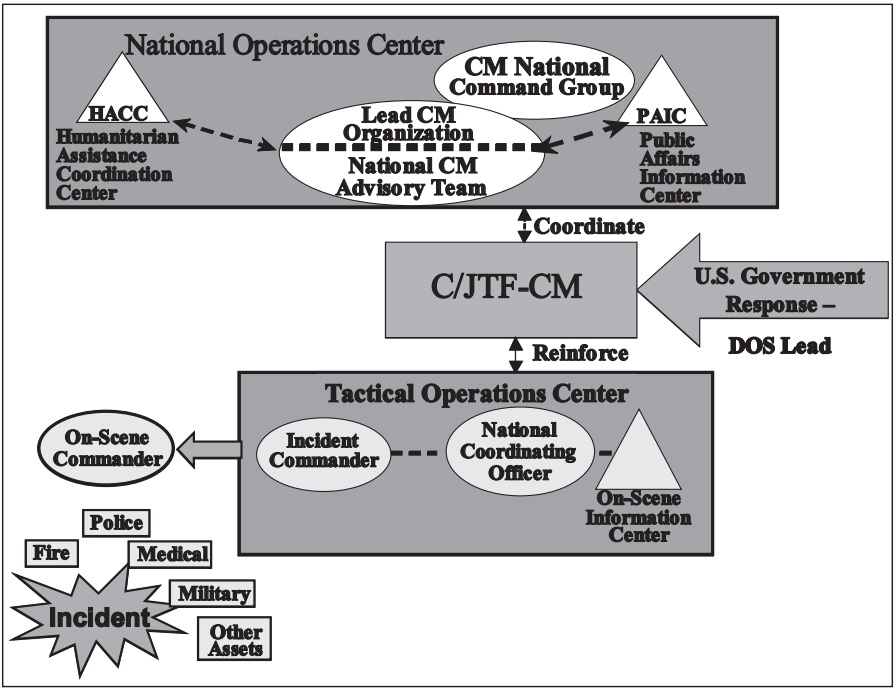

FIGURE 5-2: C/JTF-CM REINFORCEMENT

provide more than half of our capabilities and these are some of our basic capabilities that we have for an initial response (figure 5-3).

Some of our forces will respond from Kuwait, some are on 24-hour notice from within the U.S. CENTCOM Theater, and some are on a 96-hour notice to respond from outside this theater. The actual response time depends on the nature and location of the incident and availability of transportation. A liaison team (LNO Team) from the task force is the first echelon to respond to any incident. The LNO Team consists of an operations planner, logistics/transportation officer, contracting officer, medical planner, emergency services officer, U.S. Embassy LNO, and

- Coalition/Joint Task Force (Czech Republic and German Forces are part of our Task Force)
- Command and Control of U.S. Government Response
- Integrate/reinforce HN Response
- Recon—What are we faced with?
- Search and Extraction of victims
- Decontamination of victims, personnel, and equipment
- Medical—Triage and stabilization
- Communications

FIGURE 5-3: C/JTF-CM CAPABILITIES

a communications officer. Some of the primary capabilities that our liaison team has are: provides initial liaison between C/JTF-CM, U.S. Embassy, and Host Nation response; integrates into host nation first response professionals, coordinates the follow-on response from C/JTF-CM with the U.S. Embassy and the Host Nation; and establishes liaison with international agencies. They are going to arrive and mobilize very quickly and start to obtain the information necessary for us to plan our force requirements and plan operations.

The next echelon to deploy is the forward command post. Ideally the forward command post will follow and arrive behind the liaison team within a matter of hours. The nucleus of the forward command post is the operations section, logistics/contracting/health services section, nuclear, biological, and chemical (NBC) experts, force protection element, limited transportation assets, coalition LNOs, communications assets, and a public affairs officer (PAO). Some of the primary capabilities that our forward command post provides are:

- Integrates into the host nation response at the incident site
- Begins the process of command and control of U.S. Government response
- Coordinates arrival of response forces
- Communication reach-back – Military and Department of State

They will begin more detailed planning and actual execution of the C/JTF-CM mission. Very critical in those early hours is communication reach-back, and coordinating the arrival of the response forces. The initial response force will follow the forward command post into the incident area (figure 5-4).

Some members of the initial response force (IRF) are included in the forward command post, handling planning considerations critical to the success of the mission. The initial response force is designed to be a full spectrum chemical, biological, radiological, nuclear and very high explosive response force. When we developed the IRF, it was developed along the lines of the sea berth model, which is a very successful Marine Corps-specific organization in the States. However, ours is very much

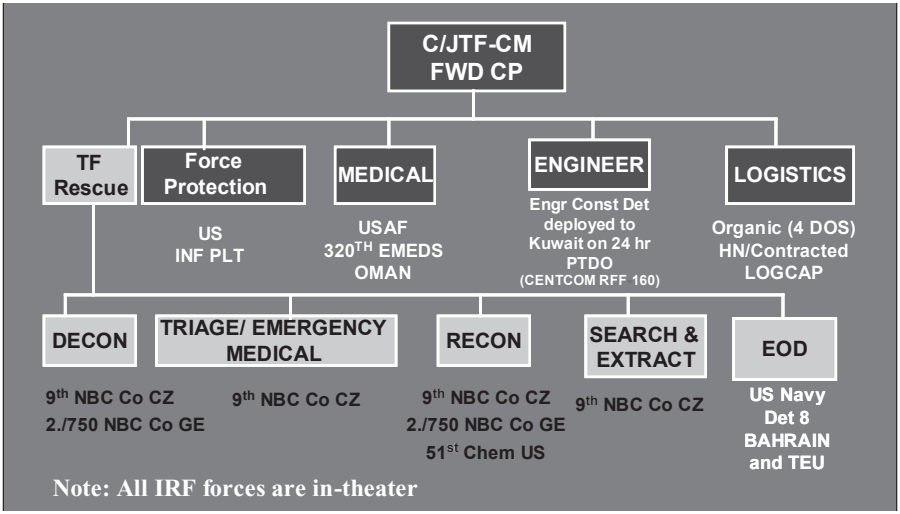

Figure 5-4: Initial Response Force

combined and very much joint. With Task Force Rescue, 85% of the troops on the ground in this part of our initial response force are going to be from our coalition forces, the Czech Republic and the Federal Republic of Germany. Our goal is to turn victims into patients.

The initial response force focuses on these portions of the consequence management spectrum. The IRF's first and foremost initial response is reinforcing a host nation's first responders. Now, in addition to the initial response force, we have a fairly extensive menu of forces that are on alert and prepared to deploy within 96 hours, who we call the Extended Operating Forces (EOF). One of the first things I would do on arrival is start looking at the situation and determine what items I need to order off of that menu, so that we can get our follow on forces properly organized and inbound.

Figure 5-5 portrays a very notional consequence management response timeline. Actual times are dependent on the type of incident. Of course, you start with an incident, and the host nation's first responders arrive and shortly thereafter, you might start to see an indication that you actually have a chemical or biological attack. As a result, the first responders will have to back off a little bit and set-up an incident site. The United States Ambassador will see that something terrible has happened. The Ambassador will call the Department of State and will

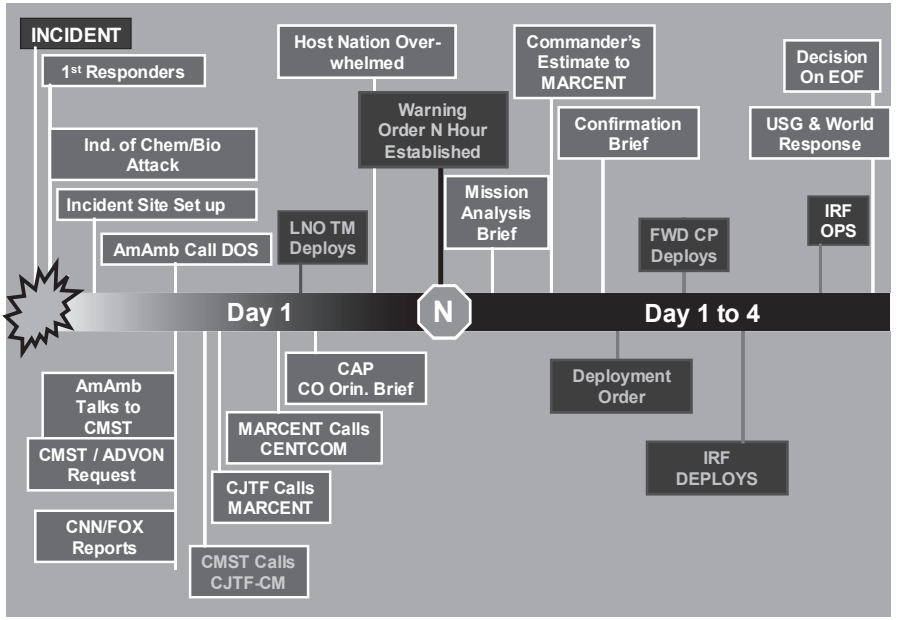

Figure 5-5: Typical Host Nation Response

talk to the Consequence Management Support Team. The Consequence Management Support Team's advance party will probably deploy to the incident area shortly thereafter. During the meantime, yes, the mass media is going to be reporting the incident.

