ORIGINAL ARTICLE

Place of Death: Trends Over the Course of a Decade

A Population-Based Study of Death Certificates From the Years 2001 and 2011

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SUMMARY

Background: In Germany, data on place of death is recorded from death certificates, but not further analyzed. Consequently, hardly any information is available at the population level regarding the distribution of place of death (e.g. home, hospital, palliative care unit, nursing home, hospice).

Methods: We carried out a descriptive statistical analysis of the registered places of death in evaluated death certificates from selected areas of Westphalia–Lippe for the years 2001 and 2011. Factors affecting the place of death were determined with binary multivariate regression.

Results: We analyzed 24 009 death certificates (11 585 for 2001 and 12 424 for 2011). The distribution of places of death for the overall population was as follows (2001 vs. 2011): at home, 27.5% vs. 23.0% ($p < 0.001$); in the hospital, 57.6% vs. 51.2% ($p < 0.001$); on a palliative care unit, 0.0% vs. 1.0%, in a care or nursing home, 12.2% vs. 19.0% ($p < 0.001$); in a hospice, 2.0% vs. 4.6% ($p < 0.001$); elsewhere, 0.6% vs. 0.6% ($p = 0.985$); not indicated, 0.1% vs. 0.6% ($p < 0.001$). Independent factors affecting the place of death were age, sex, place of residence, and the presence of cancer or of dementia.

Conclusion: Most people in Germany die in institutions; the most common place of death is still the hospital, where more than half of all deaths take place. Only one death in four occurs at home. There is a marked secular trend away from dying at home or in the hospital, in favor of dying in a care or nursing home; death in palliative care units and hospices is also becoming more common.

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According to information from the Federal Statistical Office (Statistisches Bundesamt), 852 328 persons died in Germany in the year 2011, out of a population of 80.3 million (1), indicating that the number of the deceased was 1.1% of the overall population.

Research on the subject of place of death shows that most people prefer to die at home (2–4). Dying in an institution such as a hospital or a care or nursing home is viewed negatively. Hospices and palliative care units are institutions that are consciously devoted to the issue of dignity in dying. Since the end of the 1990s, there has been a marked increase in the number of these care facilities in Germany.

In Germany, the place of death is recorded but not statistically analyzed. Official statistics on place of death relate only to hospital deaths (5).

The present study analyzes the places of death for natural deaths occurring during the years 2001 and 2011 in selected rural and urban areas of Westphalia on the basis of death certificate analysis. The aim is to draw conclusions about changes in the distribution of place of death over time. The study also determines sociodemographic factors that influence place of death.

Methods

Design

The study is a cross-sectional study based on the analysis of death certificates from the years 2001 and 2011 in selected areas of Westphalia–Lippe, Germany.

Study area

The area studied includes the cities of Bochum and Münster and the rural areas of Borken and Coesfeld in the Westphalia–Lippe region (in the state of North Rhine–Westphalia). Both urban and rural areas were purposely included in the study in order to allow comparative analyses. Because of the requirements of data protection, data collection took place on site in the local health authority offices.

On 31 December 2000, 1 231 222 persons lived in the study region. Over the course of the 10-year observation period, the population rose by 1.03%. The populations of the city of Münster and the two rural areas of Borken and Coesfeld increased, while that of

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TABLE 1

Characteristics of deceased persons recorded as dying of natural causes

	Total N = 24 009 % (n)	2001 N = 11 585 % (n)	2011 N = 12 424 % (n)	p-value
Age, all (years) Mean (SD)	76.2 (14.9)	75.1 (15.7)	77.2 (14.1)	0.001*
Age, women (years) Mean (SD)	79.6 (14.4)	78.7 (15.3)	80.4 (13.5)	0.001*
Age, men (years) Mean (SD)	72.5 (14.6)	70.9 (15.0)	73.8 (14.0)	0.001*
Female	52.7 (12 651)	53.6 (6214)	51.8 (6437)	0.005*
Male	47.3 (11 358)	46.4 (5371)	48.2 (5987)	0.005*
<18 years	0.9 (207)	1.1 (132)	0.6 (75)	0.001*
18–39 years	1.3 (303)	1.6 (183)	1.0 (120)	0.001*
40–64 years	16.6 (3984)	18.3 (2120)	15.0 (1864)	0.001*
65–79 years	34.3 (8224)	36.0 (4174)	32.6 (4050)	0.001*
≥ 80 years	47.0 (11 297)	43.0 (4976)	50.8 (6315)	0.001*
Urban area	62.3 (14 960)	63.1 (7309)	61.1 (7651)	0.016*
Rural area	37.7 (9049)	36.9 (4276)	38.4 (4773)	0.016*
Malignant disease	34.0 (8170)	33.2 (3844)	34.8 (4326)	0.007*
Dementia ≥ 65 years	9.9 (2378)	6.3 (732)	13.2 (1646)	0.001*

