



National end of life care
INTELLIGENCE NETWORK



National End of Life
Care Programme
Improving end of life care



Deprivation and death: Variation in place and cause of death

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Key findings

This report improves our understanding of socioeconomic deprivation as a factor influencing end of life care. It highlights variations, some of which are known – for example, differences in age and cause of death by deprivation. Others are less well known, for example differences in place of death by deprivation.

The report adds to the evidence base for commissioners and providers of end of life care to use in planning services and tackling inequalities.

General

- Socioeconomic deprivation is a major determinant of where, when and how people die.
- There are fewer deaths (16% of the total) in the least deprived quintile (20%) of the population.
- Much of the analysis shows clear socioeconomic gradients, which highlight how inequalities affect the whole of society, not just the most deprived.

Place of death

- People living in the most deprived quintile are more likely to die in hospital (61%) than people living in other quintiles (54–58%).
- Even after taking into account the combined effects of deprivation quintile, age at death, gender and cause of death, death in hospital is more common in the most deprived quintile.
- Death in care or nursing homes, often the usual place of residence for the very elderly, was less common among people living in the most deprived quintile (11%) than any other quintile (16–20%).

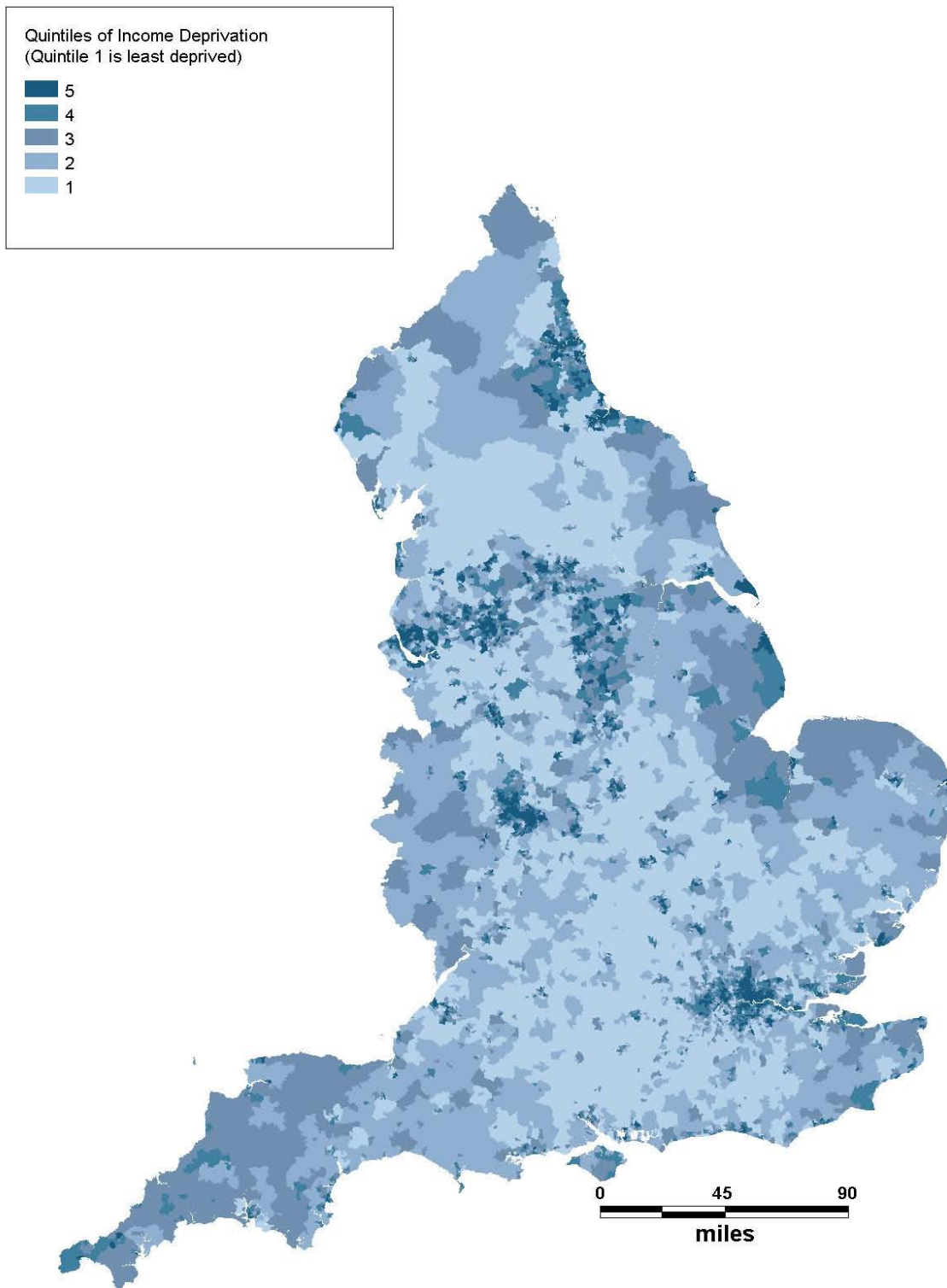
Cause of death

- For each underlying cause (cancer, cardiovascular disease, respiratory disease and 'other' causes), people living in the most deprived quintile were most likely to die in hospital.
- For each underlying cause (cancer, cardiovascular disease, respiratory disease and 'other' causes), within each age group (under 65, 65–84 and 85 and over), people living in the most deprived quintile were most likely to die in hospital, with the exception of deaths caused by cardiovascular disease and respiratory disease in the under 65 age group.
- There are more deaths caused by smoking related cancers of the lung, oesophagus, head and neck, bladder, cervix and liver in people living in the most deprived quintile (10,459) than in the least deprived quintile (6,524), and similarly more deaths caused by chronic respiratory disease in the most deprived quintile (8,820) than in the least deprived quintile (4,761).
- There are fewer deaths from malignant melanoma, breast and prostate cancer in the most deprived quintile (3,091) than any of the other quintiles (3,987–4,563).

Deaths by age

- 27% of deaths in the most deprived quintile were people aged 85 and over compared with 35–40% in each of the other quintiles. This is largely because people in the most deprived quintile die younger.
- There were twice as many deaths of people aged under 65 in the most deprived quintile (22,632) as in the least deprived quintile (11,294).
- For those who survive to age 85 and over, the ultimate cause of death is less dependent on deprivation than it is for people who die before old age.
- Among deaths of people aged under 65 years:
 - cancers associated with smoking caused twice as many deaths in the most deprived quintile (2,754) as in the least deprived quintile (1,416);
 - heart disease caused more than twice as many deaths in the most deprived quintile (3,886) as in the least deprived quintile (1,545);
 - chronic respiratory disease caused four times as many deaths in the most deprived quintile (1,251) as in the least deprived quintile (313);
 - external causes (accidents, assaults, self-harm) accounted for twice as many deaths in the most deprived quintile (2,031) as in the least deprived quintile (1,030).
- Among deaths of people aged between 65 and 84 years:
 - cancer is the most common cause of death for each deprivation quintile, and most common in the least deprived quintile (38% of deaths compared to 32–35% in the other quintiles);
 - respiratory disease accounts for nearly twice as many deaths in the most deprived quintile (7,512) as in the least deprived quintile (3,936);
- Among deaths of people aged 85 years or older:
 - less than 16% of people who die at this age live in the most deprived quintile;
 - heart disease and stroke cause more than a third of deaths at this age, a proportion that is consistent across deprivation quintiles.

Map 1: Income deprivation quintiles in England by Middle Super Output Area (IMD 2007)



Source: South West Public Health Observatory
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1 Introduction

This report looks at patterns of death by socioeconomic deprivation. It examines the interaction between deprivation, sex and age group, and place and underlying cause of death.

This work follows on from the report *Variations in Place of Death in England* (National End of Life Care Intelligence Network, 2010). Some of the analysis contained in this report repeats and expands on that undertaken in the original *Variations* report, with updated data for 2007–09, whilst other analyses are entirely new.

It is clear that there is considerable variation in patterns of ‘underlying’ cause and place of death by deprivation quintile, sex and age group. Some of these patterns are already well established and re-confirmed here; for example, the higher rates of smoking related deaths or higher proportions of deaths in hospital amongst the most deprived. Other analysis uncovers new patterns, such as the higher proportions of deaths from ‘external’ causes (accidents, assaults and self-harm) amongst the most deprived, and the variations in place of death from respiratory disease and ‘other’ causes by age group and deprivation quintile.

In this report we have chosen to present data, almost exclusively, as absolute numbers and proportions rather than the usual age-specific or age-standardised rates. The absolute numbers tell a clear story in terms of need for care and the proportions describe the way place of death varies with population segment or cause of death. It is hoped that this report will provide a useful insight into the relationship between socioeconomic deprivation and the cause and place of death in England.

2 Methodological notes

2.1 Source of data

All data presented in this report are from Office for National Statistics (ONS) mortality files for deaths registered in England between 2007 and 2009. The mortality files contain extracts from death certificates. Key data items used for this analysis include place of death postcode or 'normal' place of residence, date of birth, gender and cause of death.

2.2 Place of death

The ONS describes the place of death as i) one of 84 communal establishment types or ii) 'own residence' or iii) 'elsewhere'. The following categories, from the ONS' DH1 General Mortality Statistics are also used:

Hospital: NHS or non-NHS, acute, community or psychiatric hospitals/units, includes establishments described by ONS as:

- General Hospital (including convalescent)
- Sanatoria
- Geriatric Hospital or Unit
- Chronic Sick
- Maternity Hospital
- Military Hospital
- Psychiatric Hospital
- Psychiatric Unit
- Mental Hostel
- Mentally Handicapped (Adults)
- Mentally Handicapped (Children)
- Mental Nursing Home
- Psychiatric Hospital (Security)
- Mental Holiday Home
- Mental Aftercare
- Mental Hostel (Autism)
- Mentally Handicapped Home (Adults)
- Mentally Handicapped Home (Children)
- Mentally Infirm (Aged)
- Mental Nursing Home
- Mental Rehabilitation
- Multi-function site

Own Residence: the death occurred in the place of usual residence where this is *not* a communal establishment.

Old People's Home: Local authority or private residential home.

Nursing Home: NHS or private nursing home.

Hospice: many hospices are 'freestanding' but some are found within NHS hospitals. Also, hospices increasingly work in the community. At present ONS classifies the place of death as Hospice only when the event occurred in a freestanding hospice premises.

Elsewhere: other communal establishment or a private address other than normal place of residence or outdoor location or nil recorded.

The categorisation of place of death relies on the accuracy of ONS information regarding the nature of establishments caring for the sick. Some care needs to be taken interpreting the hospital and hospice categories in particular. Hospital refers not only to large acute hospitals but also community and psychiatric hospitals (see above). This data will under-report the role of hospices. The death certificate records the physical place of death – not who was caring for a person at the end of their life. This means, for example, if a hospice is actively caring for a person at the end of their life within a hospital setting, the place of death will be recorded as hospital.

2.3 Analysis by deprivation quintile

Lower Super Output Areas (LSOAs) are small areas of the country specifically devised to improve the reporting and comparison of local statistics. Within England there are 32,482 LSOAs (minimum population 1,000). The Index of Multiple Deprivation (IMD 2007) is a measure of how deprived each LSOA is, based on income, employment, health deprivation, education, skills, training and geographical access to services. LSOAs are grouped into quintiles according to the rank of their deprivation score such that each quintile has an equal resident population (however, as is shown in this report the distribution of deaths between quintiles is not even).

Each death is assigned to an LSOA by the person's residential postcode.