The Consequence Management Support Team is going to call the C/JTF-CM. We have a direct line to the Support Team. The C/JTF-CM will call our higher headquarters, which will notify U.S. CENTCOM. The C/JTF-CM will begin crisis action planning, but in the meantime, the C/JTF-CM will request approval from U.S. CENTCOM to deploy our liaison team, and will try to deploy the team in a matter of hours. Somewhere in here, it is very, very likely that some of the host nation's emergency capabilities are going to be overwhelmed, and there will be a request for assistance. U.S. CENTCOM will issue a warning order to the C/JTF-CM, which actually establishes our notification hour (N-hour) sequence. We proceed with a mission analysis brief, a commander's estimate, following with a confirmation brief. Acceptance of the confirmation brief will generate a deployment order from U.S. CENTCOM, and we will deploy our forward Command Post (CP), followed by the IRF, and on arrival begin to conduct immediate response

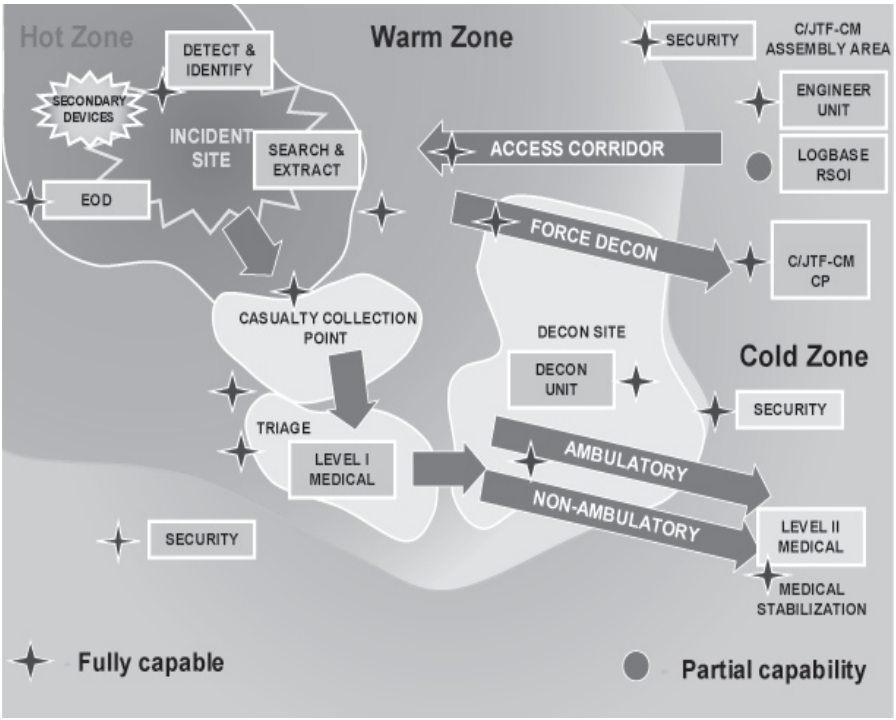

Figure 5-6: Typical Incident Site

force operations to reinforce the host nation capabilities. One of the very critical things that is going to occur early on, is a decision on what part of my extended operating forces are going to be needed. This decision is essential, because it takes time to get them in theater.

This is a graphic depiction of a typical incident site, with a hot zone, warm zone, and cold zone (figure 5-6). The hot zone is the contaminated site. The cold zone is not contaminated. The warm zone is actually created by personnel and equipment moving out of the hot zone and bringing some degree of contamination with them.

When Task Force Rescue and the Forward Command Post arrive, the first thing we are going to do is establish an access corridor, and begin force decontamination. The C/JTF cannot send anyone into the hot zone until the decontamination site is set up to bring him or her out safely. With that done, the C/JTF will send in our reconnaissance forces to detect and identify the type of contamination. The reconnaissance force will establish the proper personnel protective equipment (PPE)

so the search and extraction crews can go in to evacuate the casualties. Explosive ordinance disposal may need to go in as well to search for secondary devices. While this is ongoing, we are setting up a much larger decontamination site for equipment, ambulatory personnel, non-ambulatory personnel, medical casualty collection point, triage area, and a stabilization area in the cold zone. Again, most of my forces that would go into the hot zone are coalition partners from the Czech Republic and Federal Republic of Germany.

The task force has a robust command and control capability to assist the host nation in coordinating all organizations, military or civilian, that respond to an incident. The C/JTF has the capability to conduct a thorough site assessment, in the military called reconnaissance. The Federal Republic of Germany and the United States Forces use Fox vehicles. The Czech forces use specially equipped Land Rovers and BRDMs. The C/JTF has a robust vehicle decontamination capability using Czech, German, and U.S. assets. Of course, victims also have to be decontaminated, to include ambulatory and non-ambulatory. Within the task force, we have limited medical capability. The C/JTF can assist with triage and limited stabilization, but have to rely on other sources for any major medical treatment.

In summary, we were stood up about a year ago. The C/JTF is the first and the only consequence management task force in the militaries of the world. We do not advertise that we have got it right, but we are off to a great start. Our headquarters unit is trained and ready to go. The initial response force is identified, in place, trained, and ready to go. We have the reach-back capability and the ability to bring in additional force if necessary for extended operations, and prepared to remain in place until the end of Operation ENDURING FREEDOM. The C/JTF is not a large force, we do not claim that we can fix a major event, but we do believe that we can reinforce and augment the capabilities of any host nation that might have an instant that requires our services.

Promoting Stability and Capability: Regional Cooperative Initiatives

Mr. Paul Malik
Director,
Department of State Regional Environmental Hub-Jordan

Thanks very much, Admiral. Ladies and gentlemen, I am very pleased to be here this morning. First of all, I would like to thank our Qatari hosts, the Qatar Armed Services, as well as extend my appreciation to U.S. Central Command, the Near East-South Asia (NESA) Center, and the United States Army War College, for their kind invitation for me to come and speak today. I will discuss regional cooperative initiatives here in the Middle East. My office is located at the United States Embassy in Amman, Jordan, and I would like to give you a bit of background on it.

The Regional Environmental Hub's mission is to, "build regional coalitions and foster regional cooperation on trans-boundary environmental issues. Facilitate discussion and cooperation within a region on issues of common importance." Practically speaking, what we do is facilitate cooperation. We network within the Middle Eastern region among individuals, institutions and governments and help to organize and conduct training and workshops, specifically on environmental issues.

I would like to draw on something that Ms. Alina Romanowski, Director of the NESA Center, mentioned yesterday in her opening remarks. Alina mentioned you could look at Environmental Security through a number of different lenses. I would like to ask you today to indulge me and look at it through an economic lens. This is the way that we look at it, in my office, and have found that sustainable development is really the key to Environmental Security and stability within the region.

One definition of sustainable development is environmental stewardship and without environmental stewardship, we have environmental degradation. It impacts the environment quite substantially. These environmental changes have a very negative effect on not just the population in the region, but also on natural resources. Dr. Butts talked a little bit about the type of degradation that can occur.

Obviously, it can be man-made through mismanagement; it can be intentional, as in the case of a terrorist incident; and it can also be natural. We have both qualitative degradation and quantitative scarcity, and, at this point, I would like to walk you through a cycle that I feel threatens the Environmental Security and stability within the region.

These environmental changes can impact the social fabric and demographics of a particular country, community, or region. Specifically, what we find is it has a deteriorating effect on health conditions, and thus can oftentimes cause migration or population displacement. These negative social and health impacts can further throw off the economic balance of a particular country or region, leaving the population vulnerable. We find increases in poverty when there is environmental degradation and an inequitable distribution of wealth, services, and natural resources that are available. This sets the scene for corruption, and this sort of economic disruption ultimately can erode political institutions. The corruption that I mentioned, which is a result of the economic degradation, can impact legal mechanisms and break down law enforcement. Also, citizens feel that they no longer are part of the system, and levels of resentment tend to rise. Ultimately, civil authority can be challenged.