SD = standard deviation; *p < 0.01

Bochum decreased (6). The number of hospital beds decreased from 8.1 to 7.8 per 1000 head of population, while the number of nursing home beds increased from 7.6 to 8.9 per 1000 population (7). In 2001, there were three hospices; by 2011 they had doubled in number to six. Three palliative care units were opened between 2001 and 2011.

Definition of place of death

In this study, the place of death was divided into the following categories: “home,” “hospital,” “palliative care unit,” “care or nursing home,” “hospice,” and “other.” The category “home” included both the private home of the deceased and other private homes that were not the deceased’s own home. Hospitals, psychiatric clinics, and sanatoriums were all subsumed under the category “hospital.” Palliative care units were given a category of their own. The category “care or nursing home” included all facilities provided by care homes, nursing homes, assisted living residences, and short-term care. “Other” included (among others) public places, doctors’ offices, and leisure facilities.

Data analysis

At the time when the study was carried out, all death certificates from 2001 and 2011 were available for the study. One of the documents had been destroyed because their archiving period had expired. Data collected were: place of death, mode of death, sociodemographic details, and medical notes mentioning malignant

disease or dementia as underlying or contributory cause of death. The analysis included all deaths for which a natural cause of death was recorded in the death certificate. Documents for which no information was provided about age or sex were excluded from the analysis. This was the case for 126 death certificates. There were grounds for suspecting an unnatural cause of death in 742 cases.

Statistical analysis

The study population was investigated for differences over time (2001 vs. 2011) in terms of socio-demographic details and the distribution of places of death. In addition, both the crude and the age-adjusted mortality rate were calculated. The frequency distributions of places of death were represented both in percentages and as absolute numbers. Stratification by age and sex was carried out.

Continuous variables were tested for normal distribution using the Kolmogorov–Smirnov test and, if a normal distribution was confirmed, analyzed using the unpaired *t*-test. If the data was not normally distributed, the nonparametric Wilcoxon–Mann–Whitney test was used. Categorical variables were investigated using the χ^2 test. To minimize the global increase in the probability of a type 1 error (alpha) due to multiple testing of the same sample, the significance level was set at $p < 0.01$ (two-sided).

Regarding mortality rates, direct adjustment for age was carried out. The European Standard Population of

TABLE 2

Trend in place of death over time

	Total N = 24 009 % (n)	2001 N = 11 585 % (n)	2011 N = 12 424 % (n)	p-value
Home setting	25.2 (6049)	27.5 (3187)	23.0 (2862)	0.001 ^{*2}
Hospital*	54.2 (13 023)	57.6 (6669)	51.2 (6354)	0.001 ^{*2}
Palliative care unit	0.5 (124)	0.0 (0)	1.0 (124)	–
Care or nursing home	15.7 (3779)	12.2 (1414)	19.0 (2365)	0.001 ^{*2}
Hospice	3.4 (808)	2.0 (232)	4.6 (576)	0.001 ^{*2}
Other place	0.6 (137)	0.6 (66)	0.6 (71)	0.985
No information	0.4 (89)	0.1 (17)	0.6 (72)	0.001 ^{*2}

*1Not including palliative care units, ^{*2}p<0.01

1976 (ESP1976) was used as the standard population.

Effect sizes on the place of death were calculated by means of binary logistic regression, with place of death as the dependent variable. The following were included as independent variables in the statistical model:

- Age
- Sex
- Place of residence
- Malignant disease
- Dementia (when recorded in the death certificate as underlying or contributory cause of death).