2.4 Cause of death

The single 'underlying' cause of death is determined from the death certificate by the ONS and coded using the ICD-10 system (International Classification of Diseases, Tenth Issue). This code is used to categorise cause of death as follows:

- cancer: C00 to C97 – includes all malignant neoplasms;
- respiratory disease: J00 to J99 – includes influenza, pneumonia, bronchitis, emphysema, asthma, and other chronic obstructive pulmonary disease;
- cardiovascular disease: I00 to I52 and I60 to I69 – includes rheumatic fever, rheumatic heart disease, hypertension, ischaemic heart disease, stroke;
- other: an 'underlying' cause of death not included in the first three categories.

An 'underlying' cause of death is defined by the World Health Organisation as:

- the disease or injury that initiated the train of events directly linked to death; or
- the circumstances of the accident or violence that produced the fatal injury.

According to the 'rules' concerning the recording of deaths, people with a particular disease who die from a completely unrelated cause will not have that disease recorded as either an 'underlying' or 'mentioned' cause of death. For example, a person with cancer who dies of a road accident will not have cancer recorded as either an 'underlying' or 'mentioned' cause of death. Consequently, the numbers of deaths referred to in this report are not a true measure of the numbers of people 'who die and who have' a particular disease, nor are the numbers shown a measure of either: i) incidence (numbers of people newly diagnosed with a disease); or prevalence (numbers of people living with a disease).

3 Distribution of deaths by deprivation quintile

3.1 Numbers and proportions of deaths by deprivation quintile

In England, between 2007 and 2009, an average of 468,574 deaths were registered each year.

Table 3.1 and Figure 3.1 show that these are not evenly spread across quintiles. For example, the least deprived quintile (fifth of the population) had the fewest deaths at 16% of the total.

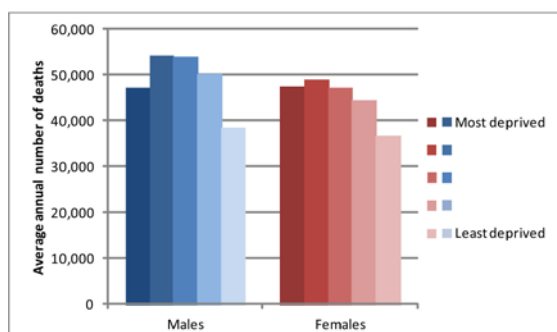
The distribution of deaths is not even across deprivation quintiles because the quintiles differ, on average, in their age profile (the most deprived areas tend to be younger), and in the health of their populations (for example, smoking and obesity are more common in the most deprived quintile).

There were more deaths of males than of females. Table 3.1 shows that this was true for each quintile with the exception of the most deprived, in which the number of male deaths was almost equal that of females.

Table 3.1: Number of deaths by deprivation quintile and sex, England, 2007–09

Deprivation quintile	People		Males		Females	
	Average annual registered deaths	Percentage of all deaths %	Average annual registered deaths	Percentage of male deaths %	Average annual registered deaths	Percentage of female deaths %
5–Most	94,479	20.2	47,082	19.3	47,396	21.1
4	103,080	22.0	54,250	22.2	48,830	21.7
3	100,972	21.5	53,838	22.1	47,134	21.0
2	94,827	20.2	50,266	20.6	44,562	19.8
1–Least	75,216	16.1	38,553	15.8	36,663	16.3
Total	468,574	100.0	243,989	100.0	224,585	100.0

Figure 3.1: Number of deaths by deprivation quintile and sex, England, 2007–09



3.2 Age at death and deprivation quintile

Just under half of all deaths were of people aged between 65 and 84 years. Figure 3.2 shows that this proportion is similar for each deprivation quintile.

Overall, there were approximately twice as many deaths in the 85 and over age group as in the under 65 age group but this was not the case for every deprivation quintile. There were more deaths at a younger age in the most deprived quintile (Figure 3.2a).

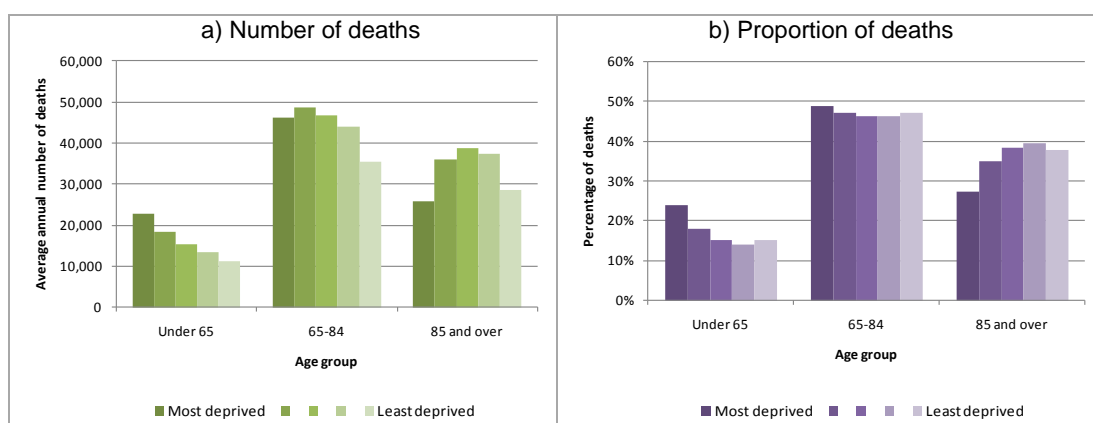
There were twice as many deaths of under 65 year-olds in the most deprived quintile (22,632) as in the least deprived quintile (11,294). Figure 3.2b shows that nearly a quarter (24%) of deaths in the most deprived quintile were in the under 65s, more than the 14–18% range in the other quintiles.

Just over a quarter (27%) of deaths in the most deprived quintile were among people aged 85 and over, a lower proportion than the 35–40% in the other quintiles.

16% of all deaths in the population aged 85 and over were in the least deprived quintile.

Tables 3.2 and 3.3 show an age gradient across deprivation quintiles. There is both an older average population and older age at death in the least deprived quintile.

Figure 3.2: Distribution of deaths by age and deprivation quintile, England, 2007–09



Note : Proportions add to 100% for each quintile

See Appendix A for more details.

Table 3.2: Average age of the living population by deprivation quintile and sex, England, 2007–09

Deprivation quintile	Average age (years)		
	People	Males	Females
5–Most	35.6	34.6	36.6
4	39.0	37.7	40.2
3	41.0	39.7	42.2
2	41.9	40.7	43.0
1–Least	41.2	40.2	42.2
All	39.7	38.6	40.8

Table 3.3: Average age at death by deprivation quintile and sex, England, 2007–09

Deprivation quintile	Average age at death		
	People	Males	Females
5–Most	73.0	69.5	76.4
4	76.4	73.0	79.5
3	77.9	74.8	80.7
2	78.5	75.6	81.1
1–Least	78.0	75.6	80.3
All	76.7	73.6	79.6

4 Distribution of place of death by deprivation quintile

4.1 Place of death and deprivation quintile

More than half (57%) of deaths in England between 2007 and 2009 occurred in hospital. Figure 4.1 shows that deaths in the most deprived quintile were more likely to have been in hospital (61%) compared with the other deprivation quintiles (54–58%).

Although the proportion of deaths in hospital is highest for the most deprived quintile, Figure 4.1a shows that the total number of deaths in this quintile is lower than in the next most deprived quintile (Quintile 4).

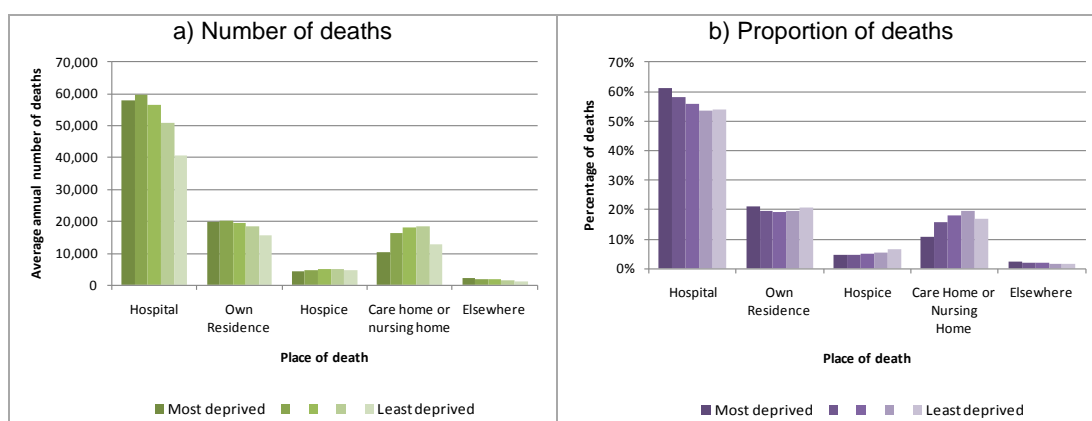
There is no clear gradient across deprivation quintiles for the proportion of deaths at home (average 20%) (Figure 4.1b).

Death in care or nursing homes, often the usual place of residence for the very elderly, was least common in the most deprived quintile (11% of deaths compared with 16–20% in the other quintiles).

Death in hospices was most common in the least deprived quintile (6.4% compared to 4.5% in the most deprived).

The 'elsewhere' category includes some accidents, road accidents, assaults, suicides and drug related deaths, many of which occur either outside or at an address other than the usual place of residence. Deaths 'elsewhere' are more common amongst people living in the most deprived quintile (2.3%) than any other deprivation quintile (1.8–2.0%).

Figure 4.1: Distribution of place of death by deprivation quintile, England, 2007–09



See Appendix B for more details.

4.2 Place of death and deprivation quintile by age at death

The variation in place of death by deprivation quintile is similar for each of the broad age groups – under 65 years, 65–84 years, and 85 years and over – and is shown in Figure 4.2 and Table 4.1.

The proportion of deaths in hospital was greatest for the most deprived quintile in each age group.

The proportion of deaths in hospices was greatest for the least deprived in each age group.

This is particularly striking in people who died aged under 65. In this age group, despite 28% of deaths being in the most deprived quintile, only 19% of hospice deaths were from this quintile.

This contrasts with the least deprived quintile, in which deaths under 65 years accounted for 14% of all deaths but 19% deaths in a hospice.

The association between deprivation and death in a person's own residence is not strong in the under 65s. However, in the 65–84 and 85 and over age groups the proportion of deaths in own residence is highest in the least deprived quintile.

For each of the three age groups the proportion of deaths in a care home or nursing home is lowest in the most deprived quintile.

