Operation Protective Edge – A Unique Challenge for a Civilian EMS Agency

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Abbreviations:
ALS: Advanced Life Support
BLS: Basic life support
EMS: Emergency Medical Service
GPS: Global Positioning System
IDF: Israeli Defense Forces
MDA: Magen David Adom
MICU: mobile intensive-care units

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Abstract: During July through August 2014, Operation Protective Edge, a military conflict between Israel and the Hamas regime in Gaza, dramatically affected both populations. Magen David Adom (MDA), the Israeli national Emergency Medical Service (EMS) and a member of the Red Cross, faced a unique challenge during the conflict: to continue providing crucial service to the entire civilian population of Israel, which was under constant missile threat. This challenge included not only providing immediate care for routine EMS calls under missile threat, but also preparing and delivering immediate care to civilians injured in attacks on major cities, as well as small communities, in Israel. This task is a challenge for a civilian EMS agency that normally operates in a non-military environment, yet, in an instant, must enhance its capability to respond to a considerable threat to its population.During Operation Protective Edge, MDA provided care for 842 wounded civilians and utilized a significant amount of its resources. Providing EMS services for a civilian population in a mixed civilian/military scenario is a challenging task on a national level for an EMS system, especially when the threat lasts for weeks.This report describes MDA's preparedness and operations during Operation Protective Edge, and the unique EMS challenges and dilemmas the agency faced.

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Introduction

In the past 10 years, Magen David Adom (MDA), the Israeli national Emergency Medical Service (EMS) and a member of the Red Cross (Washington, DC USA), faced four major military operations that dramatically affected the civilian population of Israel (Table 1). The last conflict, Operation Protective Edge, lasted for 50 days and affected the majority of the Israeli population. The number of calls received in EMS dispatch centers regarding missile attacks was significant and spread almost all over Israel (Table 2 and Table 3).

Magen David Adom is Israel's national EMS agency serving the entire population of Israel (approximately 8,250,000 people). Magen David Adom also serves as Israel's national blood bank and Red Cross agency. It operates a two-tier EMS service that includes mobile intensive-care units (MICUs) and Basic Life Support (BLS) ambulances. The agency employs a staff of 1,800 full-time employees and has 14,000 volunteers, half of whom are 15 to 18-year-old first-aid volunteers, and the rest who are adults with BLS or Advanced Life Support (ALS) training.

Magen David Adom has 850 ambulances and rescue vehicles in 142 stations across Israel. They also operate two helicopters, one in the south and the other in the north of the country, for transporting critical patients. In normal daily operations, the agency staffs approximately 40% of its ambulance fleet, including 78 MICUs staffed by paramedics. The remainder of the fleet is held in reserve, but can be fully functional at a moment's notice.

Magen David Adom has a modern, first response, volunteer-based system that deploys 3,250 medics and paramedics equipped with first-aid equipment, Global Positioning System (GPS)-enabled radios, and Smartphone applications. This allows the dispatch to alert first responders automatically to any incident proximate to their location.

The dispatch system of MDA is divided into 11 distinct dispatch centers spread throughout Israel. All of the dispatchers are either medics or paramedics with some field experience. In addition, MDA has a central national dispatch center that can back-up dispatch centers elsewhere in real-time so that no call is left unanswered. The central dispatch center also allows the chief managers of EMS to have a central command and control station in the

Conflict	No. of Days	No. of Rockets Fired at Israel	Injured Treated by MDA	Average Injuries Per Day
Second Lebanon War July 7, 2006-August 14, 2006	33	3,968	3,183	96
Operation Cast Lead December 27, 2008-January 18, 2009	22	401	770	35
Operation Pillar of Defense November 14, 2012-November 21, 2012	8	1,667	400	50
Operation Protective Edge July 8, 2014-August 26, 2014	50	4,530	842	17

Table 1. List of Major Conflicts Involving the Civilian Population in Israel in the Last 10 Years – Number of Casualties Treated by MDA
Abbreviation: MDA, Magen David Adom.