Odds ratios (OR) with their concomitant 95% confidence intervals (CI) were generated as the measurement units of the multivariate analyses. SPSS version 21 was used for the analysis.

Data protection and ethical approval

Access to archived death certificates, retrieval of the information contained in them, and the analysis of that information were permitted by the relevant health authorities on condition that data protection regulations were followed. The study was approved by the ethics committee of the Ruhr-Universität Bochum (decision no. 4338–12).

Results

A total of 24 009 death certificates were analyzed, 11 585 from the year 2001 and 12 424 from 2011. The average age at death of the study population was 75.1 years in 2001 and within 10 years rose to 77.2 years. In 2001, men died at a mean age of 70.9 years and women at 78.7. Ten years later, the mean age at death for men was 73.8 years and that for women 80.4 years. The proportion of men and women was almost equal, with slightly more women than men dying. Malignant disease was recorded in one in three death certificates. The percentage of those in which dementia was recorded rose from 6.3% in 2001 to 13.2% in 2011 (Table 1).

The crude mortality rate of death from natural causes rose over the 10-year observation period from 940.9 to 998.7 deaths per 100 000 head of population. The age-

adjusted death rate decreased from 723.2 to 648.3 deaths per 100 000 population.

Between 2001 and 2011, the rate of deaths at home fell by 4.5%. In 2011, fewer than 1 in 4 people (23%) died at home. Hospitals remained the most common place of death, with over 50%, but here too a drop of 6.4% was observed. In contrast to this, in 2011 more people died on a palliative care unit or in a hospice. In 2011, the proportion of those who died in a hospice was less than 5%. Care and nursing homes showed the largest rise as place of death (12.2% vs. 19.0%; p<0.001). Thus, in 2011 almost one person in five died in a care or nursing home (Table 2).

In absolute numbers, more men died at home, in hospital, or in “other places.” In contrast to this, there were more female deaths in care or nursing homes and in hospices. Stratification by age showed that male deaths predominated until the age of 80. Deaths at 80 years or older were predominantly among women (Table 3).

Men were 1.2 times more likely than women to die at home. In contrast, the likelihood of dying in a care or nursing home was 50% lower for men than for women. For hospital patients, those below the age of 80 were twice as likely to die in hospital compared to those aged 80 or over. People who lived in an urban area were more likely to die in hospital than those living in a rural area, and less likely to die at home or in a care or nursing home.

Malignant disease was strongly associated with the probability of dying in a hospice. Likewise, there was a strong correlation between dementia and an increased probability of dying in a care or nursing home (Table 4).

Conclusion

This study showed that hospital is by far the most common place of death, followed by the deceased’s own home, a care or nursing home, and a hospice or palliative care unit. In the comparison over time (2001 vs. 2011), in 2011 fewer people died at home or in hospital, more people in a care or nursing home, a hospice, or a

palliative care unit. The greatest increase was in the number of those who died in care or nursing homes.

Research into place of death in Germany

Some scattered information already exists from population-based studies of place of death in Germany (8–19). *Table 5* provides an overview of these studies. The most comprehensive study so far is that by Ochsmann et al. (10). This study analyzed 12 217 death certificates from the year 1995 in selected health authority areas in Rheinland-Palatinate. No information was available for hospices and palliative care units. In the study area, during the observation period, 39.8% died at home, 44.1% in hospital, 12.8% in a care home, and 1.7% in another place. In 1.7% of death certificates, no details were given of the place of death. At 39.8%, the percentage of deaths that took place at home is notably high.