Figure 4.2: Distribution of deaths by age at death, place of death and deprivation quintile, (percentage of deaths in quintile), England, 2007–09

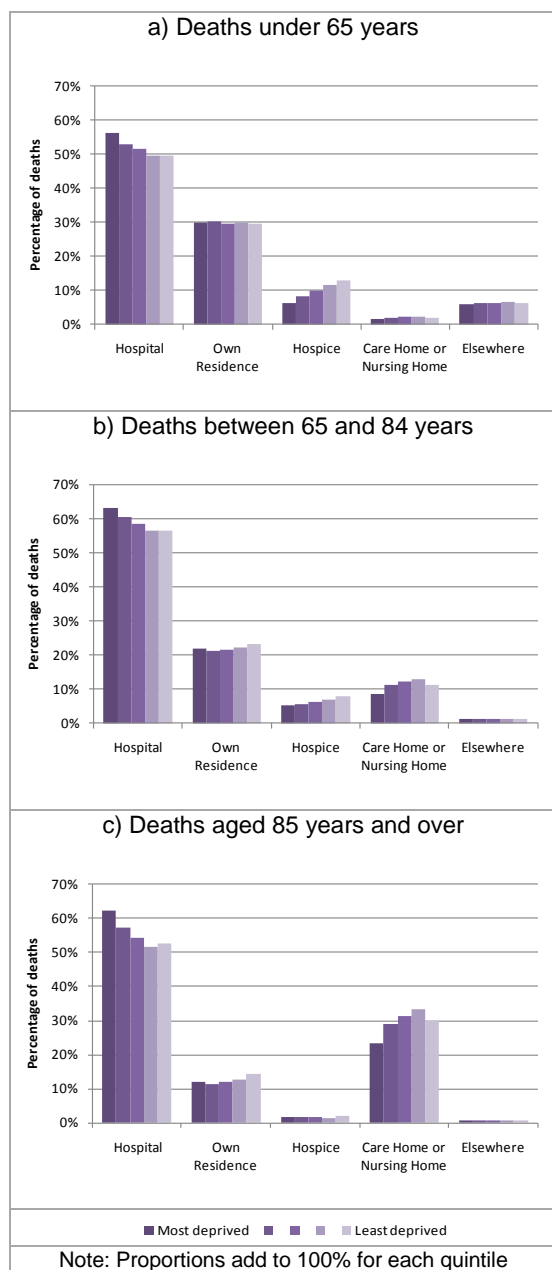


Table 4.1: Distribution of deaths by age at death, place of death and deprivation quintile, (annual average numbers of deaths), England, 2007–09

a) Average annual number of deaths under 65 years

Deprivation quintile	Hospital	Own residence	Hospice	Care or nursing homes	Elsewhere
5 –Most	12,718	6,782	1,403	351	1,378
4	9,755	5,581	1,545	348	1,178
3	7,939	4,566	1,550	349	967
2	6,639	4,009	1,557	320	896
1–Least	5,587	3,326	1,454	222	706
Total	42,638	24,263	7,510	1,590	5,125

b) Average annual number of deaths between 65 and 84 years

Deprivation quintile	Hospital	Own residence	Hospice	Care or nursing homes	Elsewhere
5 –Most	29,091	10,109	2,403	3,911	584
4	29,466	10,380	2,731	5,400	604
3	27,395	10,129	2,951	5,699	615
2	24,894	9,810	3,011	5,654	570
1–Least	20,048	8,222	2,825	3,956	440
Total	130,893	48,650	13,920	24,620	2,813

c) Average annual number of deaths 85 years and over

Deprivation quintile	Hospital	Own residence	Hospice	Care or nursing homes	Elsewhere
5 –Most	16,003	3,101	426	6,028	189
4	20,664	4,156	565	10,453	254
3	21,105	4,700	616	12,120	272
2	19,389	4,743	565	12,533	239
1–Least	15,018	4,096	546	8,573	198
Total	92,180	20,796	2,718	49,707	1,152

See Appendix C for more detail.

5 Distribution of cause of death by deprivation quintile

5.1 Underlying cause of death and deprivation quintile

The distribution of deaths by underlying cause of death varies with deprivation quintile. Figure 5.1 and Table 5.1 show this for deaths grouped broadly into four causes: cancer, cardiovascular disease, respiratory disease and any 'other' cause.

For each deprivation quintile, except the least deprived, cardiovascular disease is the most common and respiratory disease the least common underlying cause of death. In the least deprived quintile, there are more deaths from cancer than from the other three causes (Figure 5.1a).

The least deprived quintile also has the highest proportion of deaths from cancer. The most deprived quintile has the highest proportion of deaths from respiratory disease and 'other' causes but the lowest proportion of deaths from cardiovascular disease, for which there is no clear gradient across quintiles.

The least deprived quintile has the smallest number of deaths for each cause. However, it has the highest proportion of deaths from cancer. This can be explained by the relatively low numbers of deaths from respiratory disease and 'other' causes in the least deprived quintile.

Figure 5.1: Distribution of deaths by underlying cause and deprivation quintile, England, 2007–09

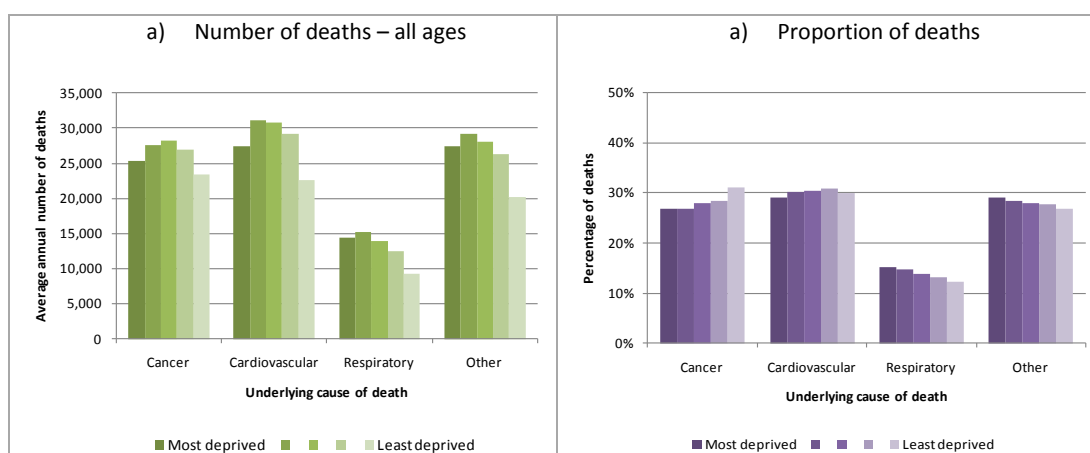


Table 5.1: Distribution of deaths by underlying cause and deprivation quintile, England 2007-09

a) Average annual number of deaths – all ages					b) Percentage of deaths within each underlying cause of death				
Deprivation quintile	Cancer	Cardio-vascular	Respiratory disease	Other	Deprivation quintile	Cancer %	Cardio-vascular %	Respiratory disease %	Other %
5–Most	25,282	27,434	14,377	27,386	5–Most	19.2	19.4	22.1	20.9
4	27,618	31,158	15,130	29,174	4	21.0	22.1	23.3	22.3
3	28,155	30,809	13,882	28,126	3	21.4	21.8	21.3	21.5
2	26,986	29,154	12,418	26,269	2	20.5	20.7	19.1	20.0
1–Least	23,331	22,539	9,219	20,127	1–Least	17.8	16.0	14.2	15.4
Total	131,371	141,095	65,026	131,082	Total	100.0	100.0	100.0	100.0

5.2 Underlying cause of death and deprivation quintile by age at death

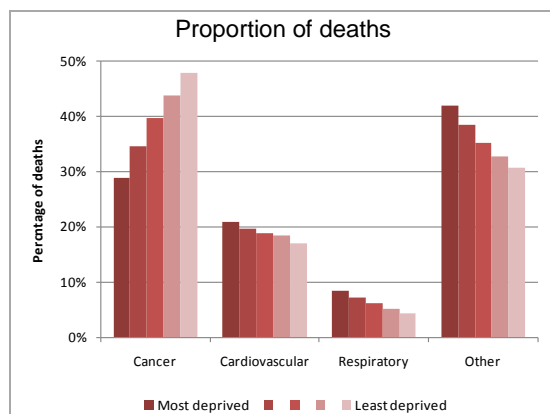
For each deprivation quintile, the distribution of cause of death varies by age at death. This section shows that the greatest deprivation effect is in deaths of people aged under 65 and the least effect in people aged 85 and over. This means that for those who survive to old age, the ultimate cause of death is less influenced by deprivation quintile than it is for people who die before old age. See Appendix D for more details.

5.2.1 Deaths under 65 years of age

Figure 5.2 shows that in this age group:

- The most common cause of death in the least deprived quintile was cancer (48% of deaths compared to 29% in the most deprived quintile).
- The most common cause of death in the most deprived quintile was 'other' causes (42% of deaths compared with 31% in the least deprived quintile).
- Death from cardiovascular disease (heart attack and stroke) was most common in the most deprived quintile (on average 19% of all deaths).
- Death from respiratory disease was least common (7% of deaths), although, again, it was most common in the most deprived.

Figure 5.2: Distribution of deaths by underlying cause and deprivation quintile for deaths under 65 years of age, England, 2007–09



Note : Proportions add to 100% for each quintile

Table 5.2 shows that the number of deaths for each cause of death is highest in the most deprived quintile and lowest for the least deprived quintile. It also shows that approximately three times as many deaths from both respiratory disease and 'other' causes occur in the most deprived quintile compared to the least deprived.

Table 5.2: Distribution of deaths by underlying cause and deprivation quintile in the under 65s, England, 2007–09

a) Average annual number of deaths

b) Proportion of deaths

Deprivation quintile	Cancer	Cardio-vascular	Respiratory disease	Other
5–Most	6,524	4,727	1,890	9,491
4	6,370	3,629	1,320	7,087
3	6,116	2,909	942	5,404
2	5,882	2,470	676	4,393
1–Least	5,409	1,923	482	3,480
Total	30,301	15,658	5,310	29,855

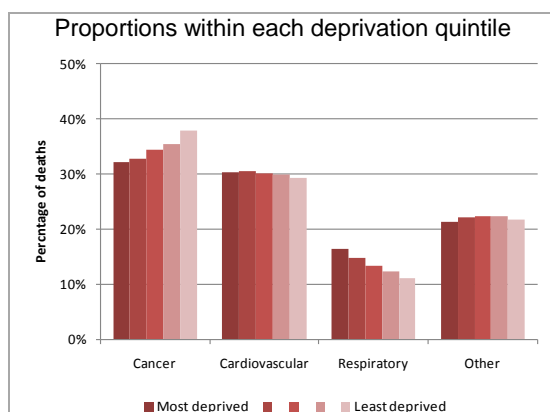
Deprivation quintile	Cancer %	Cardio-vascular %	Respiratory disease %	Other %	Total %
5–Most	21.5	30.2	35.6	31.8	27.9
4	21.0	23.2	24.9	23.7	22.7
3	20.2	18.6	17.7	18.1	18.9
2	19.4	15.8	12.7	14.7	16.5
1–Least	17.9	12.3	9.1	11.7	13.9
Total	100.0	100.0	100.0	100.0	100.0

5.2.2 Deaths in people aged between 65 and 84

Figure 5.3 and Table 5.3 show that, in this age group:

- There is less variation in cause of death than in the under 65s.
- Cancer is the most common cause of death in every quintile (on average 34%).
- Although the proportion of cancer deaths is higher in the least deprived quintile (38%) than the most deprived (32%), the range is smaller than it was for, the under 65s.
- Respiratory disease is a more common cause of death, and is more common among the most deprived (16% of deaths) than the least deprived (11%).
- The proportion of deaths from cardiovascular disease and ‘other’ causes is similar across quintiles (average 30% and 22% respectively).
- The most deprived quintile does not have the highest number of deaths for any of the underlying causes but the least deprived quintile has the lowest number of deaths for each underlying cause.

Figure 5.3: Distribution of deaths by underlying cause and deprivation quintile in people aged between 65 and 84, England, 2007–09



Note : Proportions add to 100% for each quintile

Table 5.3: Total and proportion of deaths of people aged between 65 and 84 by cause of death and deprivation quintile, England, 2007–09

a) Number of deaths

Deprivation quintile	Cancer	Cardio-vascular	Respiratory disease	Other
5–Most	14,784	13,954	7,512	9,848
4	15,909	14,803	7,159	10,709
3	16,085	14,090	6,193	10,420
2	15,544	13,179	5,381	9,835
1–Least	13,434	10,395	3,936	7,726
Total	75,756	66,422	30,180	48,538

b) Proportion of deaths

Deprivation quintile	Cancer %	Cardio-vascular %	Respiratory disease %	Other %	Total %
5–Most	19.5	21.0	24.9	20.3	20.9
4	21.0	22.3	23.7	22.1	22.0
3	21.2	21.2	20.5	21.5	21.2
2	20.5	19.8	17.8	20.3	19.9
1–Least	17.7	15.6	13.0	15.9	16.1
Total	100.0	100.0	100.0	100.0	100.0

5.2.3 Deaths in people aged 85 years and over

Figure 5.4 and Table 5.4 show that, in this age group:

- There is less variation with deprivation quintile in this age group than in the under 65s or 65–84 age group. This suggests that for people who survive to 85 years and over, their ultimate cause of death is less influenced by deprivation quintile than it is for people who die younger.
- The most common cause of death is cardiovascular disease (35%) followed by ‘other’ causes (32%).
- Deaths from cardiovascular disease are most common in the least deprived quintile, while death from respiratory disease is most common in the most deprived quintile.
- Cancer is the least common cause of death in each quintile.

