

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

Jannicke Mellin-Olsen

Assistant Medical Director, Norwegian Air Ambulance Ltd, Nordbyhagen, Norway

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 alertness.*
- 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

Ramesh Nagappan, MD, FRACP; Tom Riddell, MBBS, DRCOG; Neville Maiden, FCA (SA);

Janet Barker, RGON, FCNA; Sarah Lindsay, RGON; Grant Pennycook; Reginald Ellwood

Intensive Care Unit, Whangarei Hospital; St John's Ambulance and Northland Emergency Services Trust, Whangarei, New Zealand

**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 northernmost province of

New Zealand and has a population density of 14 per square kilometre compared to 21 for the rest of the North Island. Hospital resources are centralised in Whangarei with five smaller primary care hospitals distributed in the region. With a large and difficult terrain effective transport of the critically ill in the region relies heavily on the helicopter. The paramedics from the St. John's Ambulance Service and the nurses and doctors from the Intensive Care Unit at Whangarei Hospital work closely to provide efficient transit care of the critically ill.

**Results:** Over 3,000 patients have received this mobile ICU care in the last 10 years. The ICU at Whangarei acts as a one stop coordinating centre for Medivacs — transit care of the critically ill between hospitals. The ambulance control room acts as the coordinating centre for Casivacs — retrieval of trauma victims from the scene of trauma and from remote areas of accidents that happen during adventure pursuits. Over 80% of helicopter transfers have been for Medivac reasons — with patients receiving mobile intensive care from an ICU doctor and nurse on board. The remainder are Casivacs with paramedics providing prehospital management of serious trauma.

With over 3,000 patients in the last 10 years, an effective system of coordination between St. John's Ambulance and the Intensive Care Unit at Whangarei provides prompt and proficient critical care to victims of trauma and patients suffering from critical illness.

**Conclusion:** We believe this system is a model for regions with widespread geography. We will discuss the attributes of this coordinated helicopter service and highlight the lessons that may be of use to other non-urban areas in the world.

**Keywords:** coordination; critically ill; helicopter; intensive care; interfacility transfers; mobile intensive care; New Zealand; nurses; paramedics; physicians; scene responses; trauma

#### General Session XII

### Environmental and Nuclear Disasters

Tuesday, 11 May, 10:30–12:00 hours

Chair: Peter Zelnicek, Norifumi Ninomiya

#### G-56

##### Haze '97 – A New Type of Disaster

V. Anantharaman,<sup>1</sup> Per Kulling<sup>2</sup>

1. Department of Emergency Medicine, Singapore General Hospital, Singapore
2. Swedish Poisons Information Centre and KAMEDO, Stockholm, Sweden

In May 1997, reports were received from weather 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

#### G-58

##### Haze and the Body

Dr. G.H. Lim; Dr. K.S. Lim

Emergency Department, Singapore General Hospital, Singapore

**Introduction:** Training in the SAF always has been considered a strenuous activity. We know that the body is subjected to many adverse environmental factors during physical exertion, and air pollution is one such important factor.

**Aim:** The aim of this study was to analyse the impact on the body after exposure to different levels of air pollution.

**Method:** This is a retrospective study based on the attendance at the Dieppe Medical Centre (DMC) from October 1997 to April 1998. Five hundred soldiers, age between 18 to 24 years from the 1st Battalion, Singapore Guards were used as the study cohort. The measure of pollution used is the Pollution Standard Index (PSI) that was recorded by the Singapore Meteorological Station. The PSI measures five common pollutants in the atmosphere during the past 24 hours.

All of the soldiers who turned up at the DMC were examined thoroughly by the Medical Officer and given a diagnosis. The diseases selected were: 1) Upper Respirato-