as well as performing light rescue operations). All crew members have one common goal, but contribute differently in achieving this. This demands knowledge and support of each other's tasks, Crew Resource Management-training, and more.

- Externally — into the total chain of survival (early alarms, public first-aid competence, ambulance services, and definitive hospital treatment). HEMS systems are valueless if the other links of the chain are not strong enough to match that level.

Various HEMS bases experience different patterns regarding activity rate, patient severity, primary vs. secondary transports, and more. This illustrates variations within the country's population pattern. The HEMS services should be tailored to the specific conditions and needs within any society.

Keywords: ambulances, air; anaesthesiology; chain of defibrillation; defibrillation; emergency medical services (EMS); first aid; helicopter; intubation; Norway; Norwegian Air Ambulance Services; thrombolytic therapy; ventilation

G-45
Feasibility of Implementing Helicopter Emergency Medical Systems — Example from Egypt

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The Norwegian Air Ambulance Ltd (NLA) has provided air-ambulance services nation-wide in Norway for 21 years. We regularly are approached by requests to assist in establishing similar services. Together with Egyptian personnel, we conducted a feasibility study in Egypt. This study provides a good example to show that while it might look attractive and “high fashion” to use helicopters to retrieve patients, implementation of HEMS will not be successful if the following criteria are not fulfilled:

1) There must be a documented need for the service:
   a) Population pattern — Egypt has 60 million inhabitants, 54% of which live in rural areas, with long evacuation distances. In urban areas, evacuation time is long due to extremely heavy traffic;
   b) Traffic accidents — Since 1992, Egypt has had the world's highest rate of road accident fatalities. For example, early competent treatment after head injuries improves survival, regardless of other efforts;
   c) Tourist industry — One of Egypt's major income sources is the tourist industry. Diving is an important tourist activity, connected to time-crucial medical emergencies. Top level medical care for tourists is important;
   d) Oil industry — This industry is a high-risk activity for those involved, often in remote areas; and
e) General disaster alerts.

2) There must be an infrastructure in the chain of survival into which the HEMS services can be integrated:
   Good care of emergency patients when provided early and correctly will save lives. But, one single action is seldom life-saving by itself. A HEMS-system per se is useless if other parts of the chain of survival are not functioning.
   a) Early activation of the Emergency Medical Services (alarm system) — One alarm number, 1-2-3, operative in many governorates, is planned to be used nation-wide. A nation-wide system for wireless communication for medical emergencies is being implemented. A dispatch system for ambulances is in place;
   b) Early basic life-support (the public) — The first-aid skills of the Egyptian public must be increased;
   c) Early professional assistance (ambulance) — In Egypt there are 1,500 ambulances nation-wide today, with uniform equipment and training. An upgrading of the system is planned. Rescue work is done by the Civil Defence;
   d) Early advanced medical treatment (emergency doctor; vehicle/helicopter) — When introducing HEMS, additional training of doctors will be necessary, but there is already a recruiting ground, just as there is for pilots; and
e) Early definitive treatment (hospital) — There are hospitals that meet the requirements to match the level of HEMS-transport close to planned base locations.

3) There must be political willingness and support backed up by a financial capability to sustain the system:
   a) Egyptian side — The signals from political and other authorities in Egypt have been uniform. This project is given high priority, not only to the Minister of Health and Population; and
   b) European side — The NLA will assist Egyptian authorities to implement HEMS services. Other support is needed.

Conclusion: The project is feasible, provided that: 1) The project is given full political support; 2) Necessary financial guarantees are given; 3) The already planned improvements of the chain of survival are implemented; and 4) After implementation, there should be concrete plans to sustain the service.

Keywords: accidents, alarm systems; ambulances; basic life support; traffic; definitive care; emergency medical services; Egypt; feasibility; finances; helicopters; infrastructure; Norwegian Air Ambulance; politics; tourists

G-46
Helicopter use Transit Care of the Critically Ill: Ten Year Experience from Whangarei, New Zealand

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Introduction: New Zealand is a thinly populated country of only 3.4 million people living in an area the size of Japan. Three out of four New Zealanders live in the North Island. Northland is the northermost province of...
The haze reached extremely high levels in various parts brought on by the El Nino phenomenon. Haze '97 - A New Type of Disaster

Philippines, and even up to Hong Kong. Peat fires also countries of Malaysia, Singapore, Thailand, Brunei, across SouthEast Asia and eventually also involved the monitoring stations in SouthEast Asia of the spread of smoke and haze from forest fires occurring in Indonesia (Kalimantan and Sumatra). The smoke and haze spread across SouthEast Asia and eventually also involved the countries of Malaysia, Singapore, Thailand, Brunei, Philippines, and even up to Hong Kong. Peat fires also contributed the smoke and haze and the dry weather conditions brought on by the El Niño phenomenon. The haze reached extremely high levels in various parts of the region, especially in Malaysia and Kalimantan. The effects of the haze were reflected in the following:

1) A markedly increased incidence of upper respiratory infections, sore eyes and exacerbation of asthma and chronic bronchitis in the region;
2) Poor visibility for many months until October 1997;
3) A drastic drop in tourist arrivals in the region;
4) Closures of airports and flight diversions in some countries; and
5) Occurrence of disasters such as ship collisions, air crashes due to poor visibility — these resulted in large numbers of deaths;

In addition, certain long-term effects such as chronic respiratory diseases and even drop in mental performance were postulated as a result of the haze. The main agent causing adverse medical effects was felt to be particulate matter below 10 microns size.

The economic loss to the affected countries was in terms of hundreds of millions of dollars.

Various interventions were attempted, such as fire fighting, satellite tracking of hot spots, litigation against persons causing such fires, cloud seeding efforts, use of various types of ventilators, and increased use of medications to treat adverse health effects of the haze. The event resulted in the countries of SouthEast Asia working together to jointly map out strategies to prevent and control future such incidents.

Long-term research also will be required to study the effects of chronic exposure to such particulate matter on the health of populations.

Keywords: accidents; air crashes; Asia, southeast; asthma; El Niño; fires; haze; respiratory diseases; ships; smoke

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