Dispatch	Number of Calls
Local (any of 11 centers)	2,164
National	308
Total	2,472

Table 2. Number of Calls Received by EMS Reporting Missile Falls during Operation Protective Edge
Abbreviation: EMS, Emergency Medical Services.

event of a large-scale incident that involves more than one area in Israel. This philosophy of central command and back-up also translates in to a national mobile command center, duplicating all the necessary equipment in the central dispatch to a mobile truck with the ability to communicate via satellite phone, 2-way radio, cellular communications, pagers, and video between all dispatch centers.

All communications between ambulances and dispatch are made through specialized software and include GPS navigation, patient records, and automatic transmission of all monitored data to the medical dispatch, along with patient records from MICUs.

The national blood bank that MDA operates is located in central Israel, and 300 employees in special ambulances collect blood from all over the country daily. Each year, 300,000 blood units are donated and processed through the MDA blood bank (there is no option to sell blood in Israel – all blood is donated).

Dispatch Region	Number of Ambulances Dispatched to Missile Attack Sites
Ayalon Region	283
Asher Region	16
Gilboa Region	1
Dan Region	164
Yarden Region	14
Jerusalem Region	43
Yarkon Region	150
Carmel Region	5
Negev Region	739
Lachish Region	1,040
Sharon Region	17
Total	2,472

Table 3. Number of Calls Received by EMS during Operation Protective Edge According to Geographical and Dispatch Region
(The areas near the Gaza Strip (Negev and Lachish) had the most calls reporting missiles.)
Abbreviation: EMS, Emergency Medical Services.

Report

Preparedness

Since the First Gulf War in 1991, when Israel was attacked by Scud missiles from Iraq, each military conflict in the area has involved missile threats to civilians. The overall experience MDA has gained over the years is incorporated into its daily and emergency operating procedures in order to provide an adequate response to population needs. These operating procedures include the addition of manpower, personal protection equipment, preparedness, and command and control, in coordination with the Israeli Defense Forces (IDF; Tel Aviv, Israel), which serves as overall commander of the Home Front Command and the medical corps, in conjunction with MDA, police, and fire departments from around the country.

During peacetime, MDA participates in drills together with the IDF as part of its role in the Red Cross and in the national response to disasters. The agency has several levels of preparedness that are pre-defined and activated according to risk assessment. Each level of preparedness adds approximately 20% more staffed ambulances, with 100% staffing of all available ambulances at the highest preparedness level. Usually, preparedness is changed on a regional basis according to the Home Front Command's instructions. However, during Operation Protective Edge, the 80 kilometers of Israel closest to the Gaza Strip were on high alert. This range, which covers more than 70% of the Israeli population, presented a challenge for MDA, as it could not mobilize manpower and equipment because the demand was almost everywhere.

In addition, MDA added new, temporary ambulance stations, especially around the seven kilometer perimeter and in remote

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cities such as Eilat. Within this range, communities that were seven kilometers or less from Gaza were under constant attack. Because of their proximity to the border, these settlements were hit by continual mortar fire and had a very short time to respond to any alarm (usually five seconds or less) before a mortar hit. Most of the seriously injured and dead from this operation were hit by mortar fire and not by more advanced, longer-range missiles for which the "Iron Dome" missile defense system was designed.

A critical concept that MDA developed over the years is a gradual response system that calls for automatic back-up from different areas when a major incident takes place. Since MDA has a national command and control center, and since all information technology and communications equipment is operated centrally, the moment a major incident happens, it is possible to deploy ambulances automatically from different areas in Israel to arrive on scene after the local teams arrive. The moment other teams arrive in a certain area, the local dispatch can use those additional teams just as it uses any local team.

During Operation Protective Edge, the Home Front Command continuously broadcasted instructions on all media channels (television, radio, and Internet) for the general population on how to prepare and behave when a siren was heard. This ongoing campaign was crucial since the population was anxious, and some very simple and basic instructions helped save lives (eg, how to seek adequate shelter and what to do while driving when an alarm was sounded).