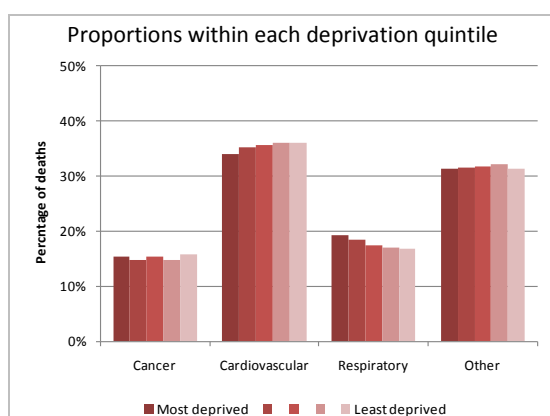
Figure 5.4: Distribution of deaths by underlying cause and deprivation quintile for deaths at 85 years and over, England, 2007-09

Table 5.4 : Total and proportion of deaths of people aged 85 and over by cause of death and deprivation quintile, England 2007–09

a) Number of deaths

Deprivation quintile	Cancer	Cardio-vascular	Respiratory disease	Other
5–Most	3,974	8,752	4,974	8,047
4	5,339	12,726	6,651	11,378
3	5,954	13,810	6,748	12,301
2	5,560	13,506	6,361	12,041
1–Least	4,488	10,221	4,802	8,920
Total	25,315	59,015	29,536	52,688

b) Proportions within each cause of death

Deprivation quintile	Cancer %	Cardio-vascular %	Respiratory disease %	Other %	Total %
5–Most	15.7	14.8	16.8	15.3	15.5
4	21.1	21.6	22.5	21.6	21.7
3	23.5	23.4	22.8	23.3	23.3
2	22.0	22.9	21.5	22.9	22.5
1–Least	17.7	17.3	16.3	16.9	17.1
Total	100.0	100.0	100.0	100.0	100.0

5.2.4 Discussion of the effect of deprivation on cause of death

Smoking is one of the major causes of premature death. It increases the risk of cancer (including lung, oesophagus, bladder, liver, stomach, cervix, myeloid leukaemia, bowel and ovary)¹, heart disease, stroke and chronic respiratory disease.² These conditions tend to correspond to those causes of death that are more common in the most deprived than in the least deprived quintile. Table 5.5 shows that this is particularly true for deaths in people aged under 85 years. See Appendix E for a more detailed breakdown.

The incidence of lung, oesophagus, stomach, head and neck, bladder, cervix and liver cancer are highest in the most deprived population.³ This is a broadly similar list to those cancers associated with smoking. Indeed deaths from these causes in the most deprived quintile are 1.5 times the number in the least deprived quintile. Malignant melanoma, breast and prostate cancer, are more common in the least deprived quintile (0.7 times the number in the most deprived). Most other cancers do not have a proven association with deprivation and the number of deaths from these causes is approximately equal in each quintile.

Deaths from 'other' causes includes external causes (accidents, assaults, self-harm) and Alzheimer's disease, dementia and senility. External cause deaths are most common in the young deprived. Alzheimer's disease, dementia and senility are most common as a cause of death in the 85s and over but are not strongly associated with deprivation. However, since relatively few of the most deprived deaths are in this older age group, deaths from Alzheimer's disease, dementia and senility are correspondingly low in the most deprived quintile.

¹ Cancer Research UK <http://info.cancerresearchuk.org/cancerstats/causes/lifestyle/tobacco/>

² NHS <http://www.nhs.uk/chq/Pages/2344.aspx?CategoryID=53&SubCategoryID=536>

³ NCIN Cancer Incidence by deprivation, England 2000-2004 (2010)

Table 5.5: Total deaths by underlying cause, age at death and deprivation quintile, England, 2007–09

Deprivation quintile	Cancer			Circulatory disease		Respiratory disease		Other causes			Total
	Cancer 1 (Higher incidence associated with more deprivation)	Cancer 2 (Higher incidence associated with less deprivation)	Cancer 3 (No proven association between incidence and deprivation)	Heart disease	Stroke	Respiratory acute	Respiratory chronic & other	Dementia, Alzheimer's disease and Senility	External causes	Other	

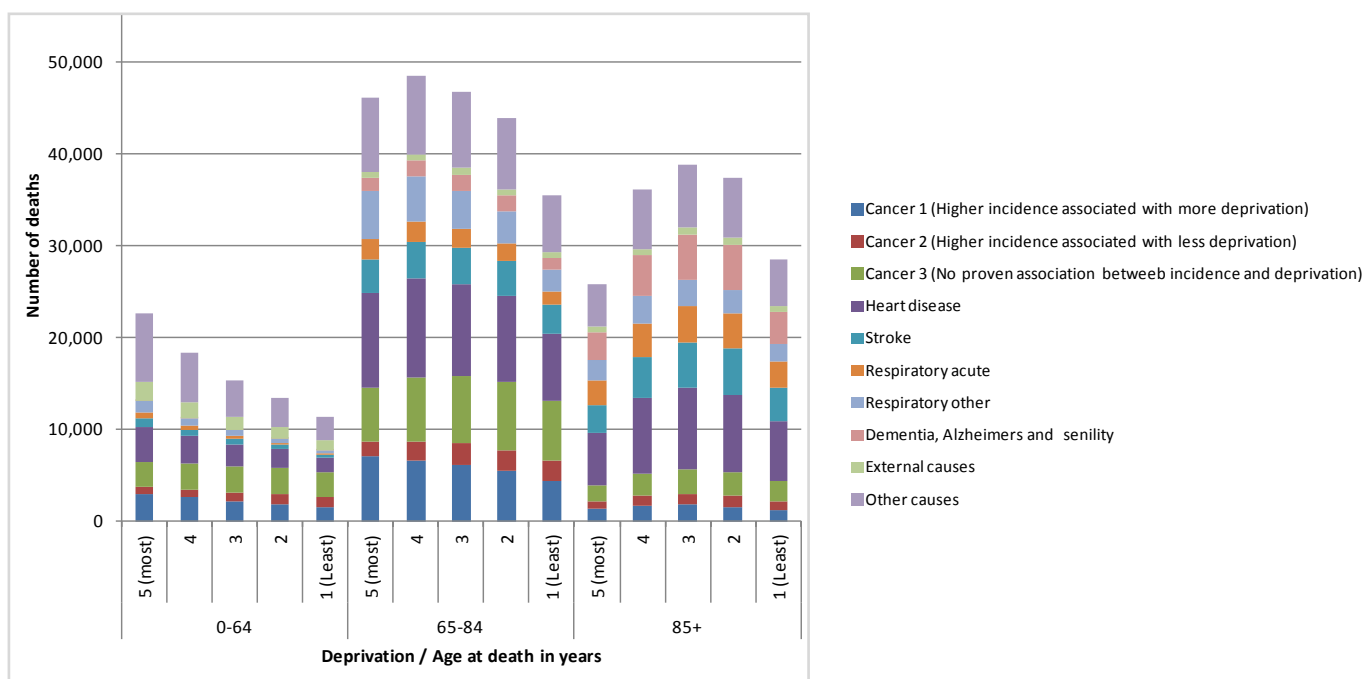
0-64 years											
5 Most	2,936	783	2,703	3,886	842	639	1,251	44	2,031	7,517	22,632
4	2,555	934	2,787	2,973	657	448	873	47	1,670	5,465	18,408
3	2,147	1,007	2,858	2,361	548	335	607	48	1,402	4,058	15,371
2	1,852	1,052	2,895	1,988	482	234	443	45	1,224	3,206	13,420
1 Least	1,529	1,090	2,714	1,545	378	169	313	35	1,030	2,492	11,295

65-84 years											
5 Most	7,078	1,642	5,796	10,332	3,623	2,251	5,261	1,409	682	8,025	46,099
4	6,657	2,011	6,916	10,789	4,015	2,283	4,877	1,721	703	8,609	48,582
3	6,123	2,351	7,279	10,044	4,045	2,081	4,109	1,685	736	8,334	46,788
2	5,428	2,351	7,430	9,307	3,872	1,883	3,496	1,719	702	7,745	43,934
1 Least	4,388	2,190	6,571	7,334	3,061	1,411	2,527	1,271	575	6,165	35,494

85+ years											
5 Most	1,417	665	1,751	5,845	2,907	2,666	2,308	3,062	545	4,582	25,749
4	1,685	1,042	2,397	8,289	4,437	3,728	2,924	4,464	725	6,404	36,096
3	1,754	1,183	2,777	8,863	4,943	3,899	2,845	4,948	795	6,794	38,801
2	1,582	1,160	2,582	8,489	5,016	3,774	2,588	4,980	749	6,548	37,468
1 Least	1,267	957	2,083	6,522	3,702	2,882	1,921	3,527	608	4,971	28,439

Notes: Cancer 1: Lung, Oesophagus, Head and Neck, Stomach, Bladder, Cervix, Liver; Cancer 2: Melanoma, Breast, Prostate; Cancer 3: All other cancers

Figure 5.5: Number of deaths by underlying cause, age at death and deprivation quintile, England, 2007–09



6 Distribution of place of death and cause of death by deprivation quintile

6.1 Place of death by deprivation quintile and cause of death

The distribution of place of death by deprivation is similar for each underlying cause (Figure 6.1 and Table 6.1).

Death in hospital is most common and death in care or nursing homes least common in the most deprived quintile for each cause of death.

There are differences, though, in particular, in the case of deaths from cancer. The overwhelming majority of hospice deaths are from cancer.

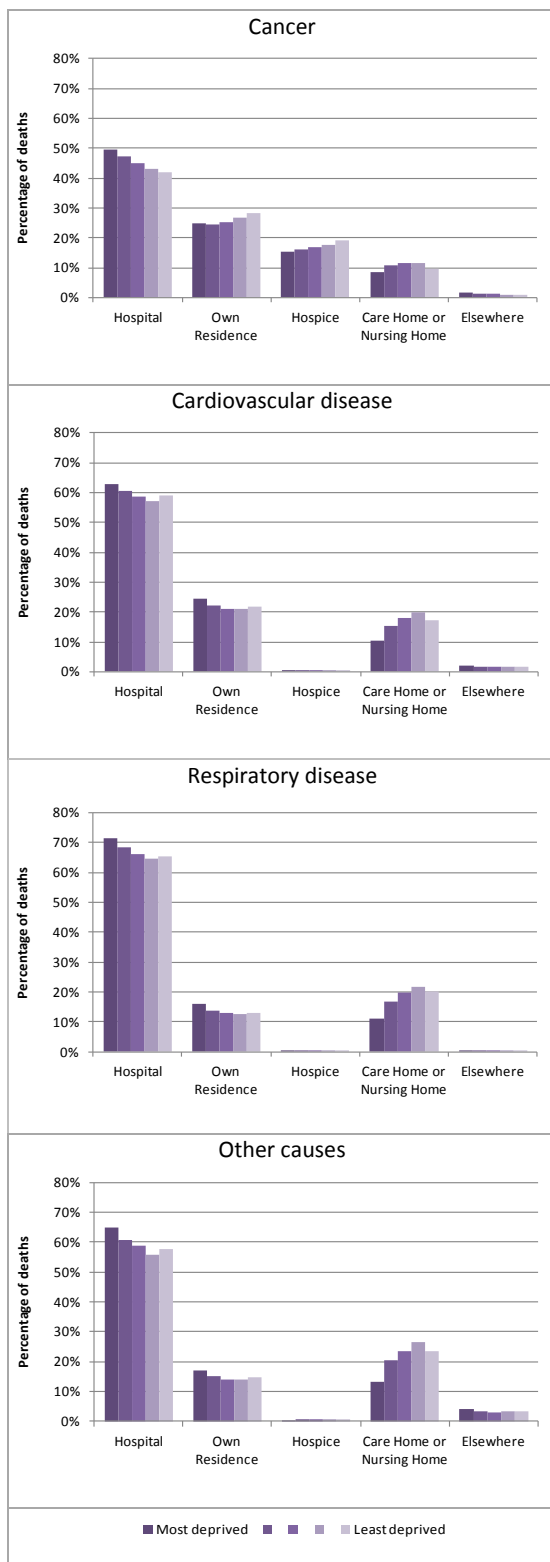
The proportion of cancer deaths that occur in hospices is highest for the least deprived quintile and lowest for the most deprived quintile. In terms of absolute numbers, however, deaths are highest in the second least deprived and middle deprivation quintiles.