International studies

International studies confirm the predominance of deaths in institutions, but differ as to the information they give (20–36). *Table 6* briefly summarizes important international studies on place of death (*Table 6*). Cohen et al. (28) investigated hospital deaths as a proportion of all deaths during 2003 in various European countries. Percentages varied from 33.9% (Ireland) to 62.8% (Wales). The care or nursing home is becoming increasingly important as a place of death, as is shown by an example from Belgium (27) showing that, from 1998 to 2007, the percentage of deaths that took place in a care or nursing home rose from 18.3% to 22.6%. The percentages of deaths occurring at home also varied between studies, but most lay between 20% and 30% (20–22, 24–27, 30–32). Over the past 40 years, various tendencies in the distribution of place of death have been observed. For example, the number of deaths at home increased in Canada (31) and the USA (33), whereas in most European countries it decreased. At the same time, between 1994 and 2004, in Canada the frequency of deaths in hospital fell from 77.7% to 60.6%, and between 1980 and 1998 in the USA it fell from 54% to 41%. Investigations by Gomes et al. (25) show a steady drop in deaths at home in England and Wales since the 1970s, down to 18.3% in 2004. In England, the National End of Life Care Programme (2003–2006) was given special financial support, partly in order to counteract this trend, and indeed the percentage of deaths at home rose again to 20.8% in 2010.

Factors influencing place of death

In the present study, the likelihood of dying at home or hospital was greater for men; women were more likely to die in a care home or hospice. Because of their lower life expectancy, men living in a relationship have a higher probability of being survived by their partner, and this increases their chance of being cared for at home by relatives at the end of their life. The corollary of this is that, living to a greater age, women are more

TABLE 3

Place of death stratified by age and sex

		Home setting			Hospital			Care or nursing home			Hospice			Other place		
		F	M	F + M	F	M	F + M	F	M	F + M	F	M	F + M	F	M	F + M
	N	3 004	3 045	6 049	6 358	6 789	13 147	2 771	1 008	3 779	453	355	808	26	111	137
<18 years	%	0.4	0.5	0.4	1.4	1.3	1.3	0.0	0.0	0.0	0.0	0.0	0.0	11.5	0.0	2.2
	(n)	(12)	(15)	(27)	(90)	(86)	(176)	(0)	(0)	(0)	(0)	(0)	(0)	(3)	(0)	(3)
18–39 years	%	1.1	1.6	1.3	1.3	1.7	1.5	0.1	0.4	0.2	0.7	1.7	1.1	0.0	5.4	4.4
	(n)	(32)	(48)	(80)	(82)	(117)	(199)	(2)	(4)	(6)	(3)	(6)	(9)	(0)	(6)	(6)
40–64 years	%	11.9	25.1	18.5	14.5	22.9	18.8	1.2	8.1	3.0	23.0	29.9	26.0	7.7	43.2	36.5
	(n)	(356)	(765)	(1 121)	(920)	(1552)	(2472)	(33)	(82)	(115)	(104)	(106)	(210)	(2)	(48)	(50)
65–79 years	%	27.5	39.8	33.7	31.8	44.9	38.5	13.6	30.0	17.9	42.8	44.8	43.7	38.5	38.7	38.7
	(n)	(827)	(1213)	(2040)	(2020)	(3048)	(5068)	(376)	(302)	(678)	(194)	(159)	(353)	(10)	(43)	(53)
≥ 80 years	%	59.2	33.0	46.0	51.1	29.3	39.8	85.2	61.5	78.9	33.6	23.7	29.2	42.3	12.6	18.2
	(n)	(1777)	(1004)	(2781)	(3246)	(1986)	(5232)	(2360)	(620)	(2980)	(152)	(84)	(236)	(11)	(14)	(25)

