

# Long-Term Mortality of Emergency Medical Services Patients



Morten T. Bøtker, MD, PhD\*; Christian J. Terkelsen, MD, DmSc; Jan N. Sørensen, MD; Søren B. Jepsen, MD; Søren P. Johnsen, MD, PhD; Erika F. Christensen, MD; Mikkel S. Andersen, MD, PhD

\*Corresponding Author. E-mail: [botker@fastmail.fm](mailto:botker@fastmail.fm), Twitter: [@POCmanDK](https://twitter.com/POCmanDK).

**Study objective:** Emergency medical services (EMS) provides out-of-hospital care to patients with life-threatening conditions, but the long-term outcomes of EMS patients are unknown. We seek to determine the long-term mortality of EMS patients in Denmark.

**Methods:** We analyzed linked EMS, hospital, and vital status data from 3 of 5 geographic regions in Denmark. We included events from July 1, 2011, to December 31, 2012. We classified EMS events according to primary dispatch category (unconsciousness/cardiac arrest, accidents/trauma, chest pain, dyspnea, neurologic symptoms, and other EMS patients). The primary outcome was 1-year mortality adjusted for age, sex, and Charlson comorbidity index.

**Results:** Among 142,125 EMS events, primary dispatch categories were unconsciousness or cardiac arrest 5,563 (3.9%), accidents or trauma 40,784 (28.7%), chest pain 20,945 (14.7%), dyspnea 9,607 (6.8%), neurologic symptoms 17,804 (12.5%), and other EMS patients 47,422 (33.4%). One-year mortality rates were unconscious or cardiac arrest 54.7% (95% confidence interval [CI] 53.4% to 56.1%), accidents or trauma 7.8 (95% CI 7.5% to 8.1%), chest pain 8.5% (95% CI 8.1% to 9.0%), dyspnea 27.7% (95% CI 26.7% to 28.7%), neurologic symptoms 14.1% (95% CI 13.6% to 14.7%), and other EMS patients 11.1% (95% CI 10.8% to 11.4%). Compared with other EMS conditions, adjusted 1-year mortality was higher in unconsciousness or cardiac arrest (risk ratio [RR] 2.6; 95% CI 2.5 to 2.7), dyspnea (RR 1.5; 95% CI 1.4 to 1.5), and in neurologic symptoms (RR 1.1; 95% CI 1.0 to 1.1), but lower in chest pain (RR 0.6; 95% CI 0.6 to 0.7) and accidents or trauma (RR 0.8; 95% CI 0.8 to 0.8).

**Conclusion:** EMS patients with unconsciousness or cardiac arrest, dyspnea, and neurologic symptoms are at highest risk of long-term mortality. Our results suggest a potential for outcome improvement in these patients. [Ann Emerg Med. 2017;70:366-373.]

Please see page 367 for the Editor's Capsule Summary of this article.

Readers: click on the link to go directly to a survey in which you can provide [feedback](#) to *Annals* on this particular article.

0196-0644/\$-see front matter

Copyright © 2016 by the American College of Emergency Physicians.

<http://dx.doi.org/10.1016/j.annemergmed.2016.12.017>

## INTRODUCTION

### Background

Emergency medical services (EMS) was born from the goal of optimizing trauma and cardiac arrest care.<sup>1</sup> Systematic clinical approaches have reduced mortality in these patients.<sup>2,3</sup> EMS cares for many other patient groups, and only limited data describe the overall or condition-specific long-term mortality rates of EMS patients. Thus, high-risk groups in need of optimized care may be overlooked.

### Importance

To clarify how EMS management affects the care of patients, it is crucial to understand condition-specific short- and long-term mortality of these patients, as well

as the confounding effect of age, sex, and comorbidities. Differences in long-term mortality may indicate opportunities for intensified or specialized initial acute care.

### Goals of This Investigation

This study aimed to determine long-term mortality rates among patients receiving EMS care in Denmark.

## MATERIALS AND METHODS

### Study Design

We used linked EMS, hospital, and vital status data from 3 geographic regions in Denmark. The Danish Data Protection Agency and the National Board of Health approved this study.