Death in a person's own residence was more common for cancer than for any of the other causes. The highest proportion of cancer deaths occurring at home was in the least deprived quintile. For each of the other causes of death, the proportion of deaths in a person's own residence was highest in the most deprived quintile.

The proportion of deaths in care or nursing homes was lowest for the most deprived quintile for each the underlying causes of death.

Deaths from 'other' causes includes accidents, falls, self-harm, and assaults – causes which can occur in a public place. This partly explains why deaths 'elsewhere' are most common for 'other' causes.

Figure 6.1: Distribution of place of death by deprivation quintile and cause of death, England, 2007–09



Note : Proportions add to 100% for each quintile

Table 6.1: Total deaths by deprivation and place of death by cause of death, England, 2007–09

Deprivation quintile	Place of death				
	Hospital	Own residence	Hospice	Care or nursing homes	Elsewhere
5 –Most	12,481	6,282	3,929	2,195	396
4	13,024	6,708	4,479	3,019	387
3	12,665	7,128	4,765	3,260	336
2	11,616	7,236	4,782	3,076	275
1 –Least	9,748	6,587	4,504	2,264	228
Total	59,534	33,940	22,460	13,814	1,623

Deprivation quintile	Place of death				
	Hospital	Own residence	Hospice	Care or nursing homes	Elsewhere
5 –Most	17,262	6,740	86	2,828	518
4	18,868	6,913	113	4,735	530
3	18,092	6,534	108	5,524	551
2	16,622	6,139	97	5,769	528
1 –Least	13,291	4,888	95	3,859	406
Total	84,135	31,214	498	22,716	2,532

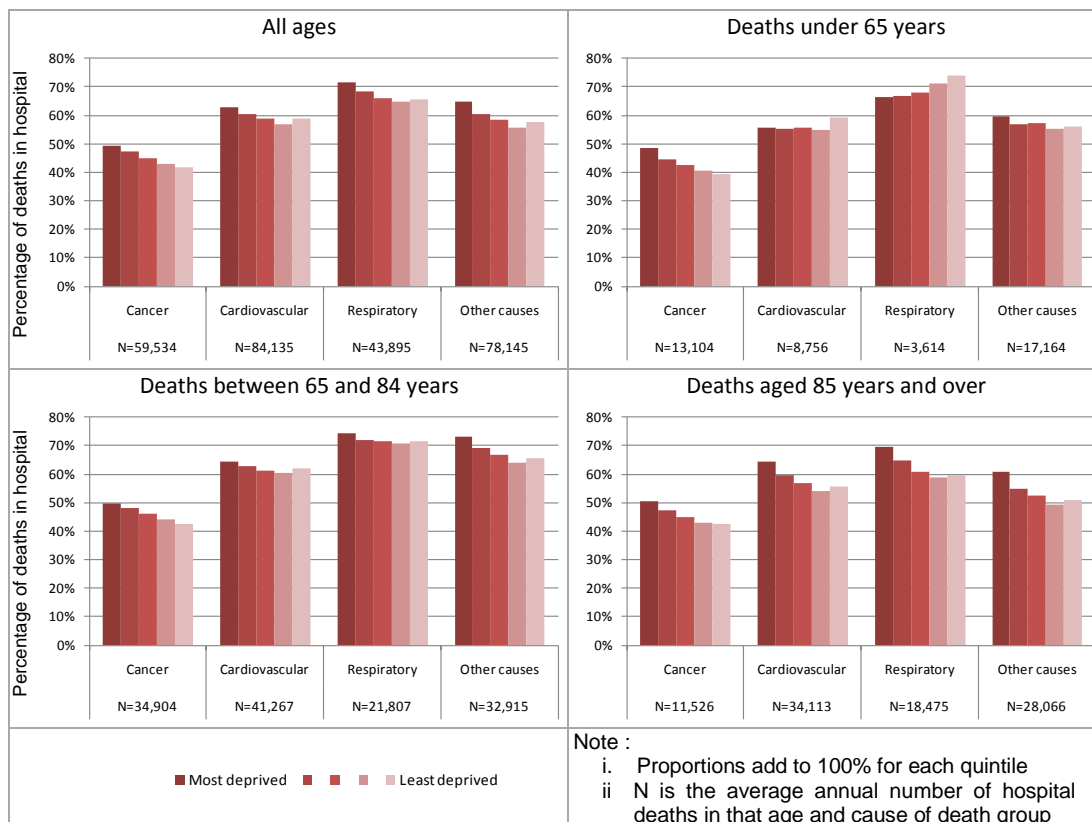
Deprivation quintile	Place of death				
	Hospital	Own residence	Hospice	Care or nursing homes	Elsewhere
5–Most	10,303	2,293	78	1,604	99
4	10,334	2,084	84	2,530	98
3	9,185	1,807	72	2,739	79
2	8,026	1,556	68	2,709	60
1–Least	6,048	1,194	60	1,871	47
Total	43,895	8,933	362	11,452	383

Deprivation quintile	Place of death				
	Hospital	Own residence	Hospice	Care or nursing homes	Elsewhere
5–Most	17,767	4,678	139	3,664	1,139
4	17,658	4,412	165	5,917	1,021
3	16,497	3,926	172	6,645	886
2	14,657	3,632	186	6,952	841
1–Least	11,566	2,974	166	4,757	663
Total	78,145	19,622	828	27,935	4,551

6.2 Deaths in hospital, underlying cause of death and deprivation quintile by age

Figure 6.2 shows that, for nearly all combinations of cause of death and age group, the proportion of people who die in hospital is greatest in the most deprived quintile. Only in the under 65 age group is the pattern not so clear. For deaths caused by cancer and 'other' causes the most deprived have the highest proportion of deaths in hospital but for deaths caused by cardiovascular disease and respiratory disease the least deprived quintile has the highest proportion of deaths in hospital.

Figure 6.2: Distribution of deaths in hospital by place of death, deprivation quintile and age at death, England, 2007–09



7 Comparison of local authorities using deprivation quintiles

This report shows variations in place, cause and age of death by deprivation quintile.

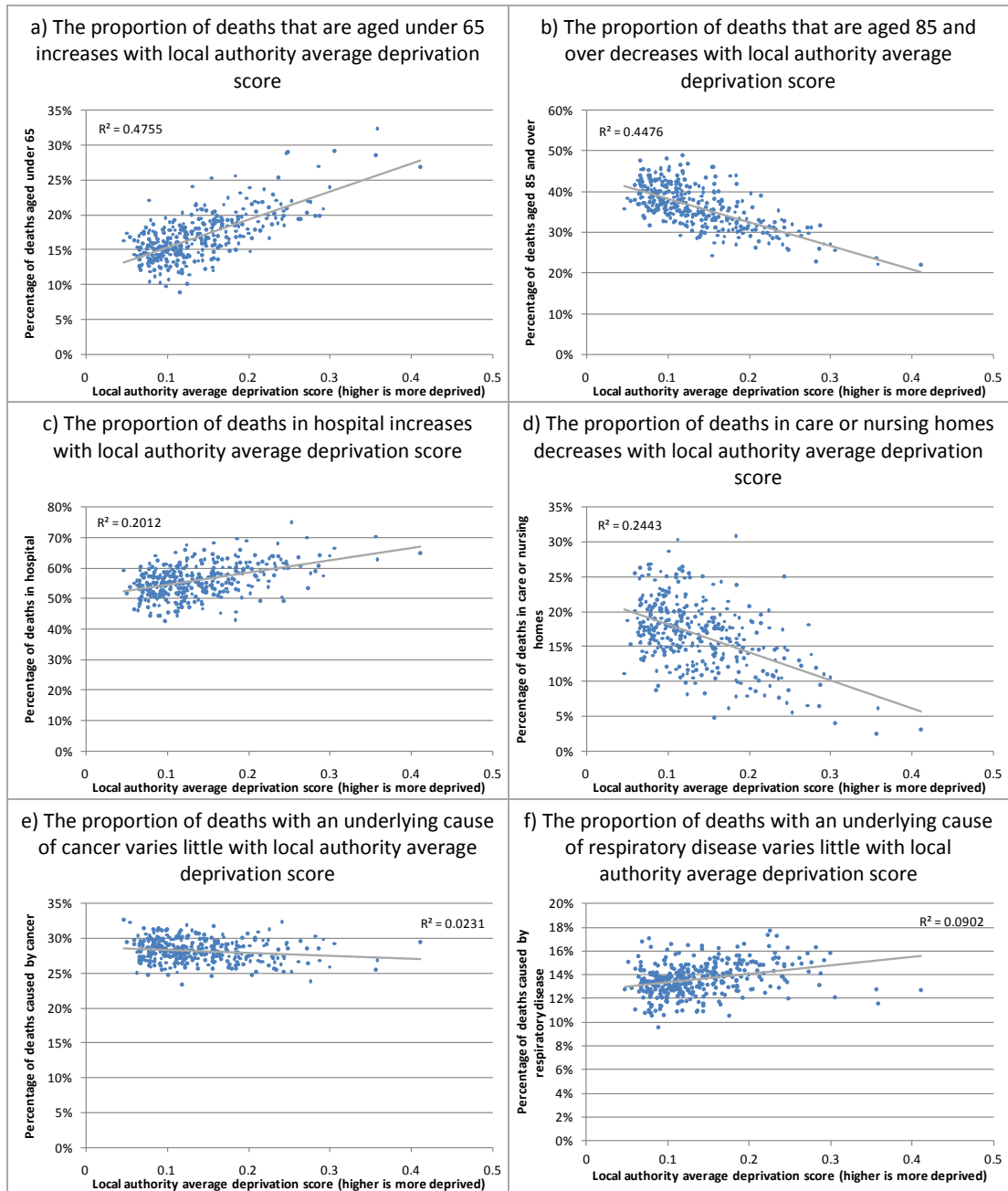
Figure 7.1 shows the results of analysis at local authority level:

- The most deprived local authorities have the highest proportion of deaths under 65 years of age.
- The least deprived local authorities have the highest proportion of deaths aged 85 and over.
- Hospital deaths are more common in the most deprived local authorities.
- Deaths in care or nursing homes are more common in the least deprived local authorities.
- The proportion of deaths with an underlying cause of cancer is not strongly associated with local authority deprivation.

Although there are some associations between local authority deprivation and place of death, age at death and cause of death, there remains considerable scatter variation. That is, the relative deprivation of local authorities accounts for some but not all of the variation. Provision and quality of health and social care vary. For example, hospitals provide specialist palliative care in some areas while in other areas there is a strong hospice or nursing home sector.

Note: For this analysis an average deprivation score was calculated for each local authority from the income deprivation score for each Lower Super Output Area within the local authority area. The component scores were combined as a population weighted mean.