F = female; M = male

TABLE 4

Factors influencing place of death

	2001			2011		
	OR	95% CI	p-value	OR	95% CI	p-value
Place of death: home setting						
Men vs. women	1.21	1.11–1.32	0.001*	1.18	1.08–1.29	0.001*
<60 years versus ≥ 80 years	0.94	0.82–1.07	0.331	1.41	1.23–1.61	0.001*
60–80 years versus ≥ 80 years	0.83	0.75–0.91	0.001*	1.14	1.04–1.26	0.006*
Urban versus rural area	0.57	0.52–0.61	0.001*	0.72	0.66–0.78	0.001*
Malignant disease	0.78	0.71–0.86	0.001*	1.07	0.98–1.17	0.128
Dementia ≥ 65 years	0.74	0.62–0.89	0.001*	0.88	0.77–1.01	0.078
Place of death: hospital						
Men vs. women	1.14	1.06–1.24	0.001*	1.36	1.26–1.46	0.001*
<60 years versus ≥ 80 years	1.87	1.66–2.12	0.001*	1.38	1.22–1.56	0.001*
60–80 years versus ≥ 80 years	1.89	1.73–2.05	0.001*	1.45	1.34–1.58	0.001*
Urban versus rural area	1.61	1.49–1.74	0.001*	1.54	1.43–1.66	0.001*
Malignant disease	1.14	1.05–1.24	0.001*	0.74	0.68–0.80	0.001*
Dementia ≥ 65 years	0.66	0.57–0.78	0.001*	0.37	0.33–0.42	0.001*
Place of death: care or nursing home						
Men vs. women	0.48	0.42–0.55	0.001*	0.50	0.45–0.56	0.001*
≥ 80 years versus < 80 years	3.73	3.25–4.28	0.001*	3.21	2.86–3.61	0.001*
Urban versus rural area	0.76	0.67–0.85	0.001*	0.71	0.65–0.79	0.001*
Malignant disease	0.73	0.63–0.84	0.001*	0.65	0.58–0.73	0.001*
Dementia ≥ 65 years	2.62	2.20–3.12	0.001*	3.64	3.24–4.10	0.001*
Place of death: hospice						
Men vs. women	0.59	0.45–0.78	0.001*	0.65	0.54–0.77	0.001*
<60 years versus ≥ 80 years	1.23	0.83–1.82	0.304	1.67	1.28–2.17	0.001*
60–80 years versus ≥ 80 years	1.02	0.75–1.40	0.878	1.43	1.16–1.76	0.001*
Urban versus rural area	-	-	-	1.13	0.94–1.35	0.204
Malignant disease	22.3	13.9–35.5	0.001*	25.7	18.4–35.7	0.001*
Dementia ≥ 65 years	0.50	0.16–1.59	0.239	0.42	0.24–0.73	0.002*

OR = odds ratio; CI = confidence interval; * p<0.01

Model accuracy of the multivariate analysis; R² (Nagelkerke):

Endpoints: 1, home setting: 0.04 (2001), 0.03 (2011); 2, hospital: 0.07 (2001), 0.08 (2011); 3, care or nursing home: 0.17 (2001), 0.23 (2011); 4, hospice: 0.18 (2001), 0.24 (2011)

likely to be widowed or living alone in old age, and to need outside or institutional help as they become more debilitated. The findings of the 2011 microcensus by the Federal Statistical Office show a steady rise in the number of persons living alone in Germany (37), which had gone up by around 4 million since 1991. At the age of 80, more than half of women (56%) were living alone, against only 22% of men.

Compared to those living in the rural areas, people living in urban areas were more likely to die in hospital. On the other hand, their probability of dying at home or in a care or nursing home was lower. Differences in the provision of care may explain the difference. If the number of hospital beds is small, as

in the rural areas selected for this study, the probability of dying at home will rise. If the availability of long-term care, hospice, and palliative care beds rises, they will increasingly be occupied. The percentage of those living alone can also have an effect here, since especially in urban areas many elderly people live on their own.

As would be expected, a clear association was found between the presence of malignant disease and an increased probability of dying in a hospice. Likewise, people with dementia more often died in care or nursing homes. Study data indicate that patients with non-solid tumors (leukemia, lymphoma) have an increased risk of dying in hospital (38).