Reinforcements

Experience shows that most conflicts and disasters begin without any significant prior notice. As mentioned, MDA is prepared to change its operating procedures from "normal" to "urgent" at a moment's notice, first utilizing existing manpower and equipment in the first hour, and then mobilizing additional forces in the first six to 12 hours of emergency, from all across Israel.

Reinforcements include using both available and reserve manpower and the National Guard on short notice, and also deploying additional ambulances and communications, as well as buffering information technology infrastructure to handle additional tasks.

Initially, the available manpower in case of emergency is the employees and volunteers of MDA. These teams work from one of the 142 stations in Israel. They are trained on a regular basis to prepare for conflict and disaster through a systematic training regime that continues year round. This training includes annual instructions and drills on earthquakes, chemical and nuclear war, disasters, and multi-casualty events.

Former employees and volunteers who agree to continue to serve as medical personnel in case of emergency, as part of the civil service, are another source of available manpower. Each year, MDA also trains hundreds of overseas volunteers in a basic first-aid course and provides 45 days of hands-on experience in the field. At any point in time, it has 3,000 overseas volunteers who can come to Israel in an emergency situation. Experience has shown that when conflicts occur, many citizens come to MDA stations willing to help in a variety of fields, such as medicine and logistics, and offer moral support to the medical personnel. For medical workers who lack recent experience, MDA created a short refresher course that is part hands-on and part web-based that was utilized for the first time in Operation Protective Edge.

All the employees and adult volunteers of the agency have personal communications equipment with them at all times; thus, in almost any given geographical spot in Israel, there was a volunteer or employee nearby in case of a rocket attack. This unique aspect of the EMS system is critical when there is an emergency and a reliable report is needed as soon as possible. Last year, MDA developed a Smartphone application that any volunteer or employee can install, and thus, get alerts on any nearby medical emergency or disaster on his or her personal phone. This application also enables the addition of new patient data to existing patient data that MDA already has on a specific patient.

To avoid the total loss of all available resources in the case of a missile hitting an EMS station, when a decision was made to raise the level of alertness, all available ambulances that were not being used in regular operations were spread throughout the cities at employees' and volunteers' homes, thus minimizing the potential loss of an ambulance fleet and reducing response times.

In order to utilize added manpower and ambulances, dedicated software has been developed that allows medics and paramedics to register themselves at any MDA station in Israel, according to its needs. During Operation Protective Edge, 50,000 shifts were added by volunteers, some of whom mainly came from southern Israel where most of the additional manpower was needed.

Adding additional manpower requires not only ambulances and communications, but also daily logistical support. Some small rural stations that typically have two or three employees on each shift suddenly had double or triple the usual manpower, thus requiring additional medical equipment, uniforms, beds, food, sanitary equipment, and logistics coordination. Stations in large cities had dozens of additional staff 24 hours a day/seven days a week. All MDA stations have bomb shelters that were utilized as large sleeping dorms since people needed to reach shelter within five to 60 seconds in the southern part of the country.

Protection

In the First Gulf War (1991), when a missile was fired, a siren was heard all over Israel. This forced all citizens to find shelter regardless of their location. Since then, advancement in technology now allows the Home Front Command to pinpoint the exact trajectory of a missile landing in a limited geographical area. This short, but crucial, early warning is broadcast by sirens in the locality where the missile is projected to hit by all television and radio channels, by some websites, and by the cell broadcast system in cellular networks.

As in all EMS agencies worldwide, MDA operates according to the concept of "safety first." A military conflict affecting a civilian population challenges this concept since the service has to respond in areas that are under direct and constant threat, and sometimes even during an attack.

In order to be able to continue to provide its crucial service under such conditions, MDA purchased thousands of helmets and protective vests, and even some bullet-proof ambulances. All dispatch centers have a back-up dispatch center in its bomb shelter ready to operate on demand. These dispatch centers were utilized in Operation Protective Edge since most of the country was under missile threat, and the continuous uninterrupted operations of the dispatch centers was essential.

During every missile attack, an immediate message is sent to all employees to protect themselves immediately and to find shelter. In many cases, medics and paramedics had critical patients in their care when a siren was activated, giving rise to many dilemmas for the teams. In a few specific scenarios, MDA paramedics and medics treated wounded civilians under constant mortar fire, including initiating ALS procedures.