Taking all of these into account—the environmental changes, the degradation that occurs at a particular location or within a region, as well as the consequent disruption of social and economic and political institutions—I think you will find these are all a recipe for disaster. I would like to present this chart; it is what I am calling the vicious cycle (figure 5-7). I think you will notice here, beginning with the environmental degradation that I spoke of, it has a negative impact on health, causing agricultural production to decline, and resulting in economic losses, which encourages corruption. When the population senses it is no longer part of the system, that it is disenfranchised from political and economic aspects of life, then resentment increases, authority is challenged, ultimately leading to civil unrest, all of which again further degrades the environment of that particular community or region.

How do we combat the vicious cycle? The Hub focuses on environmental cooperation within the Middle East and North Africa, and I think that most people here in the room would agree that

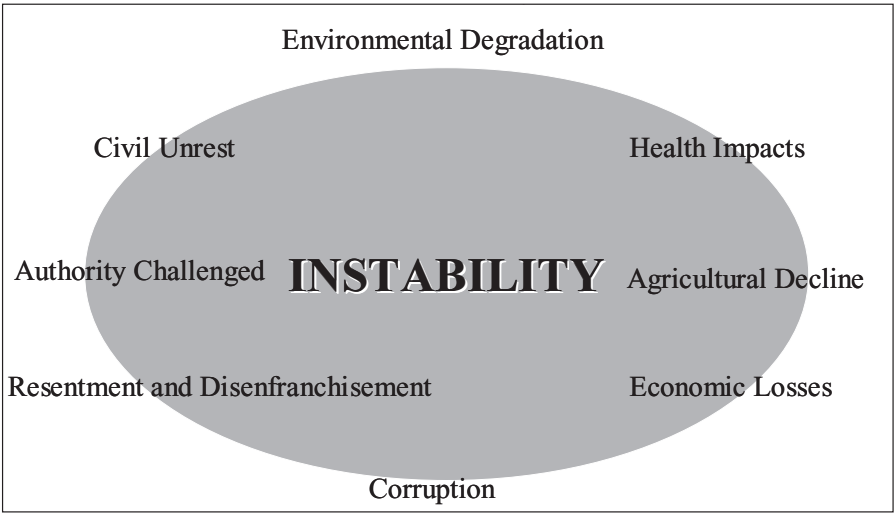

Figure 5-7: The Vicious Cycle

relationships, and when I talk about relationships, I mean from the personal level through institutional and government and international levels, help to foster communication. This communication builds trust and is a confidence-building measure. It allows individuals to exchange information, and data, and we find that transparency is oftentimes the result of good communication. This confidence-building measure that goes along with transparency ultimately leads to good governance.

I would like to consider all of these elements ingredients for economic opportunity, and that leads me to my other graphic chart, which is the virtuous cycle (figure 5-8). Here, we have environmental stewardship, or protection and cooperation on the environment, at the vanguard. This helps to create jobs, encouraging an increase in income of the local population, alleviating poverty, raising living standards, giving individuals more expendable income, oftentimes boosting economic growth. This growth leads to increased investment in the community, country or region, and, once again, brings us back to environmental stewardship.

FIGURE 5-8: THE VIRTUOUS CYCLE

Within the context of my office, we do a lot of our work in the Middle East Peace Process multilateral working groups, and this is how we encourage the virtuous cycle. The United States is the gavel holder for the Water Resources Working Group. I will discuss a couple of the projects that we feel have made a difference within the region. The first is the Executive Action Team (EXACT). The Water Data Banks Project, an element of EXACT, is a project that is administered by our U.S. Geological Survey, of which Dr. Michael Foose is a member. The project has brought together the Palestinians, Jordanians, and Israelis to work on data exchange, specifically on their scarce water resources. The interesting thing is that while we act as the administrator of the project, it is really driven by the core parties. These individuals meet on a regular basis and decide which projects they will conduct to best meet the needs of each of their countries. This has continued despite the Intifada and the current situation in the region, underscoring the Palestinian, Jordanian, and Israeli commitment to regional environmental cooperation to enhance political stability and security.

WaterNet is a similar project and is funded by the Norwegians. It is an information exchange program amongst the core parties, Palestine, Jordan, and Israel. WaterCare, very briefly, is a school curriculum developed by the core parties. It is a public awareness effort, and it will be introduced (hopefully in the next year or so) to the school systems

of the Palestinians, Jordanians, and Israelis. It is a joint project, and we are hoping that it will be a big success in terms of raising consciousness about the scarcity of the water resources within the region and the need to cooperate for the sake of stability and security.

Finally, the Middle East Desalination Research Center (MEDRC) is an institution located in Muscat, Oman. Membership to the Center is open to anyone and everyone. It is a unique center that brings together scientists to work specifically on improving efficiency and effectiveness of desalination techniques, fostering greater cooperation, and encouraging new technologies.

The second Middle East Peace Process (MEPP) working group in which we work is that of the Environment. Japan is the gavel holder, although, the United States does play a significant role in guiding its priorities. There are two projects that I would like to discuss. Combating desertification is one that is led by the World Bank and the International Center for Agricultural Research in the Dry Areas (ICARDA), based in Syria. It has been a successful program in the realm of scientific collaboration and technology transfer. What I would like to emphasize, is that it is not just composed of the core parties, but also includes Egypt and Tunisia. The other programs I would like to bring to your attention are the U.S. Environmental Protection Agency (EPA) Environmental Enforcement training module and the Solid Waste Management Programs. These are modules developed by the U.S. Environmental Protection Agency, and introduced to the region, specifically for the countries within the Middle East and North Africa. The parties that participated helped to develop the training to ensure it met their specific needs. We are hopeful in the next year or so, the Hub can develop additional modules on hazardous waste and environmental economics, showing the costs to the economy of not safeguarding the environment.

The Middle East Regional Cooperation Program (MERC) is one of the most successful programs that we have, bringing together core parties (Palestine, Jordan, Egypt, Morocco, Tunisia, Lebanon, and Israel) on environmental issues. The program is an outgrowth of the Camp David Accords of 1979 and has brought together Arab and Israeli scientists for over 20 years. In the beginning, it was just Egypt and Israel, although over the years it has evolved to include Palestine, Jordan, Morocco,

Tunisia, and Lebanon. The program promotes sustainable development and improves the quality of life of the citizens of the Middle East and North Africa region, and it does that through applied research. This is an excellent opportunity for scientists from all fields to work together. What we have found most heartening is that they are able to put their science above politics.

Here are three examples of MERC projects (figure 5-9). I would like to draw your attention in particular to the last one. I think you will note that it might be of particular interest to the military audience that we have here today, because of the research that it is done on seismic activity in the Dead Sea Rift Valley, and the applications that this has for civil defense teams on both sides, both Jordan and Israel, to be able to respond to any kind of catastrophic occurrence.

While we do have a lot of our work within the context of the Middle East Peace Process multilaterals, we are not limiting ourselves to that, and are looking for ways to encourage as much cooperation and collaboration among the Arab states within the Middle East and North Africa. I have set it as a personal goal to try to do this, and I look forward to working with all of you to make this happen in the next couple of years. I am encouraged already by the achievements that have been made by Arab countries in collaborating and cooperating on some of these sensitive issues. In particular, we have the Regional Organization for the Protection of Marine Environment (ROPME), mentioned yesterday; the Marine Emergency Mutual Aid Center (MEMAC); and the Protection of the Environment of the Red Sea and the Gulf of Aden (PERSGA), in which I believe Saudi Arabia is the only GCC member. In addition, I would like to just highlight Global Learning and Observations to Benefit the Environment (GLOBE), which is an American program for elementary and secondary school students, established in 1994. Of particular note, this year there were two joint GLOBE projects conducted by students in Bahrain, Lebanon and Jordan, on the water resources in their respective

- "Environmental Protection and the Ecological Impact of Wastewater Recycling and Reuse in the Transboundary Mountain Aquifer Areas Shared by Israelis and Palestinians"
- "Monitoring and Modeling of Salt-Water Intrusion in Gaza and Morocco"
- "Integrated Geophysical Study of the Dead Sea Rift for Hazard Assessment and Mineral Resources"

Figure 5-9: Examples of Environmental MERC Projects

countries. Finally, Jordan has a very strong background in water resources and over the years has been able to contribute substantially to training efforts and building the capacity of some of their neighbors.

Now, what I would like to do is introduce the concept that it is time to think strategically, develop that kind of strategic vision, and develop tactical implementation. It is important to overcome the environmental degradation that occurs both naturally, through mismanagement, and intentional means. Although I am not an expert in consequence management, I defer to my colleagues who are here and the experts, in our experiences we feel that communication, planning, training, and exercises are completely necessary. Something not to forget and I cannot impress upon you enough is that it is a multidisciplinary approach, and there are numerous actors that have to be consulted, if in fact you want to make a consequence management plan successful.