Figure 7.1: Plots of population end of life characteristics against average local authority deprivation quintile, England, 2007–09



8 Death in hospital and deprivation quintile: a multivariate analysis

To understand the effects of deprivation better, we did a multivariate analysis of the likelihood of death in hospital and its variation with age, sex, and cause of death (see Table 8.1).

The results of the full (all deaths) analysis, indicate that the odds of dying in hospital are increased by 29% (a factor of 1.29) for the most deprived quintile compared to the least deprived quintile.

The sub-analyses (sex, age group and underlying cause of death) show that, for each category, after adjustment, the odds of death in hospital are highest for the most deprived quintile.

The deprivation effect is not equally strong for each category. It is greater for females (43%) than males (19%) and for older (51% for 85 and over) rather than younger people (12% for 0–64 year olds).

The deprivation effect also varied between different underlying causes of death. It was strongest for Alzheimer's, dementia and senility (67%), stroke (54%) and cancers associated with less deprivation (43%), and weakest for heart disease (10%) and chronic respiratory disease (22%).

Note on the analyses: A logistic regression, modelling odds of death in hospital using deprivation quintile, age group, gender and underlying cause of death as categorical variables, was done using Stata version 10.1. Only the calculated odds ratios for deprivation quintile are reported in Table 8.1. See Appendix F for more details.

Table 8.1: Variation of death in hospital with deprivation quintile, results of logistic regression England 2007–09. Odds ratios with odds for the least deprived as the comparator¹

a) All deaths

Selected cohort of deaths in England 2007–09	Deprivation quintile					Notes – adjustments in the model
	Least (baseline)	2	3	4	Most	
Full	1	0.973	1.059	1.146	1.294	Sex, age group, underlying cause of death

b) Sub-analyses

Males	1	0.969	1.037	1.092	1.185	Age group, underlying cause of death	
Females	1	0.983	1.086	1.208	1.426		
85+	1	0.968	1.083	1.218	1.508	Sex, underlying cause of death	
65-84	1	0.988	1.060	1.147	1.267		
0-64	1	0.965	1.020	1.030	1.121		
Cancer ²	1. Lung, Bladder, Stomach etc.	1	1.071	1.155	1.223	1.305	Sex, age group
	2. Melanoma, Breast, Prostate	1	1.027	1.132	1.205	1.434	
	3. Other cancers	1	1.048	1.129	1.281	1.419	
Circulatory disease	Heart disease	1	0.933	0.984	1.036	1.103	
	Stroke	1	0.906	1.018	1.192	1.536	
Respiratory Disease	Acute	1	0.951	1.014	1.128	1.388	
	Chronic/ other	1	0.967	1.032	1.110	1.216	
Other causes	Dementia, Alzheimers, senility	1	0.960	1.130	1.230	1.686	
	External causes	1	1.014	1.111	1.142	1.331	
	Others	1	0.940	1.036	1.106	1.263	

Notes:

- Odds ratios with an associated P value greater than 0.05 are indicated by shaded boxes
- Cancers split by association with deprivation (see Appendix E for more details):
 Cancer 1 : Cancers for which higher incidence is associated with more deprivation
 Cancer 2 : Cancers for which higher incidence is associated with less deprivation
 Cancer 3 : Cancers with now demonstrated association with deprivation

9 Conclusions

- One of the key messages of the Marmot Review was that health inequalities result from social inequalities. This report is evidence that inequalities at the end of life result, in part, from social inequalities.
- Health inequalities between social groups contribute to a lowered life expectancy for the most deprived and to differences in cause and place of death.
- People from the most deprived quintile are, on average, 29% more likely to die in hospital than the least deprived quintile.
- Where people eventually die depends on a range of factors: the disease or event causing the death, the trajectory or acuteness, but also on the social factors of access to services (public or private), living arrangements and the availability of family or other local support. All of these factors are affected by health and social inequalities.
- Many agencies – NHS, local authorities, charities and private organisations – provide support for people when they become ill and less independent. Accessing these services at the end of life is not always easy and can depend on personal circumstances. This report shows that all of these factors need to be taken into account when commissioning and providing end of life care.

Appendix A: Deprivation and age at death

Registered deaths, England 2007–09

Table A1: Average annual number of deaths by age at death and deprivation quintile, England, 2007–09

Deprivation quintile	Age at death (years)			Total
	<65	65–84	85+	
5–Most	22,632	46,098	25,748	94,479
4	18,406	48,580	36,094	103,080
3	15,371	46,788	38,813	100,972
2	13,421	43,938	37,468	94,827
1–Least	11,294	35,491	28,431	75,216
Total	81,125	220,896	166,553	468,574

Table A2: Distribution of deaths by deprivation quintile for each age group, England, 2007–09

Deprivation quintile	<65 %	65–84 %	85+ %	Total %
5–Most	24.0	48.8	27.3	100.0
4	17.9	47.1	35.0	100.0
3	15.2	46.3	38.4	100.0
2	14.2	46.3	39.5	100.0
1–Least	15.0	47.2	37.8	100.0
Total	17.3	47.1	35.5	100.0

Table A3: Distribution of deaths by age group for each deprivation quintile, England, 2007–09

Deprivation quintile	<65 %	65–84 %	85+ %	Total %
5 –Most	27.9	20.9	15.5	20.2
4	22.7	22.0	21.7	22.0
3	18.9	21.2	23.3	21.5
2	16.5	19.9	22.5	20.2
1–Least	13.9	16.1	17.1	16.1
Total	100.0	100.0	100.0	100.0

Appendix B: Deprivation and place of death

Registered deaths, England 2007–09

Table B1: Average annual number of deaths by place of death and deprivation quintile, England, 2007–09

Deprivation quintile	Place of death					Total
	Hospital	Own residence	Care or nursing homes	Hospice	Elsewhere	
5–Most	57,813	19,992	10,290	4,232	2,152	94,479
4	59,885	20,117	16,201	4,841	2,037	103,080
3	56,439	19,395	18,168	5,117	1,853	100,972
2	50,921	18,562	18,507	5,133	1,705	94,827
1–Least	40,653	15,643	12,750	4,825	1,344	75,216
Total	265,710	93,709	75,917	24,148	9,090	468,574

Table B2: Distribution of deaths by place of death for each deprivation quintile, England, 2007–09

Deprivation quintile	Hospital %	Own residence %	Care or nursing homes %	Hospice %	Elsewhere %	Total %
5–Most	61.2	21.2	10.9	4.5	2.3	100.0
4	58.1	19.5	15.7	4.7	2.0	100.0
3	55.9	19.2	18.0	5.1	1.8	100.0
2	53.7	19.6	19.5	5.4	1.8	100.0
1–Least	54.0	20.8	17.0	6.4	1.8	100.0
Total	56.7	20.0	16.2	5.2	1.9	100.0

Table B3: Distribution of deaths by deprivation quintile for each place of death by, England, 2007–09

Deprivation quintile	Hospital %	Own residence %	Care or nursing homes %	Hospice %	Elsewhere %	Total %
5–Most	21.8	21.3	13.6	17.5	23.7	20.2
4	22.5	21.5	21.3	20.0	22.4	22.0
3	21.2	20.7	23.9	21.2	20.4	21.5
2	19.2	19.8	24.4	21.3	18.8	20.2
1–Least	15.3	16.7	16.8	20.0	14.8	16.1
Total	100.0	100.0	100.0	100.0	100.0	100.0

Appendix C: Deprivation and place of death by age

Registered deaths, England 2007-09

C1 Deprivation and place of death – people aged under 65

Table C1: People under 65 – average annual number of deaths by place of death and deprivation quintile, England, 2007–09

Deprivation quintile	Place of death					Total
	Hospital	Own residence	Care or nursing homes	Hospice	Elsewhere	
5–Most	12,718	6,782	351	1,403	1,378	22,632
4	9,755	5,581	348	1,545	1,178	18,406
3	7,939	4,566	349	1,550	967	15,371
2	6,639	4,009	320	1,557	896	13,421
1–Least	5,587	3,326	222	1,454	706	11,294
Total	42,638	24,263	1,590	7,510	5,125	81,125

Table C2: People under 65 – distribution of deaths by place of death for each deprivation quintile, England, 2007–09

Deprivation quintile	Hospital %	Own residence %	Care or nursing homes %	Hospice %	Elsewhere %	Total %
5–Most	56.2	30.0	1.6	6.2	6.1	100.0
4	53.0	30.3	1.9	8.4	6.4	100.0
3	51.6	29.7	2.3	10.1	6.3	100.0
2	49.5	29.9	2.4	11.6	6.7	100.0
1–Least	49.5	29.4	2.0	12.9	6.3	100.0
Total	52.6	29.9	2.0	9.3	6.3	100.0

Table C3: People under 65 – distribution of deaths by deprivation quintile for each place of death, England, 2007–09

Deprivation quintile	Hospital %	Own residence %	Care or nursing homes %	Hospice %	Elsewhere %	Total %
5–Most	29.8	28.0	22.1	18.7	26.9	27.9
4	22.9	23.0	21.9	20.6	23.0	22.7
3	18.6	18.8	21.9	20.6	18.9	18.9
2	15.6	16.5	20.1	20.7	17.5	16.5
1–Least	13.1	13.7	14.0	19.4	13.8	13.9
Total	100.0	100.0	100.0	100.0	100.0	100.0

C2 Deprivation and place of death – people aged 65–84

Table C4: People aged 65–84 – average annual number of deaths by place of death and deprivation quintile, England, 2007–09

Deprivation quintile	Hospital	Own residence	Care or nursing homes	Hospice	Elsewhere	Total
5 –Most	29,091	10,109	3,911	2,403	584	46,098
4	29,466	10,380	5,400	2,731	604	48,580
3	27,395	10,129	5,699	2,951	615	46,788
2	24,894	9,810	5,654	3,011	570	43,938
1–Least	20,048	8,222	3,956	2,825	440	35,491
Total	130,893	48,650	24,620	13,920	2,813	220,896

Table C5: People aged 65–84 – distribution of deaths by place of death for each deprivation quintile, England, 2007–09

Deprivation quintile	Hospital %	Own residence %	Care or nursing homes %	Hospice %	Elsewhere %	Total %
5–Most	63.1	21.9	8.5	5.2	1.3	100.0
4	60.7	21.4	11.1	5.6	1.2	100.0
3	58.6	21.6	12.2	6.3	1.3	100.0
2	56.7	22.3	12.9	6.9	1.3	100.0
1–Least	56.5	23.2	11.1	8.0	1.2	100.0
Total	59.3	22.0	11.1	6.3	1.3	100.0

Table C6: People aged 65–84 – distribution of deaths by deprivation quintile for each place of death, England, 2007–09

Deprivation quintile	Hospital %	Own residence %	Care or nursing homes %	Hospice %	Elsewhere %	Total %
5–Most	22.2	20.8	15.9	17.3	20.8	20.9
4	22.5	21.3	21.9	19.6	21.5	22.0
3	20.9	20.8	23.1	21.2	21.9	21.2
2	19.0	20.2	23.0	21.6	20.3	19.9
1–Least	15.3	16.9	16.1	20.3	15.6	16.1
Total	100.0	100.0	100.0	100.0	100.0	100.0

C3 Deprivation and place of death – people age 85 and over

Table C7: People aged 85 and over – average annual number of deaths by place of death and deprivation quintile, England, 2007–09

Deprivation quintile	Hospital	Own residence	Care or nursing homes	Hospice	Elsewhere	Total
5–Most	16,003	3,101	6,028	426	189	25,748
4	20,664	4,156	10,453	565	254	36,094
3	21,105	4,700	12,120	616	272	38,813
2	19,389	4,743	12,533	565	239	37,468
1–Least	15,018	4,096	8,573	546	198	28,431
Total	92,180	20,796	49,707	2,718	1,152	166,553