Coordination with Other Emergency Agencies

In Israel, the civilian EMS is separated from the fire and police departments. Each agency has a dedicated number and a different

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dispatch. This poses some unique challenges in coordinating between the IDF, Home Front Command, and the Ministry of Health (Jerusalem, Israel) during an emergency.

Every year, a large number of nationwide exercises involving the different agencies are conducted; thus, over the years, much experience has been gained through exercises of military operations involving the civilian population. In a conflict or emergency, representatives of all emergency agencies meet in an operational center of the Home Front Command to coordinate and communicate between themselves in real-time. A statewide joint communications channel is also available to EMS, the Home Front Command, police, fire, hospitals, and other agencies as a back-up to telephone communications.

In Operation Protective Edge, after an alarm was sounded and a missile was identified as hitting an inhabited area, the local dispatch awaited calls from civilians. This information was coordinated with the Home Front Command and all other agencies. The average response time to an incident involving a rocket or missile attack was 10 minutes and 50 seconds. The teams arriving at the scene scanned the area where the missile had fallen, together with the police and fire departments, to find casualties. This process was carried out in the shortest time possible because most missile attacks were followed by additional attacks, and the teams were most vulnerable outside the stations in the streets.

In the settlements around the Gaza Strip, the IDF's medical corps operated together with MDA since many IDF soldiers were posted in that area. In a few cases, MDA treated wounded soldiers and IDF physicians and paramedics also treated civilians, combining their resources.

Casualties

Overall, over the course of 50 days, MDA treated 842 casualties (averaging 17 casualties a day) from 4,530 rockets and mortars fired at Israel. This relatively small number of casualties compared to the scope of the threat can be attributed to early warning systems and missile defense, ongoing distribution of civil defense instructions to the public, and the availability of shelters to the majority of the population. The toll on EMS dispatch was significant and included 2,472 calls reporting missile attacks on civilians.

In four specific incidents, the teams arrived even before a call was made to the EMS dispatch center. In one incident, a missile fell outside an EMS station, and immediately the teams went to look for casualties. A teenage boy was found unconscious and not breathing with serious shrapnel injuries to his chest. Due to the quick response from the team, including advanced airway, the boy was later released from the hospital without any permanent damage.

In a second incident, a missile fell near an ambulance, hitting the driver of a car who did not have a chance to escape his vehicle. The driver was found unconscious with a traumatic brain injury and was transported to the nearest hospital. In a third incident, seven civilians living in a community near the Gaza border were hit by a mortar. On scene was one fatality (a volunteer Emergency Medical Technician) and two critically injured civilians with amputations and major blood loss. Also on scene was another volunteer who helped to treat and to triage the patients. During the treatment, three additional missiles fell in the same location near the medical teams. The critically injured civilians were transported by military helicopter to the hospital.

During this relatively long conflict, because a major part of Israel's population was under constant threat, many individuals suffered from stress and anxiety. Therefore, on many occasions when a siren was heard, a significant number of civilians with anxiety symptoms required medical attention. As a result, special centers staffed with mental health professionals were opened in all the major cities in the 40 kilometer range next to Gaza; these centers were to treat these patients in order not to overcrowd the emergency rooms. Identifying on-scene patients with anxiety symptoms, who were without physical injury, was a unique challenge considering the number of civilians who presented with anxiety symptoms. In a few particular events, the number of patients with anxiety was significant, requiring as many as 25 ambulances (each evacuating two patients) in the aftermath of the missile attack.

Conclusions

For a civilian EMS agency, an armed conflict involving civilians is a major challenge. This experience shows that the preparedness of the agency is crucial for success. Coordination with the military, police, fire department, and the Ministry of Health through continuous dialog and routine drills allows all agencies to work together. As emergencies happen without prior notice, an EMS agency needs to be able to shift its mode of operation immediately, with minimal disturbance to normal operations. When a population is confident that the EMS service will continue to provide its crucial services in an emergency, the sense of security and resilience of the whole country is enhanced.