



# Estimating the Organ Donor Potential in Denmark: A Prospective Analysis of Deaths in Intensive Care Units in Northern Denmark

M. Madsen and L. Bøgh

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## ABSTRACT

To estimate the organ donor potential in Denmark we conducted a prospective registration of deaths in all intensive care units (ICUs), counting 15 ICUs and two neurosurgical ICUs in the four northern Danish counties, which cover a population of 1.64 million inhabitants or 30% of the Danish population. From September 1, 2000 till August 31, 2002, all deaths in the ICUs in 15 hospitals were recorded. Each case was evaluated locally postmortem with respect to medical suitability to organ donation. A total of 1655 deaths were recorded, corresponding to 504 deaths per million population per year (PMP). Median age was 70 years (0 to 99 years), 52% were more than 70 years, and 22% more than 80 years of age. The cause of death was cerebral lesion in 18% of the cases (neurosurgical ICUs:  $n = 182$ ; ICUs:  $n = 110$ ). By thorough medical record examination, the number of potential donors was estimated to be 169, corresponding to 51 PMP. The cause of death was cerebral lesion in 96% of the potential donors. Organ donation was performed in 43 cases (32 from neurosurgical ICUs and 11 from ICUs) or 13.1 PMP. Thus, 25% of the potential became organ donors. The major reason for nondonation was refusal from the relatives. Out of 127 questioned, the relatives refused in 62 cases (49%). By comparison, 74% of the general Danish population are willing to donate organs after death. The rate of nondetection of potential donors by the hospital staff could be estimated to 22%. In conclusion, the organ donor potential may allow for improvement in donation rates. An increased effort for donor hospitals is warranted. The motives for refusal by the relatives need elucidation.

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**D**URING THE LAST 10 years, the rate of organ donation from deceased human beings in Denmark has been rather constant with an average of 70 donors per year or 13 per million population (PMP) per year. However, the number of potential donors in the country is unknown. Accordingly, the aim of the present investigation was to estimate the organ donor potential in Denmark. Further, we wanted to review the causes of death in potential organ donors, estimate the donation refusal rate, and ascertain reasons for nondonation.

## METHODS

Over a 2-year period, from September 1, 2000 till August 31, 2002, a prospective registration of deaths in intensive care units (ICUs) in the four northern counties of Denmark was performed. All ICUs in the region participated, counting 15 ICUs and two neurosurgical ICUs. The region covers a population of 1.64 million inhabitants, corresponding to 30% of the total Danish population. Local intensive

care doctors evaluated each case of death with respect to medical suitability to organ donation.

## RESULTS

A total of 1655 deaths in the 17 ICUs were recorded, corresponding to 504 deaths PMP per year. The median age of the deceased patients was 70 years (range 0 to 99 years). Fifty-two percent of the patients who died were over 70 years of age, and 22% were more than 80 years old.

The cause of death was cerebral lesion in 292 of the cases (18% of all deaths). The cerebral lesion was spontaneous bleeding or hemorrhage in 66% and traumatic in 9% of the

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From the Departments of Renal Medicine (M.M.) and Nursing Research (L.B.), Aarhus University Hospital, Skejby Sygehus, Aarhus, Denmark.

Address reprint requests to Melvin Madsen, MD, Department of Renal Medicine, Aarhus University Hospital, Skejby Sygehus, DK-8200 Aarhus N, Denmark. E-mail: melvin.madsen@dadlnet.dk

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360 Park Avenue South, New York, NY 10010-1710

cases. A total of 182 deaths from cerebral lesion occurred in neurosurgical ICUs (62%) and 110 cases in ICUs (38%).

By thorough medical record examination, the number of medically suitable organ donors was estimated to be 169 (10.2% of all deaths), corresponding to 51 PMP per year. Among these potential donors the cause of death was cerebral lesion in 96% of the cases. Organ donation was realized in 43 cases (32 from the neurosurgical ICUs and 11 from ICUs). This figure corresponds to 25% of the organ donor potential or 13.1 PMP per year. The major reason for nondonation was refusal from the relatives. In 127 of the cases in which the deceased patients were found medically suitable for donation, the relative were approached with the question of donation. Of these, 62 refused to organ donation, corresponding to a refusal rate of 49%. The rate of nondetection by the hospital staff of medical suitable donors could be estimated to be 22%.

#### DISCUSSION

The organ donation potential in our region covering approximately 30% of the Danish population could be esti-

mated to be 51 PMP. Thus, Denmark has a donor potential comparable with other countries with higher organ donation rates. However, donation was only effected in approximately one fourth of the cases. The most important reason for nondonation was refusal from the relatives. Nearly 50% of the approached relatives refused to donation. The circumstances of the process of approaching the family members were not reported. The motivation of the relatives for rejection is so far unknown and warrants elucidation.

It is noteworthy that almost all of the deceased patients who were found suitable for organ donation from a medical point of view had died from an intracranial lesion. This fact may be important with respect to the education in organ donation of the considerable number of ICU staff members. Thus, the educational efforts can focus on patients dying from intracerebral lesion or disease. Despite this fact, our data also indicate that all ICUs are important in organ donation. Thus, 38% of all patients who died from an intracerebral cause died outside the neurosurgical ICUs. Further, 26% of all donations during the study period were carried out in nonneurosurgical ICUs.