Table C8: People aged 85 and over - distribution of deaths by place of death for each deprivation quintile, England, 2007–09

Deprivation quintile	Hospital %	Own residence %	Care or nursing homes %	Hospice %	Elsewhere %	Total %
5–Most	62.2	12.0	23.4	1.7	0.7	100.0
4	57.3	11.5	29.0	1.6	0.7	100.0
3	54.4	12.1	31.2	1.6	0.7	100.0
2	51.7	12.7	33.4	1.5	0.6	100.0
1–Least	52.8	14.4	30.2	1.9	0.7	100.0
Total	55.3	12.5	29.8	1.6	0.7	100.0

Table C9: People aged 85 and over – distribution of deaths by deprivation quintile for each place of death, England, 2007–09

Deprivation quintile	Hospital %	Own Residence %	Care or nursing homes %	Hospice %	Elsewhere %	Total %
5 –Most	17.4	14.9	12.1	15.7	16.4	15.5
4	22.4	20.0	21.0	20.8	22.0	21.7
3	22.9	22.6	24.4	22.7	23.6	23.3
2	21.0	22.8	25.2	20.8	20.7	22.5
1–Least	16.3	19.7	17.2	20.1	17.2	17.1
Total	100.0	100.0	100.0	100.0	100.0	100.0

Appendix D: Deprivation and cause of death

D1 Deprivation and cause of death – people aged under 65

Table D1: People aged under 65 – average annual number of deaths by underlying cause of death and deprivation quintile, England, 2007–09

Deprivation quintile	Cancer	Cardio-vascular	Respiratory disease	Other	Total
5–Most	6,524	4,727	1,890	9,491	22,632
4	6,370	3,629	1,320	7,087	18,406
3	6,116	2,909	942	5,404	15,371
2	5,882	2,470	676	4,393	13,421
1–Least	5,409	1,923	482	3,480	11,294
Total	30,301	15,658	5,310	29,855	81,125

Table D2: People aged under 65 – distribution of deaths by underlying cause of death for each deprivation quintile, England, 2007–09

Deprivation quintile	Cancer %	Cardio-vascular %	Respiratory disease %	Other %	Total %
5–Most	28.8	20.9	8.4	41.9	100.0
4	34.6	19.7	7.2	38.5	100.0
3	39.8	18.9	6.1	35.2	100.0
2	43.8	18.4	5.0	32.7	100.0
1–Least	47.9	17.0	4.3	30.8	100.0
Total	37.4	19.3	6.5	36.8	100.0

Table D3: People aged under 65 – distribution of deaths by deprivation quintile for each underlying cause of death, England, 2007–09

Deprivation quintile	Cancer %	Cardio-vascular %	Respiratory disease %	Other %	Total %
5–Most	21.5	30.2	35.6	31.8	27.9
4	21.0	23.2	24.9	23.7	22.7
3	20.2	18.6	17.7	18.1	18.9
2	19.4	15.8	12.7	14.7	16.5
1–Least	17.9	12.3	9.1	11.7	13.9
Total	100.0	100.0	100.0	100.0	100.0

D2 Deprivation and cause of death – people aged 65-84 years

Table D4: People aged between 65 and 84 – average annual number of deaths by underlying cause of death and deprivation quintile, England, 2007–09

Deprivation quintile	Underlying cause of death				Total
	Cancer	Cardio-vascular	Respiratory disease	Other	
5—Most	14,784	13,954	7,512	9,848	46,098
4	15,909	14,803	7,159	10,709	48,580
3	16,085	14,090	6,193	10,420	46,788
2	15,544	13,179	5,381	9,835	43,938
1 – Least	13,434	10,395	3,936	7,726	35,491
Total	75,756	66,422	30,180	48,538	220,896

Table D5: People aged between 65 and 84 – distribution of deaths by underlying cause of death for each deprivation quintile, England, 2007–09

Deprivation quintile	Cancer %	Cardio-vascular %	Respiratory disease %	Other %	Total &
5—Most	32.1	30.3	16.3	21.4	100.0
4	32.7	30.5	14.7	22.0	100.0
3	34.4	30.1	13.2	22.3	100.0
2	35.4	30.0	12.2	22.4	100.0
1—Least	37.9	29.3	11.1	21.8	100.0
Total	34.3	30.1	13.7	22.0	100.0

Table D6: People aged between 65 and 84 – distribution of deaths by deprivation quintile for each underlying cause of death, England, 2007–09

Deprivation quintile	Cancer %	Cardio-vascular %	Respiratory disease %	Other %	Total %
5—Most	19.5	21.0	24.9	20.3	20.9
4	21.0	22.3	23.7	22.1	22.0
3	21.2	21.2	20.5	21.5	21.2
2	20.5	19.8	17.8	20.3	19.9
1—Least	17.7	15.6	13.0	15.9	16.1
Total	100.0	100.0	100.0	100.0	100.0

D3 Deprivation and cause of death – people aged 85 years and over

Table D7: People aged 85 and over – average annual number of deaths by underlying cause of death and deprivation quintile, England, 2007–09

Deprivation quintile	Underlying cause of death				Total
	Cancer	Cardio-vascular	Respiratory disease	Other	
5–Most	3,974	8,752	4,974	8,047	25,748
4	5,339	12,726	6,651	11,378	36,094
3	5,954	13,810	6,748	12,301	38,813
2	5,560	13,506	6,361	12,041	37,468
1–Least	4,488	10,221	4,802	8,920	28,431
Total	25,315	59,015	29,536	52,688	16,6553

Table D8: People aged 85 and over – distribution of deaths by underlying cause of death for each deprivation quintile, England, 2007–09

Deprivation quintile	Cancer %	Cardio-vascular %	Respiratory disease %	Other %	Total %
5–Most	15.4	34.0	19.3	31.3	100.0
4	14.8	35.3	18.4	31.5	100.0
3	15.3	35.6	17.4	31.7	100.0
2	14.8	36.0	17.0	32.1	100.0
1–Least	15.8	36.0	16.9	31.4	100.0
Total	15.2	35.4	17.7	31.6	100.0

Table D9: People aged 85 and over – distribution of deaths by deprivation quintile for each underlying cause of death, England, 2007–09

Deprivation quintile	Cancer %	Cardio-vascular %	Respiratory disease %	Other %	Total %
5–Most	15.7	14.8	16.8	15.3	15.5
4	21.1	21.6	22.5	21.6	21.7
3	23.5	23.4	22.8	23.3	23.3
2	22.0	22.9	21.5	22.9	22.5
1–Least	17.7	17.3	16.3	16.9	17.1
Total	100.0	100.0	100.0	100.0	100.0

Appendix E: Further detail on cause of death by age group

Table E1: More detailed breakdown of cause of death

Broad cause of death	Specific cause of death	Description	ICD-10 codes	Notes
Cancer	Certain cancers have been identified for which incidence is significantly associated with deprivation quintile (Cancer Incidence by deprivation, England, 2000–04, NCIN, 2010). This report was used to split cancers into three groups:			
	Cancer 1	Lung Oesophagus Head and neck Stomach Bladder Cervix Liver	C33, C34 C15, C0-C14,C30- C32 C16, C64, C53, C22	Cancers for which incidence is significantly higher than average for the most deprived
	Cancer 2	Melanoma Breast Prostate	C43, C50, C61	Cancers for which incidence is significantly higher than average for the least deprived
	Cancer 3		All other C codes	Other sites, i.e. cancers where no significant association with deprivation was found.
Cardiovascular disease	Heart disease	Heart disease including myocardial	I00-I52	
	Stroke	Cerebrovascular disease including stroke	I60-I69	
Respiratory disease	Acute respiratory	Including pneumonia and influenza	J10-J29, J85-J86, J91-J96	
	Other respiratory		J00-J99 excluding those in the above group.	
Other	Dementia	Dementia, Alzheimer's disease and senility	F01, F03, G30, R54	
	External causes	Includes; accidents, self-harm, assault	S00-Y98	
	Other	Any conditions not previously mentioned	All codes not previously mentioned	

E1 Distribution of deaths by specific underlying cause of death and deprivation quintile – all ages

Table E2: Number of deaths by detailed underlying cause of death and deprivation quintile, England, 2007–09

Any age at death	Underlying cause of death										
	Cancer			Cardiovascular disease		Respiratory disease		Other causes			All causes
Deprivation quintile	Lung, oesophagus, stomach, head & neck, bladder, cervix and liver cancer	Malignant melanoma, breast and prostate cancer	Other cancers	Heart disease	Stroke	Acute respiratory disease	Chronic and other respiratory diseases	Dementia, Alzheimer's, senility	External causes	Other	
a) Average annual number of deaths											
5 –Most	11,430	3,091	10,251	20,063	7,371	5,556	8,820	4,515	3,258	20,124	94,479
4	10,897	3,987	12,101	22,051	9,110	6,459	8,674	6,233	3,098	20,479	103,086
3	10,024	4,541	12,914	21,268	9,537	6,315	7,561	6,681	2,933	19,186	100,960
2	8,863	4,563	12,907	19,784	9,370	5,891	6,527	6,744	2,675	17,498	94,822
1–Least	7,184	4,237	11,368	15,402	7,140	4,462	4,761	4,833	2,213	13,628	75,227
Total	48,398	20,418	59,541	98,567	42,528	28,683	36,343	29,006	14,176	90,915	468,574
b) Distribution of deaths by underlying cause of death for each deprivation quintile (%)											
5 –Most	12.1	3.3	10.8	21.2	7.8	5.9	9.3	4.8	3.4	21.3	100.0
4	10.6	3.9	11.7	21.4	8.8	6.3	8.4	6.0	3.0	19.9	100.0
3	9.9	4.5	12.8	21.1	9.4	6.3	7.5	6.6	2.9	19.0	100.0
2	9.3	4.8	13.6	20.9	9.9	6.2	6.9	7.1	2.8	18.5	100.0
1–Least	9.5	5.6	15.1	20.5	9.5	5.9	6.3	6.4	2.9	18.1	100.0
Total	10.3	4.4	12.7	21.0	9.1	6.1	7.8	6.2	3.0	19.4	100.0
c) Distribution of deaths by deprivation quintile for each underlying cause of death (%)											
5– Most	23.6	15.1	17.2	20.4	17.3	19.4	24.3	15.6	23.0	22.1	20.2
4	22.5	19.5	20.3	22.4	21.4	22.5	23.9	21.5	21.9	22.5	22.0
3	20.7	22.2	21.7	21.6	22.4	22.0	20.8	23.0	20.7	21.1	21.5
2	18.3	22.3	21.7	20.1	22.0	20.5	18.0	23.3	18.9	19.2	20.2
1–Least	14.8	20.8	19.1	15.6	16.8	15.6	13.1	16.7	15.6	15.0	16.1
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

E2 Distribution of deaths by specific underlying cause of death and deprivation quintile – under 65 years

Table E3: People aged under 65 – number of deaths by detailed underlying cause of death and deprivation quintile, England, 2007–09