Of the stakeholders, we have the usual list of ministries and agencies within the government. The Ministry of Defense, I should highlight, and highlighted by many of the speakers, is an important actor in consequence management. It is oftentimes the Ministry that is able to provide the manpower and materiel to respond appropriately. Non-governmental organizations (NGOs) are important stakeholders within the process, as are international organizations, such as the United Nations Environmental Program, Red Crescent/Red Cross, and again, ROPME and MEMAC, which are particular to the Arabian Gulf. It is important not to forget scientists and academics. These individuals have the technical background and expertise to provide the necessary scientific assessments on which we base our responses and actions. This is why a program such as MERC is successful. Finally, industry is another key player. While I have only cited Arabian American Oil Company (ARAMCO) as one example, as was pointed out in the presentation on the Qatar Electrical and Water Organization, utility companies should be a part of any national or regional consequence management plan. Although we think of industry as a source of environmental degradation and pollution, it is also part of the solution. I cannot underscore for you enough that industry does take preventative measures and this is a very significant part of consequence management. It is all about planning ahead and developing contingency plans to respond after an incident.

So, with coordination and cooperation and collaboration, these are some of the benefits that we can reap:

- Economic – leverage and share limited resources
- Efficiency – streamline decision-making
- Effectiveness – identify new technologies
- Emerging Opportunities – buy-in of stakeholders for future collaboration

There are additional successful examples of relationships that exist in other parts of the world. I have highlighted the U.S. relationship with Canada and Mexico--of course, very significant relationships on all levels for us. In particular, the U.S. Coast Guard manages inland waters, in the form of our Great Lakes and the coastal zones. Whenever there is an occurrence of an event involving environmental degradation that requires a response from both sides, there is a formal protocol already established. When forest fires, normally handled by local fire fighting units, extend beyond their capabilities, and I think we have seen this in the last year, the National Guard and the military are oftentimes called in to provide assistance. An example of the key role the military has to play in environmental protection and consequence management.

So, in summary, the foundation is here. I was pleased to hear about the military exercises that take place on a regular basis amongst the GCC countries, and you are certainly to be lauded for the kind of cooperation and initiatives that you have already taken. I would like to ask you to recall the two cycles once again. There is the vicious cycle and the virtuous cycle. There is a choice, and I think it is clear which one we want to make. So, I leave you with the challenge that the GCC work more collaboratively and cooperatively together to develop the consequence management plan that can respond efficiently and effectively to any sort of economic and environmental degradation.

Turkish Earthquakes: Response, Lessons Learned, New Procedures and Mechanisms

Professor Mustafa Erdik
Chairman, Earthquake Engineering Department
Boğaziçi University, Istanbul, Turkey

INTRODUCTION

During the recent decade Turkey has been the scene of several urban earthquake disasters (figure 5-10). The recent series of devastating earthquakes during the last 10 years have caused housing losses in hundreds of thousands, loss of lives of tens of thousands and created a financial loss in excess of 22 billion USD (about 10% of the average gross domestic product (GDP) or about 1% annual GDP loss).

Earthquake	Lives Lost	Housing Units Damaged/Collapsed	Number of Homeless	Approx. Total Damage (Billions USD)
1992 Erzincan	645	8,000/1,500	10,000	1.0
1995 Dinar	100	6,500/2,000	8,000	0.4
1998 Adana-Ceyhan	150	21,000/2,000	24,000	0.5
1999 Kocaeli	18,000	320,000/40,000	600,000	20.0
1999 Düzce	812	10,100/800	-	1.0

FIGURE 5-10: RECENT EARTHQUAKE LOSSES IN TURKEY

In the 1970 Gediz, the 1976 Lice, the 1983 Erzurum-Kars, the 1992 Erzincan, the 1995 Dinar, and the 1998 Ceyhan-Adana disasters, the emergency response was fairly consistent and predictable. Survivors on the scene were the first to begin search and rescue, with their bare hands, without lifting equipment, listening devices, sniffing dogs, or lights in the darkness. Local press and visual media were quickly on the scene, followed hours later by foreign search and rescue teams, then even later by NGOs (non-governmental organizations) and governmental organizations. The sheer size of the Kocaeli earthquake disaster strongly challenged the existing emergency management system in Turkey. This study will first describe the earthquake disaster and the immediate response, and then will analyze the problems and provide information

on the lessons learned. The post earthquake developments will cover the rehabilitation; new paradigms, institutions and the legislations initiated for the improvement national post earthquake response capabilities.

KOCAELI EARTHQUAKE DISASTER

On August 17, 1999, a magnitude MW 7.4 earthquake struck the Kocaeli and Sakarya provinces in northwestern Turkey, a densely populated region in the industrial heartland of Turkey. I have published a comprehensive report on this earthquake (2001). It is described as one of the twentieth century's most powerful, rivaling the 1906 earthquake that ravaged San Francisco. The cities devastated by the earthquake included Izmit, Sakarya, Istanbul, Bolu, Bursa, and Eskisehir, and they comprised Turkey's most important industrial hub. Effects of the tremor were felt as far east as Ankara, 200 miles away, and across parts of the Balkan Region.

The earthquake nucleated at a depth of about 15km at about 10km east of the town of Gölcük. It is associated with a 120km rupture involving four distinct fault segments on the northernmost strand of the western extension of the 1300 km-long North Anatolian fault system. Predominantly right-lateral strike slip offsets were in the range of 3 to 4 m over a significant length of the fault. The earthquake region has been identified as a seismic gap with stress concentrations indicative of a large impending earthquake.

The August 17 earthquake is considered to be the largest event to have devastated a modern, industrialized area since the 1923 Tokyo earthquake. The earthquake caused considerable damage to residential and commercial buildings, public facilities and infrastructures with substantial casualties in an area of 20km by 200km. The number of condemned buildings after the earthquakes amounted 23,400. About 16,400 of these were heavily damaged and collapsed buildings during the earthquakes, which encompasses around 93,000 housing units and 15,000 small business units. Another 220,000 housing units and 21,000 small business units have experienced lesser degrees of damage. As much as 120,000 families were left in need of homes after the earthquake. The number of totally collapsed buildings (pancake collapse) is estimated to be in the range of 3,000-3,500. The pervasive building collapses in the

two earthquakes caused substantial number of casualties. There were 18,373 accounted deaths and 48,901 hospitalized injuries, of which about 40% will be left permanently disabled. The fatality ratio has reached a maximum of 7% in the center of Gölcük. Altogether up to 600,000 people were left in need of homes after the earthquake. About 95% of these losses were associated with the Kocaeli earthquake. In past urban earthquakes in Turkey almost 50% of all medium-rise reinforced concrete (R/C) frame buildings were damaged beyond repair in Intensity IX+ regions. This ratio is at least 4 times higher than what was observed in 1995 Kobe and 12 times higher than 1994 Northridge earthquakes.

The four districts most severely affected (Kocaeli, Sakarya, Bolu and Yalova) contribute over 7% of the country's GDP and 14% of industrial value added. Per capita income is almost double the national average. Though containing only 4% of the nation's population, the region contributes over 16% of budget revenues. The immediately surrounding districts (of Bursa, Eskisehir, and Istanbul) have been mainly affected indirectly by their close economic linkages with the former area, e.g., industries and small businesses supplying services or material inputs to each other's production processes. They also are subject to a shared seismic risk and so face magnified uncertainty for the future as a fall-out of the recent events.

Taking all seven cities together, the wider earthquake region accounts for 35% of national GDP and almost half of the nation's industrial output. Building losses are reported to amount to about 5 billion United States dollars. Damage to lifelines is estimated to be in the order of US$1 billion. Industrial facilities and small business losses are respectively about US $2 and US $1 billion. If we assume that the indirect socio-economic losses is about as much as the direct physical losses, the total loss figure will be in the vicinity of US $16 billion (about 7% of GDP of Turkey). Most of the industrial (large facilities) losses were covered by the insurance. A sizable portion of the residential losses (about 3 billion USD) was borne by the government.

DISASTER MANAGEMENT SYSTEM AT THE TIME OF THE DISASTER

The disaster management response system in Turkey is centralized and hierarchical. Responsibility moves from district level to provincial level and to national level as the size of the event grows (Guler and Ergunay, 2002). The central organizational structure of the disaster management system on the basis of the Disaster Law (No: 7269, Date: 1959) is provided in figure 5-11.