TABLE 5

Population-related place of death data: Germany

Author	Location	Year	Characteristics of population sample	(n)	Home setting (%)	Hospital (%)	Nursing or care home (%)	Hospice (%)	Other place of death (%)
Weber et al. (8)	Mainz	1951–1995	Data from a funeral home (Mainz)	2914	33.8	51.8	13.5	n.d.	0.9
Bickel (9)	Mannheim	1991–1993	All deaths ≥ 65 years (n = 2507); of these, 38.2%	958	29.1 ^{*1}	49.7	21.2	n.d.	n.d.
Ochsmann et al. (10)	Rheinland-Palatinate	1995	All deaths Those with malignant disease	12 217 2487	39.8 44.1	44.1 43.9	12.8 10.2	n.d. n.d.	1.7 1.8
van Oorschot et al. (11)	Jena	1999	All deaths Those with malignant disease	860 212	28.7 32.5	48.6 54.2	18.0 11.3	n.d. n.d.	4.7 1.9
Papke et al. (12)	"Saxon Switzerland" (region of Saxony, Germany)	1997–2003	All deaths with malignant disease	2 361	44.0 ^{*3}	49.0	7.0 ^{*3}	n.d.	n.d.
Kaluza et al. (13)	Leipzig	1999	All deaths (source: Leipzig Health Authority)	n.d.	33.9	51.3	12.2	n.d.	2.7
Rodenstein (14)	Frankfurt (Main)	2000	All deaths (source: Frankfurt Register Office)	7402	30.0	62.0	9.0	n.d.	n.d.
Nick (15)	Landkreis Harburg	2004	All deaths	2170	27.0	48.1	18.1	n.d.	6.8
Escobar Pinzon et al. (16, 17)	Rheinland-Palatinate	2008	All deaths (n = 10 183); of these, 13.5% Those with malignant disease Those with dementia	1378 536 310	38.2 38.1 42.4	39.3 36.8 26.2	13.4 7.7 26.9	7.5 ^{*2} 16.8 ^{*2} 3.2 ^{*2}	1.6 0.8 1.3
Federal Statistical Office (Statistisches Bundesamt) (6)	Germany	Every year, e.g., 2013	Hospital deaths	417 300		46.7			
Sauer et al. (18)	Germany	2000–2009	Data from a health insurance company. Deaths ≥ 30 years	59 922	35.0 (2000) 29.9 (2009)	48.0 (2000) 51.0 (2009)	17.0 (2000) 20.0 (2009)	n.d.	n.d.
Schindler, Jaspers (19)	Germany	Up to 2004	Collation of place of death literature up to 2004		25.0–30.0	42.0–43.0	15.0–25.0	1.0–2.0	3.0–7.0

^{*1}Private home and other; ^{*2}hospice or palliative care unit; ^{*3}annual mean; n.d. = no data.
Search: PubMed/MEDLINE, Internet

TABLE 6

Population-related place of death data: international

Author	Location	Year	Characteristics of population sample	(n)	Home setting (%)	Hospital (%)	Nursing or care home (%)	Hospice (%)	Other place of death (%)
Federal Office of Health (Bundesamt für Gesundheit) (20)	Switzerland	2006–2011	All deaths	59 958 (2006) 61 786 (2011)	24.6 ^{*1} 19.3 ^{*1}	39.0 39.9	36.2 40.8	n.d.	n.d.
Austrian Federal Office of Statistics (Bundesanstalt Statistik Österreich) (21)	Austria	Every year	All deaths	79 526 (2013)	26.9	50.5	17.4	n.d.	5.1
Gao et al. (22)	England	1984–2010	All deaths	4 588 315 (1984–92) 3 998 686 (1993–00) 4 567 704 (2001–10)	24.1 20.4 19.0	64.7 55.0 57.3	n.d. 18.2 17.2	n.d. 4.1 5.1	11.1 2.3 1.4
National End of Life Care Intelligence Network (24)	England	2005–2007	All deaths	474 719 ^{*2}	19.1 ^{*2}	58.4 ^{*2}	15.6 ^{*2}	5.0	1.9
Gomes et al. (25)	England and Wales	2004–2010	All deaths	512 541 (2004) 493 242 (2010)	18.3 20.8	58.2 ^{*3} 53.7 ^{*3}	9.6 ^{*4} 9.7 ^{*4}	4.6 5.2	8.7 9.4
Houttekier et al. (27)	Belgium	1998–2007	Deaths ≥ 1 year of age	66 481 (1998) 65 435 (2007)	23.0 22.5	55.1 51.7	18.3 22.6	n.d. n.d.	3.6 3.1
Cohen et al. (28)	Belgium Netherlands England Wales Scotland Sweden	2002 (S) 2003 (B, NL, ENG, WAL, SCO)	All deaths	7156 (B) 141 936 (NL) 505 341 (ENG) 33 810 (WAL) 58 473 (SCO) 95 064 (S)	n.d.	51.6 (B) 33.9 (NL) 58.1 (ENG) 62.8 (WAL) 58.5 (SCO) 62.5 (S)	22.2 (B) 33.5 (NL) 17.2 (ENG) 14.1 (WAL) 18.1 (SCO) n.d. (S)	n.d.	n.d.
Loucka et al. (30)	Czech Republic Slovakia	2011	All deaths	9280 (CZ) 6305 (SK)	20.4 (CZ) 30.0 (SK)	58.4 (CZ) 54.8 (SK)	12.2 (CZ) 3.0 (SK)	n.d.	9.1 (CZ) 12.1 (SK)
Wilson et al. (31)	Canada	1994–2004	All deaths	155 514 (1994) 171 094 (2004)	19.3 29.5	77.7 60.6	3.0 9.9	n.d.	6.8
National Center for Health Statistics (32)	USA	2007	All deaths	2.5 million	24.0 (≥ 65 yrs) 30.0 (<65 yrs)	35.0 (≥ 65 yrs) 38.0 (<65 yrs)	28.0 (≥ 65 yrs) 5.0 (<65 yrs)	n.d.	n.d.