### Editor's Capsule Summary

#### *What is already known on this topic*

Emergency medical services (EMS) patients include those with life-threatening conditions such as cardiac arrest and major trauma.

#### *What question this study addressed*

What is the long-term mortality of EMS patients who present with different chief complaints?

#### *What this study adds to our knowledge*

In this study of 142,125 EMS events in Denmark, 30-day and 1-year mortality was highest for cardiac arrests or unconsciousness (49% and 55%, respectively), dyspnea (12% and 28%, respectively), and neurologic emergencies (6% and 14%, respectively).

#### *How this is relevant to clinical practice*

These results highlight high-mortality conditions that deserve EMS focus and research in regard to how more effective treatment might be achieved.

### Setting

The Capital Region of Denmark, the Central Denmark Region, and the Region of Southern Denmark are populated by 4.2 million inhabitants, representing approximately 75% of the total Danish population.<sup>4</sup> The Danish National Health Service provides universal tax-supported health care, guaranteeing unfettered access to general practitioners, EMS, and hospital care. Field services are subsidized and private contractors operate ambulances (staffed by emergency medical technicians and paramedics), ground-based out-of-hospital critical care teams (staffed by nurses or physicians), and helicopter EMS (staffed by physicians).

Denmark is served by regionally organized systems of EMS dispatch. The telephone number for requesting EMS care is 112. Until May 2011, the police answered 112 calls and dispatched private ambulance contractors. Since May 2011, all medical 112 calls have been directed to 1 of 5 public emergency medical coordination centers staffed by health care professionals (educated nurses, paramedics, and physicians). Supplementary education of emergency medical coordination center personnel includes a 6-week course in communication, a 3-month apprenticeship, continuous supervision of selected calls, and sequential courses on medical dispatch issues. Emergency medical coordination center personnel are allowed not to send an ambulance and either give advice or refer the patient

instead to other kinds of assistance such as telephone consultation with a general practitioner.

### Data Collection and Processing

EMS events were identified through regional dispatch software containing individual-level information on level of emergency, dispatch criterion, time stamps for medical emergency call, ambulance dispatch and on-scene times, and a unique patient identification number (the Civil Personal Registration number) for each EMS event. Emergency medical coordination center personnel prospectively register patient data during each EMS call, and time stamps are automatically collected from dispatch software and ambulances. The regional dispatch software is administered by the emergency medical coordination center administration under each of the 5 Danish regions. The unique Civil Personal Registration number assigned to each Danish citizen at birth and to residents on immigration makes accurate and unambiguous linkage to all public registries at the individual level possible.

We determined previous diagnoses according to the *International Classification of Diseases, 10th Revision (ICD-10)* from the Danish National Patient Register, which is administered by the national Danish Health Authorities and contains information about all hospital admissions in Denmark.<sup>5</sup> The physicians responsible for the patient consecutively register all diagnoses in the register during the patient's hospital admission. We determined vital status from the public Danish Civil Registration System, which is national, is administered by the governmental Central Office of Civil Registration, and contains daily updated individual-level information on all persons residing in Denmark.<sup>6</sup> Both the Danish Civil Registration System and the Danish National Patient Register have been independently validated.<sup>6,7</sup>

### Selection of Participants

This study included all patients calling the medical emergency number 112 and receiving ambulance care. The contact was excluded if an invalid dispatch code was registered or if the Civil Personal Registration number was invalid or missing. Only the first medical emergency call for each individual was included in the analyses.

We included EMS events from July 1, 2011, through December 31, 2012.

### Outcome Measures

The primary exposure was the EMS dispatch category. The emergency medical coordination centers use a unique criteria-based dispatch system (Danish Index for Emergency Care) to determine the emergency level of the 112 call and to dispatch the relevant EMS resources

Download English Version:

<https://daneshyari.com/en/article/5651423>

Download Persian Version:

<https://daneshyari.com/article/5651423>

[Daneshyari.com](https://daneshyari.com)