The "Central Coordinating Committee" is the main body in the central government comprising of undersecretaries of related ministries, president of Turkish Red Crescent Society and a representative from General Staff. Upon the decision of Prime Minister a "Crisis Center" can be formed with the organization shown in figure 5-12. General

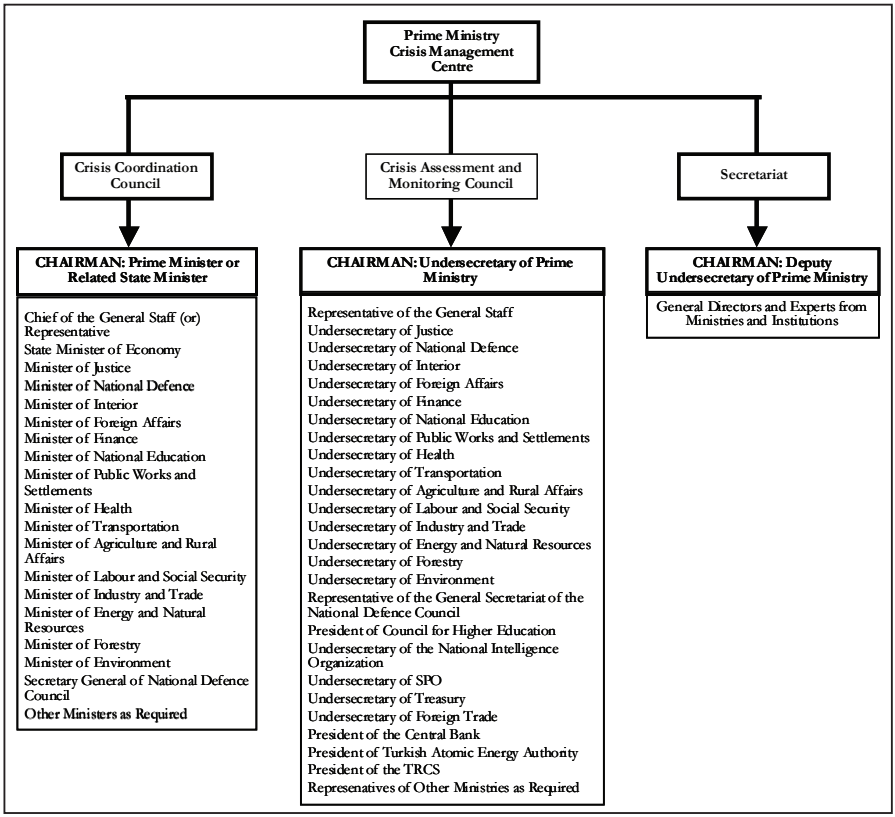

FIGURE 5-11: ORGANIZATIONAL SET UP OF CENTRAL COORDINATION COMMITTEE (AFTER GULER AND ERGUNAY, 2002)

The Cabinet
CENTRAL DISASTER COORDINATING COMMITTEE
CHAIRMAN: Undersecretary of the Ministry of Public Works and Settlement
UNDERSECRETARIES OF THE MINISTRIES OF: - National Defense - Foreign Affairs - Finance - National Education - Health - Transportation - Agriculture and Rural Affairs - Forestry - Environment **and** - President of the Red Crescent Society - Representative of Turkish General Staff (Army)
Secretariat: General Directorate of Disaster Affairs (GDDA)

FIGURE 5-12: ORGANIZATION OF THE CENTRAL CRISIS CENTER (AFTER GULER AND ERGUNAY, 2002)

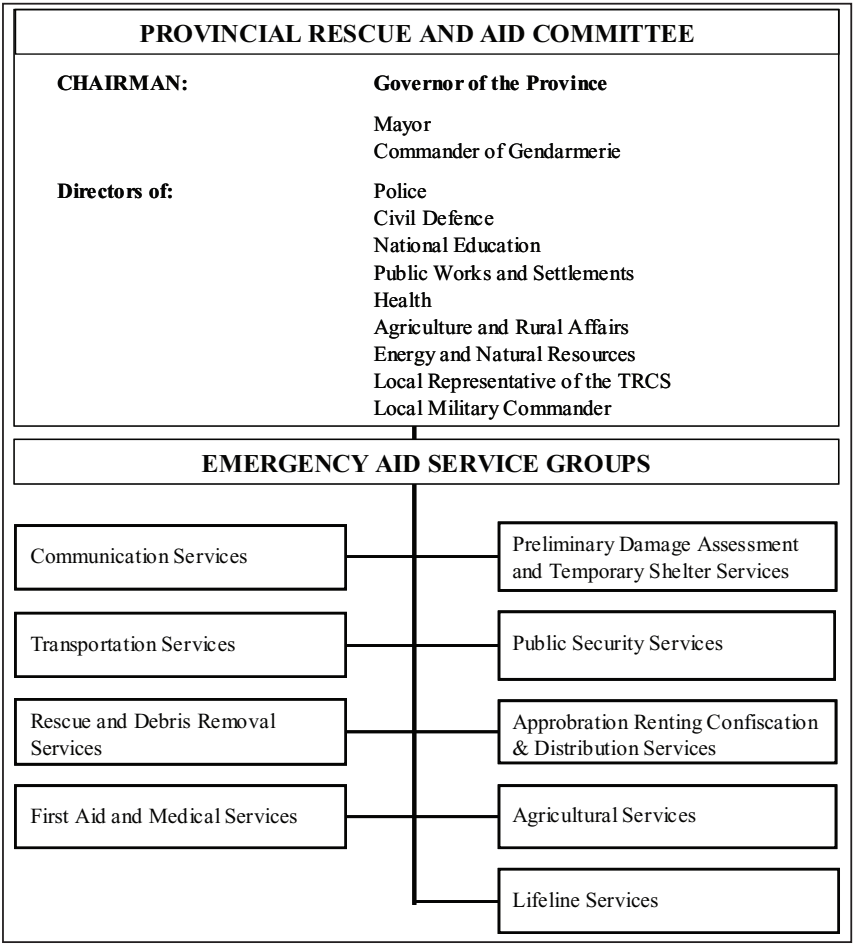

FIGURE 5-13. ORGANIZATION OF THE PROVINCIAL RESCUE AND RELIEF ASSISTANCE COMMITTEE

Directorate of Disaster Affairs under Ministry of Public Works, General Directorate of Civil Defense under Ministry of Interior and Turkish Emergency Management General Directorate under Prime Ministry are the central organizations involved in disaster management and response with somewhat overlapping mandates and activities.

At the provincial level the governor heads the so-called "Provincial Rescue and Relief Assistance Committee", also known as "Crisis Committee" (figure 5-13). They are charged with preparation and implementation of disaster response plans with training and exercise activities. Turkish Red Crescent Society is a semi-governmental structure. Its main activities are disaster response, blood bank operations and first-aid training. Turkish Armed Forces always played an important role in the response and relief phases of disaster management. The military forces develop their own disaster plans staring from central down to small units. Armed forces are also represented in all of the disaster committees.

EMERGENCY RESPONSE

A brief chronological order of the Search and Rescue (SAR) and relief activities after the earthquake follows:

Day One

- Earthquake occurs at 3:02 AM.
- Kandilli Observatory reports a magnitude 6.7 earthquake in Marmara Sea at 3:20 AM.

Central Scene (Ankara)

- Prime Ministry declares a Crisis situation at 4:30 AM.
- Crisis Coordination and Crisis Assessment Councils meet at 6:30 AM.
- No communication possibility with the affected region (damage and blockage of telecommunication systems).
- Crisis Coordination Center sends message to all related ministries and General Staff of the Army have their disaster management plans implemented and to mobilize their SAR teams with limited information on where they would be needed.

- Two SAR teams from General Directorate of Civil Defense in Ankara reach Adapazari at 7:30 and Izmit at 9:00.
- At about 9:00 AM Crisis Coordination Center learns that all the transportation in and out of the affected region is blocked (due to traffic and damage) and most of the SAR teams (including Red Crescent) are waiting on the main freeway.
- Main source of information is TV. Several news teams from Istanbul with helicopters. Live reports of damage.
- At 10:00 army, police and gendarmerie in the vicinity of the affected region have established limited wireless communication. Limited information on casualties and damage is available. Fire at TUPRAS Refinery.
- Government orders all provinces to send SAR teams, relief materials and heavy machinery.
- Government requests for international assistance.
- Turkish Red Crescent appeals for assistance from International Federation of Red Cross and Red Crescent.

Local Scene

- Provincial Rescue and Aid Committees are formed in few hours in lesser-affected provinces.
- In Kocaeli, Sakarya and Yalova these committees were partially formed only after 10 hours after the earthquake.
- Bursa and Istanbul Governorates started sending assistance to Yalova and Kocaeli.
- In the first day there was no effective SAR and relief operation in the affected region. Locals, volunteers and local military personnel organized all the local activities in an ad-hoc manner.

Day Two

Central Government

- Central Crisis Management System became effective for central command and control.
- General Directorate of Civil Defense mobilized all available SAR teams, voluntary groups and coal mine workers. About 90

government SAR personnel, 40 NGO volunteers and 148 coal miners.
- About 10,000 army personnel were activated for SAR.
- Ministry of Health sends 113 ambulances, 116 physicians and 350 paramedics and nurses.
- Turkish Red Crescent sends 3,000 tent, 10,000 blankets, and 5 mobile kitchens.
- Twenty foreign SAR teams with 700 personnel arrive.
- Turkish Petroleum Refineries Corporation (TUPRAS) fire grows out of control.