*1 Place of death (home, hospice, other place); *2 annual mean; *3 state hospitals and care homes; *4 non-state hospitals and care homes; B = Belgium, NL = Netherlands, ENG = England, WAL = Wales, SCO = Scotland, S = Sweden, CZ = Czech Republic, SK = Slovakia, n.d. = no data; Search: PubMed/MEDLINE, Internet

Finally, public health cost considerations may be related to the observed distribution of place of death—specifically, with the fall in the number of hospital deaths. The growing pressure of cost containment in the hospital sector could be one factor that has led to a reduction in lengths of hospital stay since the introduction of the DRG (diagnosis-related group) funding system in German health care; but has at the same time led to earlier discharge of patients for whom no further inpatient treatment options remain.

On the subject of factors influencing place of death, Gomes and Higginson (38) and Thönnies (39) provide concise literature reviews.

Strengths and limitations of this study

A strength of this study is the large number of death certificates analyzed ($n = 24\,009$)—the largest dataset for any study on this topic so far in Germany. Only 0.4% of the death certificates included lacked information about the place of death. The details given about the place of death were illegible or ambiguous only in a few rare cases; overwhelmingly, they were valid. No systematic misclassification in these few cases was identifiable. With regard to cause of death, the study looked only at whether malignant disease or dementia was present. It is not clear when the patients who died in hospital were admitted, or whether the admission was in fact pre-terminal for the purposes of life-preserving treatment. There is a limit to how far generalizations can be made on the basis of this study, because it is restricted to selected areas of Westphalia-Lippe and did not aim to represent the overall population of Germany.

KEY MESSAGES

- In Germany, place of death as given on the death certificate is not included in official statistics. Official statistics on place of death relate only to deaths that occurred in hospital.
- The present study investigated place of death as recorded on the death certificates of persons who died of natural causes in the years 2001 and 2011 in selected areas of Westphalia, Germany.
- Hospitals are still the most common place of death in Germany, followed by the deceased's home, care or nursing homes, hospices, and palliative care units.
- Fewer people are dying at home, and likewise fewer are dying in hospital. The greatest rise is in the number of people who die in care or nursing homes. The number of those dying in palliative care units or in hospices is increasing, but still makes up less than 6% of all deaths.
- Age, sex, place of residence, and the presence of malignant disease or dementia were shown to be independent variables influencing the place of death.

Future perspectives

Death occurs predominantly in institutions. It may be anticipated—not least owing to demographic changes, with increased life expectancies and a rise in the absolute number of deaths—that over the next few decades (40) dying in institutions will at least remain steady or, more likely, will increase.

At the same time, however, the hospice movement and palliative medicine are active in support of dying at home. These two areas of medicine are steadily becoming more accepted and valued by society in Germany. Against this background, it will be interesting to see whether this development even leads to a reversal of the trend: away from institutionalized dying and toward dying at home.

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Conflict of interest statement

Mr. Blum has had conference fees and travel and accommodation costs reimbursed by Mundipharma.

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