

# Place of death – among patients dying from chronic progressive diseases.

## A Danish national cohort study

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### Introduction

In order to optimize a country’s provision of palliative care, knowledge of where people die and from which causes is required. This knowledge is prerequisite to organize the health care system so the right capacity and demands for qualifications are met.

### Study Aim

To describe place of death among persons dying from natural causes.

To analyze which factors may play a role for place of death among persons dying from non-malignant chronic progressive diseases.

### Methods

A population based cohort study using the The Danish Register of Causes of Death. Data on place and causes of death in Denmark during 2007-2011, among persons aged 19+ were included (N=257,266). To identify factors associated with death in hospital (DInH) caused by non-malignant chronic progressive diseases (nmCPD) (N=77,681), crude and adjusted odds-ratios were calculated. Apoplexia and pneumonia as death causes were not included in the category of nmCPD, because it could not be ruled out from the registry whether they were caused by chronic progressive diseases or not.

Table 2: Odds-ratios for factors associated with death in hospital (InH) for persons dying from nmCPD\* in Denmark, 2007 - 2011

| Categories                  | Explanatory variables |                                |
|-----------------------------|-----------------------|--------------------------------|
|                             | Age                   |                                |
|                             | crude                 | Adj.: sex, death cause, region |
|                             | 0.34 [ 0.33 , 0.36 ]  | 0.51 [ 0.49 , 0.53 ]           |
|                             | 1                     | 1                              |
|                             | 1.47 [ 1.41 , 1.55 ]  | 0.88 [ 0.83 , 0.93 ]           |
| 86+ yrs                     | 1.09 [ 0.87 , 1.37 ]  | 0.73 [ 0.58 , 0.93 ]           |
| 65-85 yrs (ref.)            |                       |                                |
| 40-64 yrs                   |                       |                                |
| 19-39 yrs                   |                       |                                |
|                             | Sex                   |                                |
|                             | crude                 | Adj.: age, death cause, region |
|                             | 1                     | 1                              |
| female (ref.)               | 1.65 [ 1.60 , 1.70 ]  | 1.21 [ 1.18 , 1.26 ]           |
| male                        |                       |                                |
|                             | Region                |                                |
|                             | crude                 | Adj.: sex, age, death cause    |
|                             | 1                     | 1                              |
|                             | 0.76 [ 0.72 , 0.81 ]  | 0.75 [ 0.70 , 0.80 ]           |
|                             | 0.88 [ 0.83 , 0.93 ]  | 0.88 [ 0.83 , 0.94 ]           |
|                             | 1.02 [ 0.97 , 1.08 ]  | 1.06 [ 1.00 , 1.12 ]           |
|                             | 1.19 [ 1.13 , 1.26 ]  | 1.21 [ 1.14 , 1.29 ]           |
| North Denmark Region (ref.) |                       |                                |
| Central Denmark Region      |                       |                                |
| Region of Southern Denmark  |                       |                                |
| Capital Region of Denmark   |                       |                                |
| Region Zealand              |                       |                                |

\* nmCPD: non-malignant chronic progressing diseases (chron.heart diseases, COL, dementia, diabetes, chron.liver diseases, senilitas, arteriosclerosis, parkinson, other chron.respiratory diseases)

### Conclusion

Persons dying from non-malignant chronic progressive diseases (nmCPD) or cancer constitute around 60% of all natural causes of death in Denmark. However, the two groups show opposite proportions with regard to place of death, where 64% dying from nmCPD and 43% dying from cancer died outside the hospital.

Among nmCPD, both age, sex and region appeared to influence place of death. When place of death is addressed, these factors should be considered.

Analysis of a country’s epidemiology of death causes may indicate that different capacities, knowledge and competencies are required in order to optimize the organization of palliative care in primary or secondary health care sectors.

### Results

Among all deaths from natural causes, 30% died from nmCPD (N=77.681) and 29% died from cancer (N=75.857).

Table 1 shows the proportions of deaths in hospital and outside hospital for different groups of death causes. In hospital, 23% died from nmCPD and 35% died from cancer. Outside hospital, 37% died from nmCPD, and 24% died from cancer.

Table 1: Place of death - all natural causes of deaths in Denmark, 2007 - 2011

| Cause of death           | deaths in hospital (InH) or outside hospital (OutH) |         |         |                 |     |
|--------------------------|---|---------|---------|-----------------|-----|
|                          | numbers   |         |         | proportions (%) |     |
|                          | OutH  | InH     | total   | OutH            | InH |
| chronic progr. diseases* | 49.886  | 27.795  | 77.681  | 64              | 36  |
| cancer                   | 32.796  | 43.061  | 75.857  | 43              | 57  |
| mixed diseases           | 33.143  | 38.137  | 71.280  | 46              | 54  |
| apoplexia                | 8.343   | 5.034   | 13.377  | 62              | 38  |
| pneumonia                | 4.320   | 5.437   | 9.757   | 44              | 56  |
| non-medical causes       | 6.434   | 2.880   | 9.314   | 69              | 31  |
| All                      | 134.922   | 122.344 | 257.266 | 52              | 48  |

\* non-malignant CPD: chron.heart diseases, COL, dementia, diabetes, chron.liver diseases, senilitas, arteriosclerosis, parkinson, other chron.respiratory diseases

Table 2 shows the associations between death in hospital and age, sex and geographical region of Denmark. Age, sex and regions all appeared to significantly influence place of death.

Table 3 shows how death in hospital is influenced by cause of death, among persons dying from nmCPD. Chronic heart disease was the most frequent cause of death (37%), of whom only 36% died in hospital. Compared to this group, persons dying from respiratory diseases or chronic liver diseases had a much higher risk of death in hospital. The odds of dying in hospital from Parkinson, dementia or senilitas were very small, compared to those dying from heart diseases.

Table 3: Associations between cause of death and death in hospital (InH) among persons dying from nmCPD\* - presented as adjusted odds-ratios

| Cause of death                | Odds-ratios [95% CI] |         |       |                      |
|-------------------------------|----------------------|---------|-------|----------------------|
| nmCPD*                        | N (all)              | N (InH) | % InH | adjusted for         |
|                               | 77.681               | 27.795  | 36    | age, sex and region  |
| chronic respiratory_oth       | 1215                 | 841     | 69    | 3.53 [ 3.11 , 4.00 ] |
| chronic liver diseases        | 4265                 | 3043    | 71    | 3.47 [ 3.21 , 3.75 ] |
| COPD                          | 16325                | 9178    | 56    | 2.00 [ 1.92 , 2.08 ] |
| chronic heart diseases (ref.) | 28517                | 10319   | 36    | 1                    |
| diabetes                      | 6558                 | 2339    | 36    | 0.85 [ 0.81 , 0.91 ] |
| arteriosclerosis              | 2082                 | 636     | 31    | 0.82 [ 0.74 , 0.90 ] |
| parkinson                     | 1526                 | 331     | 22    | 0.43 [ 0.38 , 0.49 ] |
| dementia                      | 14023                | 948     | 7     | 0.14 [ 0.13 , 0.15 ] |
| senilitas                     | 3170                 | 160     | 5     | 0.12 [ 0.10 , 0.14 ] |

\* nmCPD - non-malignant, chronic progressive diseases

Declaration of conflicts of interests; The authors have nothing to declare.