Local Level

- Provincial Rescue and Aid Committees in Kocaeli, Sakarya and Yalove provinces became more effective.
- Local SAR and relief efforts continued with no effective coordination.

As it can be assessed, the emergency management, SAR, and relief activities were totally inadequate and inefficient in the first two days. Coordination, command and control at all levels were ad hoc or limited. Much of the initial response was by survivors. International search and rescue teams began arriving within 24 hours, and 65 foreign SAR teams saved 621 lives in intensive efforts that continued for four or five days following the earthquake. Overall SAR personnel from General Directorate of Civil Defense rescued 245 victims from collapsed buildings. About 64,000 military personnel from the Turkish Army were engaged in SAR, relief, and security operations in the affected area. Turkish Armed Forces built a casualty center at Izmit Cengiz Topel airport, conducted triage, provided first aid and transported serious injuries to active hospitals via ships and helicopters. Army provided SAR, relief and transfer services for about 40,000 earthquake victims. Foreign SAR teams from about 50 countries participated in the SAR operations with approximately 3,600 personnel.

According to United Nations Development Program (UNDP), a total of 87 countries provided emergency assistance to Turkey by the end of September. This assistance included SAR teams, consisting of 2,463 personnel from 44 countries. Nineteen countries sent mobile hospitals; 26 countries provided 406 medical personnel; 45 countries

sent approximately 30,000 tents; and 23 countries supplied 121,147 blankets. Three ships from the U.S. Sixth Fleet deployed from Spain and provided 2,100 Marines, 60 hospital beds, six operating rooms, and five X-ray rooms to render assistance. The 22 helicopters on the ships provided medical evacuations from the damaged areas. The U.S. military also assisted earthquake victims through its European Command (EUCOM) under "Operation AVID RESPONSE." On August 19, U.S. Naval Forces Europe, stationed in Naples, Italy, dispatched a 24-member surgical response team. One of the most urgent needs was for firefighting equipment to cope with the massive oil refinery fire. Three C-130 Air National Guard planes; equipped to spray fire retardants and suppressants, were sent to Turkey.

The initial response to the Kocaeli earthquake was similar to the prior earthquake disasters. The Prime Minister's National Crises Action Center reportedly was activated on day one, followed by provincial and township crises center activation. Quickly, television and newspaper reporters descended on the scene and were broadcasting to the nation from town after town that suffered casualties and damages. However, mainly due to the sheer size of the disaster, professional search and rescue efforts were slow to respond, and the public viewed this live on TV. For about two days, live cameras showed the enormous strain on the survivors and the lack of response. Survivors received little assistance within the first 48 hours, and some got no help for up to four days. Because major hospitals were damaged, field hospitals were established with international assistance. The affected populace has mobilized a massive public opinion that questioned the responsible institutions in Turkey. Criticisms were directed toward their inability to quickly and adequately respond for search and rescue.

LESSONS LEARNED

Kocaeli earthquake has clearly demonstrated that Turkey is in need of a new emergency management plan that is effective from top down, and bottom up. It needs to be created from scratch and practiced frequently. The highly centralized, hierarchical, top-down characteristic of the disaster management in Turkey discourages local initiatives and limits community participation. Despite the rigid structure of the system, lack of coordination and ad-hoc management were substantial

problems as witnessed in the first days of the 1999 Kocaeli Earthquake. Communication, coordination and cooperation problems between appointed and elected administrators have, in certain cases, hindered effective SAR and relief operations. Lack of rapid loss estimation system, lack of disaster scenarios and disaster operation plans, shortage of equipment and materials and an absence of disaster response training hindered organized and effective search, rescue and relief operations.

These lessons helped initial rectification of the emergency management system. In fact, the October 12, 1999 Duzce earthquake that took place roughly three months later, governmental and military personnel including coal miners and volunteers successfully handled the Search and Rescue operation. The rapid and effective response to the disaster was due to somewhat smaller size of the earthquake and the quality and quantity of the SAR personnel. In the Duzce earthquake, in some cases, the large international teams even inhibited that response by placing an unnecessary logistical burden on the local authorities.

NEW DEVELOPMENTS

Kocaeli and Duzce earthquakes affected a very large area in the nations industrial heartland, causing extensive building damage, casualties and displaced people. Most of the victims were urban, upper middle class. Damage to industry and small business were widespread. With about half a million displaced people and total losses reaching 20 billion USD rehabilitation was not an easy and speedy process. There was a general outpouring of criticism by the public to the existing disaster management system.

About 120,000 families in need of emergency housing after the earthquake were sheltered, in about equal proportions: in tent cities; in individual tents and public buildings and; friends/relatives and rented houses. Within several days to few weeks, a total of 165,000 tents were distributed to affected people/families. A total of 162 tent cities encompassing about 28,000 tents were built. Although initially planned to be temporary, as of August 2000 about 30,000 people were still living in 33 tent cities. Several months after the earthquake about 40,000 prefabricated housing units were erected. Almost all of them are currently being used. In addition, about 130,000 families received 300

million USD rent assistance, and about 92,000 homeowners received 100 million USD "Light Damage" repair assistance.

An important dimension of the rehabilitation and recovery efforts of Turkey is the Marmara Earthquake Emergency Reconstruction project (MEER). The MEER project is part of the comprehensive Framework Program that has been prepared by the World Bank in cooperation with UNDP, the European Union, other co-financiers and other donors at a total cost of US$737.11 million. In summary the project aimed: Creation Of Emergency Management Agencies at National and Municipal Levels; Creation of Disaster Insurance Scheme; Modifications in the Current Disaster Law, Municipalities Law and Public Tender Law; Strengthening of the Municipal Capability for Disaster Resistant Development; Developing Risk-Based Municipal Master Plans; Establishment of a Land Information System; Trauma Program for Adults; Construction of Permanent Housing; Business Rehabilitation; Repair of Existing Housing Stock and Healthcare Facilities; Rebuilding and Repair of Infrastructure And Lifelines.

Following important developments have taken place in connection with the post-earthquake rehabilitation and disaster management.

Post Earthquake Housing

For repair/strengthening of medium damaged housing units the government has extended about USD 5,000 low interest credit to about 50,000 homeowners with long payment terms. Extensive applications of repair and strengthening are being undertaken with varying quality and control. About 38,000 have been constructed and delivered to eligible homeowners. These were provided to qualified families with very easy pay back conditions. Financing came from the following sources: the World Bank (30%), the European Development Bank (30%) and Government (30%) credits. The remaining 10% was financed through private donations. The distribution of permanent housing with respect to the affected provinces are as follows: Duzce – 8400; Bolu – 1458; Sakarya – 6404; Kocaeli – 15,300; Yalova – 5,408 and; Istanbul – 1,209.

Rehabilitation of Lifelines

About 600 million USD has been spent for the rehabilitation of urban infrastructure. Regarding the highway system, about 85 bridges in the earthquake-affected region were repaired.

Legislation for Building Design and Construction Supervision

Legislation was enacted on April 10, 2000 to enforce mandatory design checking and construction inspection of all buildings (initially in 27 provinces) by government-licensed private "supervision firms". Supervision firms must be owned by a majority of engineers or architects and are required to hire "expert" professionals and have professional liability insurance. For new buildings this supervison will ensure compliance with earthquake resistant design code and nominal construction quality standarts. The government has recently waived the requirement for insurance due to problems in getting liability insurance with uncertain coverage of earthquake damage.

Revision Of Law On Engineering And Architecture

On June 28, 2000, a professional qualification "expert" system under certification by chambers of engineers and architects was established. To start the system all engineers and architects with 12-year professional experience are awarded with the "expert" title. Current activities are underway to provide professional training to those already awarded with the "expert" title.

Standardized Development Regulations for Municipalities

This decree is intended to develop uniform land-use regulations in municipalities. Substantial geological and geotechnical investigations are specified to establish land use decisions.

Compulsory Earthquake Insurance

Through a World Bank project a government-sponsored Turkish Catastrophic Insurance Pool (TCIP) is created with the essential aim of transferring the government's financial burden of replacing earthquake-damaged housing to international reinsurance and capital markets.

New Government Institutions

Turkey Emergency Management General Directorate (TEMAD) was formed directly under the prime ministries office. Emergency Management Agency of Turkey was established, within the body of Prime Ministry on Nov. 22, 1999. It is empowered nationwide to take necessary measures in order to provide an effective emergency management for earthquake and other natural disasters, technological accidents and population movements that are in such a scale that threatens national security and to provide coordination between related agencies. Formal civil defense units for SAR operations have been formed in all provinces and several sub-provinces.