People aged under 65 years	Underlying cause of death										
	Cancer			Cardiovascular disease		Respiratory disease		Other Causes			All causes
Deprivation quintile	Lung, Oesophagus, Stomach, Head & Neck, Bladder, Cervix and Liver cancer	Malignant Melanoma, Breast and Prostate cancer	Other cancers	Heart disease	Stroke	Acute Respiratory disease	Chronic and other respiratory diseases	Dementia, Alzheimer's, Senility	External Causes	Other	
a) Average annual number of deaths											
5–Most	2,936	783	2,703	3,886	842	639	1,251	44	2,031	7,517	22,632
4	2,555	934	2,787	2,973	657	448	873	47	1,670	5,465	18,408
3	2,147	1,007	2,858	2,361	548	335	607	48	1,402	4,058	15,371
2	1,852	1,052	2,895	1,988	482	234	443	45	1,224	3,206	13,420
1–Least	1,529	1,090	2,714	1,545	378	169	313	35	1,030	2,492	11,295
Total	11,019	4,865	13,958	12,752	2,906	1,825	3,486	220	7,356	22,738	81,125
b) Distribution of deaths by underlying cause of death for each deprivation quintile (%)											
5–Most	13.0	3.5	11.9	17.2	3.7	2.8	5.5	0.2	9.0	33.2	100.0
4	13.9	5.1	15.1	16.1	3.6	2.4	4.7	0.3	9.1	29.7	100.0
3	14.0	6.5	18.6	15.4	3.6	2.2	3.9	0.3	9.1	26.4	100.0
2	13.8	7.8	21.6	14.8	3.6	1.7	3.3	0.3	9.1	23.9	100.0
1–Least	13.5	9.7	24.0	13.7	3.3	1.5	2.8	0.3	9.1	22.1	100.0
Total	13.6	6.0	17.2	15.7	3.6	2.2	4.3	0.3	9.1	28.0	100.0
c) Distribution of deaths by deprivation quintile for each underlying cause of death (%)											
5–Most	26.6	16.1	19.4	30.5	29.0	35.0	35.9	20.2	27.6	33.1	27.9
4	23.2	19.2	20.0	23.3	22.6	24.5	25.0	21.4	22.7	24.0	22.7
3	19.5	20.7	20.5	18.5	18.9	18.3	17.4	22.0	19.1	17.8	18.9
2	16.8	21.6	20.7	15.6	16.6	12.8	12.7	20.6	16.6	14.1	16.5
1–Least	13.9	22.4	19.4	12.1	13.0	9.3	9.0	15.9	14.0	11.0	13.9
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

E3 Distribution of deaths by specific underlying cause of death and deprivation quintile – 65–84

Table E4: People aged between 65 and 84 – number of deaths by detailed underlying cause of death and deprivation quintile, England, 2007–09

People aged 65 – 84 years	Underlying cause of death											
	Cancer				Cardiovascular disease		Respiratory disease		Other Causes			
	Lung, Oesophagus, Stomach, Head & Neck, Bladder, Cervix and Liver cancer	Malignant Melanoma, Breast and Prostate cancer	Other cancers	Heart disease	Stroke	Acute Respiratory disease	Chronic and other respiratory diseases	Dementia, Alzheimer's, Senility	External Causes	Other	All causes	
a) Average annual number of deaths	5 –Most	7,078	1,642	5,796	10,332	3,623	2,251	5,261	1,409	682	8,025	46,099
	4	6,657	2,011	6,916	10,789	4,015	2,283	4,877	1,721	703	8,609	48,582
	3	6,123	2,351	7,279	10,044	4,045	2,081	4,109	1,685	736	8,334	46,788
	2	5,428	2,351	7,430	9,307	3,872	1,883	3,496	1,719	702	7,745	43,934
	1–Least	4,388	2,190	6,571	7,334	3,061	1,411	2,527	1,271	575	6,165	35,494
	Total	29,674	10,546	33,993	47,806	18,616	9,910	20,271	7,805	3,398	38,878	220,896
b) Distribution of deaths by underlying cause of death for each deprivation quintile (%)	5 –Most	15.4	3.6	12.6	22.4	7.9	4.9	11.4	3.1	1.5	17.4	100.0
	4	13.7	4.1	14.2	22.2	8.3	4.7	10.0	3.5	1.4	17.7	100.0
	3	13.1	5.0	15.6	21.5	8.6	4.4	8.8	3.6	1.6	17.8	100.0
	2	12.4	5.4	16.9	21.2	8.8	4.3	8.0	3.9	1.6	17.6	100.0
	1–Least	12.4	6.2	18.5	20.7	8.6	4.0	7.1	3.6	1.6	17.4	100.0
	Total	13.4	4.8	15.4	21.6	8.4	4.5	9.2	3.5	1.5	17.6	100.0
c) Distribution of deaths by deprivation quintile for each underlying cause of death (%)	5 –Most	23.9	15.6	17.1	21.6	19.5	22.7	26.0	18.1	20.1	20.6	20.9
	4	22.4	19.1	20.3	22.6	21.6	23.0	24.1	22.1	20.7	22.1	22.0
	3	20.6	22.3	21.4	21.0	21.7	21.0	20.3	21.6	21.7	21.4	21.2
	2	18.3	22.3	21.9	19.5	20.8	19.0	17.2	22.0	20.7	19.9	19.9
	1–Least	14.8	20.8	19.3	15.3	16.4	14.2	12.5	16.3	16.9	15.9	16.1
	Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

E4 Distribution of deaths by specific underlying cause of death and deprivation quintile – 85 years and over

Table E5: People aged 85 and over – number of deaths by detailed underlying cause of death and deprivation quintile, England, 2007–09

People aged 85 years or older		Underlying cause of death										
		Cancer					Cardiovascular disease		Respiratory disease		Other Causes	
Deprivation quintile		Lung, Oesophagus, Stomach, Head & Neck, Bladder, Cervix and Liver cancer	Malignant Melanoma, Breast and Prostate cancer	Other cancers	Heart disease	Stroke	Acute Respiratory disease	Chronic and other respiratory diseases	Dementia, Alzheimer's, Senility	External Causes	Other	All causes
		a) Average annual number of deaths										
5–Most		1,417	665	1,751	5,845	2,907	2,666	2,308	3,062	545	4,582	25,749
4		1,685	1,042	2,397	8,289	4,437	3,728	2,924	4,464	725	6,404	36,096
3		1,754	1,183	2,777	8,863	4,943	3,899	2,845	4,948	795	6,794	38,801
2		1,582	1,160	2,582	8,489	5,016	3,774	2,588	4,980	749	6,548	37,468
1–Least		1,267	957	2,083	6,522	3,702	2,882	1,921	3,527	608	4,971	28,439
Total		7,705	5,006	11,590	38,009	21,006	16,949	12,587	20,981	3,422	29,299	166,553
b) Distribution of deaths by underlying cause of death for each deprivation quintile (%)												
5–Most		5.5	2.6	6.8	22.7	11.3	10.4	9.0	11.9	2.1	17.8	100.0
4		4.7	2.9	6.6	23.0	12.3	10.3	8.1	12.4	2.0	17.7	100.0
3		4.5	3.0	7.2	22.8	12.7	10.0	7.3	12.8	2.0	17.5	100.0
2		4.2	3.1	6.9	22.7	13.4	10.1	6.9	13.3	2.0	17.5	100.0
1–Least		4.5	3.4	7.3	22.9	13.0	10.1	6.8	12.4	2.1	17.5	100.0
Total		4.6	3.0	7.0	22.8	12.6	10.2	7.6	12.6	2.1	17.6	100.0
c) Distribution of deaths by deprivation quintile for each underlying cause of death (%)												
5–Most		18.4	13.3	15.1	15.4	13.8	15.7	18.3	14.6	15.9	15.6	15.5
4		21.9	20.8	20.7	21.8	21.1	22.0	23.2	21.3	21.2	21.9	21.7
3		22.8	23.6	24.0	23.3	23.5	23.0	22.6	23.6	23.2	23.2	23.3
2		20.5	23.2	22.3	22.3	23.9	22.3	20.6	23.7	21.9	22.3	22.5
1–Least		16.4	19.1	18.0	17.2	17.6	17.0	15.3	16.8	17.8	17.0	17.1
Total		100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Appendix F: Multivariate analysis of death in hospital

Table F1: Odds ratios for death in hospital, all deaths and cohorts, selected by deprivation quintile, sex and age at death, England, 2007–09

Factor	Particular selection of deaths, England 2007–09								
	All deaths	Least deprived quintile	Most deprived quintile	Males	Females	85+	65-84	0-64	
<i>Deprivation quintile (baseline least deprived quintile)</i>									
2	0.973			0.969	0.983	0.968	0.988	0.965	
3	1.059			1.037	1.086	1.083	1.060	1.020	
4	1.146			1.092	1.208	1.218	1.147	1.030	
5 (Most deprived)	1.294			1.185	1.426	1.508	1.267	1.121	
<i>Sex (baseline males)</i>									
Female	0.912	0.847	1.022			0.715	0.940	1.191	
<i>Age at death (baseline 85+)</i>									
65–84	1.200	1.244	1.098	1.024	1.339				
0–64	0.863	0.978	0.768	0.697	1.137				
<i>Underlying cause of death (baseline Cancer 1: lung, stomach, bladder etc.)</i>									
Cancer	2. Melanoma, breast, prostate	0.883	0.890	0.948	0.817	0.915	0.825	0.873	0.781
	3. Others	1.108	1.095	1.169	1.086	1.152	1.151	1.123	0.985
Circulatory disease	Heart disease	1.700	1.994	1.575	1.498	2.049	1.797	1.745	1.326
	Stroke	2.382	2.560	2.977	2.646	2.407	1.822	2.972	5.365
Respiratory disease	Acute	2.850	3.143	3.143	3.244	2.819	2.373	3.925	2.646
	Chronic/other	2.453	2.684	2.493	2.400	2.575	1.895	2.869	2.715
Other causes	Dementia, Alzheimer's, senility	0.628	0.659	0.732	0.830	0.615	0.536	0.886	1.098
	External causes	1.474	1.675	1.254	1.039	2.725	5.462	3.019	0.550
	Others	3.001	3.293	3.100	2.772	3.358	2.812	3.277	2.570

Notes:

- Odds ratios with an associated P value greater than 0.05 are indicated by shading the box
- Cancers split by association with deprivation :
 - Cancer 1: Cancers for which higher incidence is associated with more deprivation
 - Cancer 2: Cancers for which higher incidence is associated with less deprivation
 - Cancer 3: Cancers with now demonstrated association with deprivation

Table F2: Odds ratios for death in hospital, all deaths and cohorts, selected by underlying cause of death, England, 2007–09

Factor	Particular selection of deaths									
	Cancer			Circulatory disease		Respiratory disease		Other causes		
	Lung, Bladder, Stomach etc.	Melanoma, breast, prostate	Other cancers	Heart disease	Stroke	Acute	Chronic/other	Dementia, Alzheimer's senility	External causes	Others

Deprivation quintile (baseline least deprived quintile)

2	1.071	1.027	1.048	0.933	0.906	0.951	0.967	0.960	1.014	0.940
3	1.155	1.132	1.129	0.984	1.018	1.014	1.032	1.130	1.111	1.036
4	1.223	1.205	1.281	1.036	1.192	1.128	1.110	1.230	1.142	1.106
5	1.305	1.434	1.419	1.103	1.536	1.388	1.216	1.686	1.331	1.263

Sex (baseline males)

Female	0.856	0.883	0.886	1.031	0.761	0.669	0.880	0.551	1.243	1.007
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Age group (baseline 85+)

65-84	0.977	1.036	0.998	1.035	1.652	1.633	1.525	1.617	0.617	1.233
0-64	0.916	0.992	0.844	0.726	2.723	0.966	1.354	1.870	0.108	0.903

Further information

This report is available online at:
www.endoflifecare-intelligence.org.uk

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About the National End of Life Care Intelligence Network

The Department of Health's National End of Life Care Strategy, published in 2008, pledged to commission a National End of Life Care Intelligence Network (NEoLCIN). The Network was launched in May 2010. It is tasked with collating existing data and information on end of life care for adults in England. This is with the aim of helping the NHS and its partners commission and deliver high quality end of life care, in a way that makes the most efficient use of resources and responds to the wishes of dying people and their families.

Key partners include the National Cancer Intelligence Network (NCIN), which will work closely with the Network to improve end of life care intelligence; and the South West Public Health Observatory, lead public health observatory for end of life care, which hosts the NEoLCIN website. The SWPHO has been commissioned to produce key outputs and analyses for the Network, including the national End of Life Care Profiles.

See www.endoflifecare-intelligence.org.uk for more information about the Network and its partners.

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