The Danish Prehospital System

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Background and history

Denmark covers 43,000 square kilometers and is populated by 5,800,000 inhabitants. Since 2007, Denmark has been divided into five health regions responsible for the health care. All Danish citizens have free access to healthcare.

Today the Danish prehospital emergency medical system ambulance service is a publicly funded, nationally implemented system providing the same basic service to every citizen in Denmark. The Danish prehospital emergency medical system dates back to 1886 when the first horse-drawn ambulance was deployed [1]. Up until 1909, the ambulance personnel received no education whatsoever. Furthermore, throughout most of the 19th and 20th century, the educational level of the Danish ambulance personnel was not standardised but was defined individually by the local ambulance entrepreneurs. This limited amount of education restricted the prehospital treatment to the load-and-go principle, spending as little time as possible at the scene and simply rushing the patient to the hospital as fast as possible.

This approach changed in 1975, when the Danish Ministry of Health defined minimal national standards for all Danish ambulances. In 1992, these regulatory measures were replaced by a formal executive order that defined the specific medical equipment required in an ambulance and the minimal educational levels of the ambulance personnel [2]. In 1994, an update to this executive order made the provision of defibrillators mandatory. Successive updates to the executive orders have led to the ambulance service of what it is today.

The prehospital system of today is a three-tiered system in which the basic resource is an ambulance manned by two emergency medical technicians [3,4]. The prehospital resource is dispatched by one of five emergency medical dispatch centres, one in each health region. The dispatcher, usually a nurse or a paramedic, dispatches one of the following: an ambulance, an ambulance and a paramedic, or an ambulance and an anaesthesiologist-manned mobile emergency unit which can be either a ground-based unit (MECU) or a one of four helicopters (HEMS)[5]. The anaesthesiologist-manned supplemental units are always dispatch along with an ambulance using a rendez-vous model. The dispatchers’ choice of MECU or HEMS depends on the geographical location of the patient or incident and is thus primarily based on the estimated response time of the unit in question. However, in mass casualty incidents, usually both one or more MECUs and one or more helicopters are dispatched.

Competencies of care

The minimal competencies required for an emergency medical technician today are regulated by executive orders [3,4]. The basic education consists of a one-year education within the public health educational system. Each ambulance is required to be manned with two emergency medical technicians (EMT), of whom at least one must have received supplemental education consisting of an additional 18 months of internship in an ambulance service and a further five weeks of education. Following three years of practice, the EMT may receive a further five weeks of theoretical and practical education as a paramedic (PM)[3,4]. The physician-manned rapid response units are typically manned by anaesthesiologists supplemented by PMs.

In Denmark in 2018, 355,773 calls (61.45 per 1000 inhabitants) were handled at the five emergency medical dispatch centres. These calls resulted in 158,272 ambulances dispatched with horns and sirens (corresponding to 27.52 per 1000 inhabitants). The median response time from emergency call until arrival at the scene was 8 minutes (Quartiles: 6 – 11 minutes) [6]. The MECUs were dispatched approximately 40,000 times in 2018 (6.9/1000 inhabitants) while a helicopter was dispatched approximately 4,000 times in 2018 (0.69/1000 inhabitants).
Telemedical support in patients with time-critical conditions

Using telemedical support of the ambulance personnel, patients with suspected stroke or coronary infarction are evaluated by thrombolysis centres or coronary intervention centres with the aim of transporting the patients directly to these highly specialised centres. By-passing local hospital during transportation of these patients is possible due to a close collaboration between the receiving hospitals, the ambulance providers, and the prehospital anaesthesiologists acting as back-up for the ambulances.

Nationwide registries in the health care system in Denmark

In September 2015, a nationwide Danish prehospital electronic patient care record and registry was established. This registry contains information of all prehospital contacts with the emergency medical system, regardless of whether the ambulance operator is a private or a public/municipal entrepreneur. The registry operates on an individual identifiable basis and holds information about the prehospital findings, the prehospital examinations and treatments, as well as information regarding which hospitals that the patients are admitted to. This registry forms the foundation of the Danish database for the emergency medical services [6,7]. Furthermore, a registry of out-of-hospital cardiac arrests, the Danish Cardiac Arrest Registry, is a nationwide registry and contains data from June 2001 and forward [8].

The prehospital registries are supplemented by other Danish health care registries, covering all patient contacts with the hospitals, all in-hospital treatments and diagnoses, as well as information regarding the population’s education, living conditions, labour, income and wealth. Information about the total consumption of physician-prescribed drugs in Denmark is also available [9]. The registries, with their almost complete follow-up, are very useful in prehospital cross sectional as well as longitudinal studies of an entire population [10,11,12,13]. Future perspectives are large population based studies of an entire population based on almost complete registries reporting on the patient flow from the first encounter with the health care system at the emergency medical dispatch centre and to finalised treatment at the hospitals, giving a unique overview of the whole chain of care that can be offered.

Conclusions

The Danish prehospital emergency medical system ambulance service is a publicly funded, nationally implemented system providing the same basic service to every citizen in Denmark. It is based on a balanced response ranging from EMTs and PMs to anaesthesiologist-manned ground based or air based units. The treatment starts on site and continues during transportation to the nearest ED or during direct transportation to a specialised centre for advanced care.

The prospective registration of every transported patient and the Danish population based registers allows for high quality population based research and quality improvement.
References:


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