Community Training

Several universities, NGOs, Turkish Red Crescent-American Red Cross, FEMA and other concerned agencies are working with local offices of emergency management, neighborhood groups and business partners to increase community preparedness levels through training and education.

Earthquake Rapid Response and Early Warning System for Istanbul

For post-earthquake rapid response information (similar to the Tri-net of Southern California - Shake Maps) in Istanbul, Bogazici University has installed one hundred (100) 18 bit resolution "dial-up" strong motion accelerometers in populated areas of the city, within an area of approximately 50x30km, to constitute a network that will enable early damage assessment and rapid response information after a damaging earthquake. Early response information is achieved through very fast acquisition, analysis and elaboration of data obtained from the network. In normal times these stations will be interrogated on regular basis by the main data center located at the Kandilli Observatory and Earthquake Research Institute of Bogazici University (KOERI-BU). For the Early Warning system ten (10) (24 bit resolution) strong motion stations were located as close as possible to the fault area in "on-line" mode. The continuous on-line data from these stations will be used to provide near-real time warning for emerging potentially disastrous earthquakes.

SAR Unit of the Turkish Armed Forces

After the August 17, 1999, earthquake, Turkish Armed Forces decided to improve its capabilities on specialized search and rescue missions in order to better cope with large scale natural disasters. A battalion size search and rescue unit subordinate to Special Forces command is designed to conduct search and rescue operations in cases of natural and biological disasters. The unit is composed of professional soldiers well equipped and trained to carry out missions in Turkey and abroad. It can be deployed anywhere in Turkey within three hours and can conduct specialized search and rescue activities at eighteen different sites simultaneously up to 15 days without supply. NATO has recently established a "European-Atlantic Disaster Response Center attached to the Civil Emergency Planning Committee (SCEPC)." It is expected that this new mechanism will promote closer cooperation between civil and military sectors.

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Medical Responses

Dr. Abdul Wahab Al-Mosleh
Assistant Medical Director,
Hamad Medical Corporation

Thank you very much. It is my pleasure to be with you today and share with you some of the medical viewpoints, in response to emergencies. I welcome all the guests here in Qatar, the guests from GCC and international community. Before I start, the talk by Professor Mustafa Erdik is of great interest because it shows the actual response to an event. We talk theoretically, but they have faced the situation, and a lot of lessons I am sure can be learned from their experience and invite Professor Erdik to write some of their experiences for our *Middle East Journal for Emergency Medicine*, which is published here in Qatar and has a wide distribution in the Middle East.

I read this morning an abstract of a paper published recently about physicians. They are very serious and the article states, "that in monitored consultation rooms they found out that 74% of the patients laugh or smile to the doctors, but only 10% of the doctors smile back." I wonder what the results would be if the study was conducted on military personnel.

In order to discuss medical response, we have to discuss some of the principles of disaster management. Medical response and other emergency services are part of disaster management. In fact the general principles are the same and could be applied in all cases with some variations. These are the principles we seek to accomplish throughout Qatari society in general, and especially in the institutions and ministries particularly concerned with disaster management. This is conducted through a number of programs such as the International Hamad Center, which is a part of Hamad Medical Establishment.

The process is known by different titles. Military personnel call it consequence management and the World Health Organization and civilian organizations call it disaster management. Disaster management is more comprehensive title, because it includes more than just dealing

with the consequences. By that I mean planning, readiness, protective measures, response and healing from disasters.

There are several definitions for disasters, or crisis, adopted by the different sectors. Civil Defense personnel have a different definition from the one adopted by the health sector and both definitions are different from, the one used by the military. At the end of the day they all talk about more or less the same content. The health sector defines a disaster as, "when the health of the members of society is in danger or when the medical services are not functioning properly or when a large number of people are injured." This is not a good definition because it is possible to have a large number of injuries and if the injuries are dealt with in a proper manner and distributed to several hospitals there is no loss in functionality. This is true when we talk about countries that have numerous well-equipped hospitals. However, for a country like Qatar, where there is only one hospital, then it becomes a big problem for the medical services. So it is a relative matter.

Disasters could be categorized in several ways. We use the expression of "contained" and "uncontained" disasters. A "contained" disaster is where the services are capable of dealing with the problem; "uncontained" disasters occur where the resources are not enough to deal with the consequences even if we call upon all the human and financial resources. Another kind of categorization is the "simple" vs. the "compound" disaster. If the infrastructure is affected then it is a compound crisis. Otherwise it is a simple crisis. There are natural, such as earthquakes and floods, and man-made disasters. Man-made disasters include acts of terrorism.

There are some common characteristics for all disasters. This is very important to understand in disaster management, because it allows those in charge, to build a common strategy to deal with the various characteristics, which are common to many types of disasters. For example, disasters involve a surprise element, they are violent, casualties and damage become worse if not dealt with, and are difficult to bear for an extended period of time. All disasters cause confusion, fear, and a sense of helplessness. Decision makers are always under pressure and need innovative and fast methods to deal with these crises. Some crises are distinguished from others by different consequences, such as the use

of weapons of mass destruction and these require different measures to deal with the consequences.

The crisis could effect individuals, an institution, an organization, and/or alternatively, affect the whole country. For individuals, the likely effect could be death or injury, including the spread of diseases. For institutions and states, disasters could affect their legitimacy, or cause a lack of confidence in the organization or establishment, or it could destroy the mission of the institution. There are many historical examples, where entire institutions or organizations, perhaps even states, were destroyed. Disasters have a well-known life cycle. The disaster grows very fast until it reaches a peak and then starts diminishing over time. This point is very important, because of the necessity to act fast in order to speed up the life cycle from the peak to the decrease in effect. The disaster itself could last for hours, days, weeks, or months, but the consequences could be prolonged and last for a longer period without adequate intervention.

There are common objectives for individuals and authorities involved in crisis management. The most important one is to prevent disasters through proper planning and protective measures and alternatively, minimizing the effects of the disaster if it happens. Another objective is to protect society and the environment and to save lives and property. The latter is an important objective for the military, doctors, police, and civil defense forces. Rebuilding and re-establishing basic services, repair the infrastructure in the disaster area, manage and protect financial, medical and human resources, are important common objectives.

Crisis and disaster management have some common and important terminology, such as comprehensive management, defined as, "dealing with all the 12 steps to manage crises and disasters." All steps should be dealt with adequately aiming at sustainable development. The responsible authorities need to analyze the dangers in any society, industry, or company to ensure all the aspects of dangers are addressed without focusing only on one aspect and forgetting the rest. Naturally, the dangers should be prioritized. To cover all the sectors means that all the governmental agencies and departments should be represented as well as non-governmental organizations when managing the crisis. This is done through the participation of the different ministries in the committees and the crisis management command structure in any

country. Disaster management is the responsibility of everybody, the importance to analyze all the dangers, and to keep these in mind during the planning process for sustainable development. Concerned authorities should focus on the actual steps that cover all the aspects and not only the written plans, which is often the case in the Third World.

The process for developing a disaster management plan begins with passing laws and policies approved by the government, state, and individual organizations. Higher-level management of an organization should have defined policies and a written agenda to begin the planning process. The leader should define the mission and form a working group that includes the various organizations who are responsible for disaster management. The working team develops a detailed explanation of each organizations responsibility and resources to provide and an analysis of available capabilities. The plan is approved and put in place for response in the event of a disaster. Following the incident, efforts are focused on restoring normal conditions in the affected area, as well as, continuous monitoring and evaluation. The latter is extremely important in the development of disaster management plans. Conditions will continue to change; therefore it is important to continue the monitoring and analysis, and to change the plans accordingly where necessary. Teaching and training are very important, and that is what we hope will take place here in Qatar. Our objective is to create awareness among a large number of people about disaster management at all levels.

Obviously there is an interaction between the community, the environment, and risk. Each influences the others. Any change in the community could influence the environment, while changes in the environment could cause risks that consequently could influence the environment and society.

We can easily say that the steps for risk management, a clear evaluation of the potential impact of these risks, and the best methods for crisis management are all basic matters for planning the strategy to deal with disasters in any country or organization. In Qatar we have the Permanent Committee for Emergencies, established by a cabinet decree. The Armed Forces has established the Joint Operations Center. The Ministry of Interior governs the Permanent National Emergency Committee. The Joint Operations Center is a newly established center and the first meeting

was conducted on 16 September 2002 under the supervision of the Armed Forces. We look forward for a total coordination effort between the Emergency Committee and the Joint Operations Center. The Ministry may even merge the Committee with the Joint Operations Center, to avoid confusion about the respective areas of supervision for each group and to use resources more wisely in the future. The Joint Operations Center is a good start and hopefully the merger will take place in the future. Of course this team would constitute the highest command for disaster management in the country. It is therefore important that this team should include representatives from the various relevant ministries and organizations, technicians, and experts. Representatives who work on this team should be of high caliber and authorized to make decisions. In the case of a disaster, it is very difficult and time consuming to go back to people in authority and wait for their decision. Waiting for a decision causes unnecessary delay and, as stated in Professor Erdik's presentation, saving the lives of individuals depends a great deal on rapid response. If the chances for saving lives during the first half hour are 90%, quickly falls to 50% after one hour, and to 30% within twenty-four hours.

Some of the key characteristics of the working team are: capable to communicate horizontally and vertically among the officials of this authority, as well as between them and their own higher authorities; able to make decisions; participate in setting the plans; they should possess loyalty; a willingness to sacrifice; and the ability for teamwork. Personal skills are very important, as well as mental and practical skills.

The steps in disaster management are very important because, as we mentioned earlier, speed plays an important role in minimizing the consequences. There are five stages. The first stage is the initial evaluation and assessment. This stage starts at the beginning of a disaster and continues throughout the full life cycle of the disaster. The second stage is the immediate assistance, followed by sustained assistance, followed by withdrawal and rehabilitation or going back to the normal situation as it was before the disaster, then comes redeployment which might continue in some cases for years. The various organizations that provide emergency services to deal with disaster management include; police forces, civil defense, medical services, Ministry of Defense, and the auxiliary services. Coordination of services among these bodies is very important to achieve effective management.

I am not going to focus in great detail on medical services, as most of the audience today is not concerned with medical services. Medical services are divided into medical services at the hospital and at the site of the incident. There are general principles, which apply to medical services as well as others. These include setting priorities for the on-site response, whether by the police force, the civil defense personnel, the medical services, or the Ministry of Defense. The priorities are safety, management and control, assessment, communications, search and rescue, triage, treatment, and transportation of the injured.

We will talk about some of these priorities. When we say safety, we mean emergency personnel should ensure their own safety before rescuing others. We do not need to add to the burden of the emergency services by acting in haste to help people in a manner that will expose the rescuer to danger. This will only make the task of rescue operations more difficult and complicated and then comes the safety of the casualties and overall site safety.

Command and control refers to the various emergency services. Each service, for example medical services, must have its own vertical command structure. Control is the general control of the entire emergency services. For instance, at the site there are police, civil defense and medical services that should all be controlled by one responsible organization. The organization in charge could change from one disaster to another. When the disaster is concerned with diseases and epidemics, the Medical Service should provide control. For instance, the Army should control the operation if the incident is related to weapons of mass destruction. The control is changeable in accordance with the crisis or the nature of disaster.

Communications is very important in order to coordinate the activities at the site, such as the police, civil defense, military personnel and medical staff. Communication between the people in charge should run horizontally and vertically between them and their superiors at the ministries and the country's higher authorities.

The site of the disaster is divided into three areas: the Bronze area or the actual place of the incident that is isolated (fenced). This is called the inner cordon. Then comes the Silver area where all the action takes place,

the location where the practical steps are carried out by the different emergency services. Then comes the Gold area, the strategic area, which could be in the high command or the highest authority in the affected state. The most important area for the medical and other emergency services is the Silver area, which of course is adjacent to the incident site. This is where all the casualties are gathered, classified, and then transported to a loading zone where emergency transport vehicles are assembled. This is where vehicles are allowed to enter and exit the site. There are strict rules that govern operations in the area and entry to it. There are equally important rules that restrict entry into the inner cordon, in order to prevent additional injuries within the emergency services. On-site emergency services, including medical services, must carry out the initial assessment of the situation, classification of the injured, treatment and transport. These are very important basic matters. Any person present at the place of the incident, including the first arrivals of the emergency services, whether the police, civil defense or military forces, should gather this information in order to convey them to the communications center, so that the additional necessary resources would be made available. It is important to identify the location, the kind of disaster, whether there is continued danger, the impact on the infrastructure and environment, what type of transport is available, the roads leading to the location of the incident, and then the need for extra resources. The most important factor is basic life support: water, food and shelter.

The medical services working team should start the classification (triage) of casualties, then their transport to suitable locations. The objective of triage is to move the casualties to the right place, at the right time, and to make the best use of the resources available. You might find somebody who is badly injured and cannot be saved even if he is transferred to the medical services. This kind of casualty is called injury of the fourth category. Even though the injured is still alive, the injury is of such an extent that you know there is no chance of saving his life. This evaluation depends on the resources available, and might involve feelings of guilt. However, this type of injury will use up a lot of the resources that could be used to save a large number of people. It is a changeable and repetitive operation, and uses color codes. The first category (immediate) is red, second category (urgent) is yellow, third category (where assistance may be delayed somewhat) is green, fourth category (blue), which I mentioned above, where the injured is not expected to survive, and the

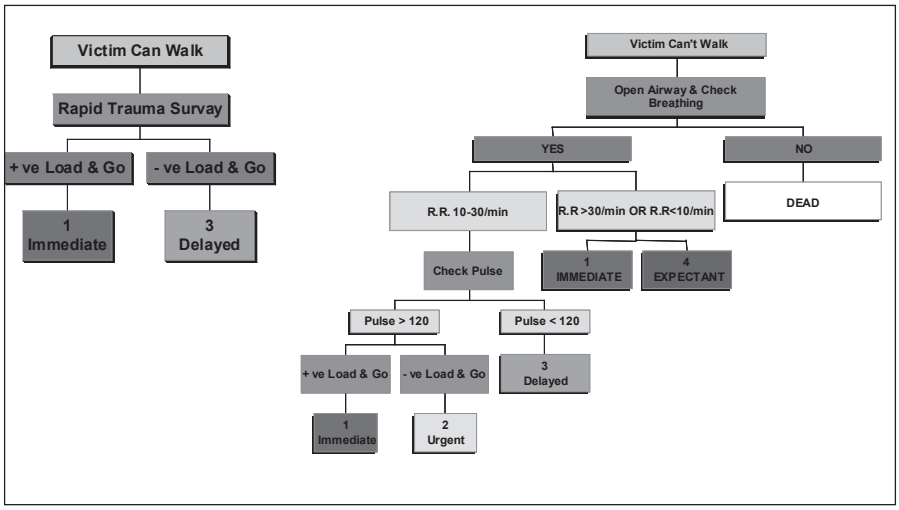

FIGURE 5-14: TRIAGE PROCEDURE

fifth (white), is for the deceased. This is the proper color-coding system used for the categorization of casualties.

This is the procedure for triage (figure 5- 14). It is not complicated, if it is carefully studied. Even the non-specialized person can carry out this process at the site of the incident. We are teaching this process to civil defense personnel, the police force and the public during our training courses.

There are responsibilities for the medical team that arrive at the site of the incident, for the paramedics, and plans for the medical team at the hospital. Making treatment available to save lives is very important to avoid additional casualties. The task also involves declaring cases of death and I will discuss this later.

Emergency services are extremely important when a disaster takes place, and we call upon additional emergency channels. The first ambulance that arrives at the scene is considered to be the control unit regarding the emergency. The attendant is designated as the acting Ambulance Incident Officer (AIO) until a higher command and control element arrives. The AIO establishes the safety zones (1, 2, 3) and communicates the initial scene assessment to ambulance or hospital command structure depending on the normal operating procedures. The AIO uses the key word, ETHANE to prepare the scene assessment.

ETHANE stands for, "Exact location of the disaster, Type of incident, Hazards, Access to the site, Number of victims, and Emergency services needed to respond. The first thing that should be done is to declare the site a major incident because a delay in declaration could lead to increased casualties or deaths. The driver remains with the ambulance.

Based on the scene assessment, additional ambulances and paramedics are sent to provide treatment to the casualties. The paramedics conduct dynamic triage and provide life-saving first aid, advanced life support treatment, and sets-up a casualty clearing station. The ambulances transport the casualties to local hospitals for advanced medical treatment. The hospitals activate their hospital disaster plan and if needed, mobilize mobile medical teams to the incident site.

The medical personnel are responsible for the declaration of death at the scene and isolating the dead and expectant casualties from the remainder. The dead are transported separately from the ambulatory and non-ambulatory casualties to the local mortuary.

Depending on the size of the incident, psychological effects, such as, Post Traumatic Stress Disorder may affect the victims, relatives, emergency service personnel, and the public. In these cases, advanced psychological assistance is needed to relieve the stress and affects as a result of the incident.

The Hamad International Medical Training Center conducts different levels of training for medical to civil defense personnel, police, and the public. The Center conducts lectures, symposia, workshops, self-learning modules, courses, conferences, and drills and exercises based on the training and learning objectives established by host organization.