Primary care service use by end-of-life cancer patients: a nationwide retrospective cohort study in the United Kingdom

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Wei Gao  
wei.gao@kcl.ac.uk  
King's College London  
Corresponding Author  
ORCiD: 0000-0001-8298-3415

Martin Gulliford  
King's College London

Myfanwy Morgan  
King's College London

Irene J Higginson  
King's College London

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Abstract

Background End of life (EoL) care becomes more complex and increasingly takes place in the community but there is little data on the use of general practice (GP) services to guide care improvement. This study aims to determine the trends and factors associated with GP consultation, prescribing and referral to other care services amongst cancer patients in the last year of life.

Methods A nationwide, retrospective cohort study using the Clinical Practice Research DataLink (CPRD) in the United Kingdom primary care, 2001-2014. Outcome variables were number of GP consultations (primary), number of prescriptions and referral to other care services (yes vs no) in the last year of life. Explanatory variables included socio-demographics, clinical characteristics and the status of palliative care needs recognised or not. The association between outcome and explanatory variables were evaluated using multiply adjusted risk ratio (aRR).

Results Of 68,523 terminal cancer patients, 70% were aged 70+, 75% had comorbidities and 45.5% had palliative care needs recognised. In the last year of life, a typical cancer patient had 43 GP consultations (Standard deviation (SD): 31.7; total=3,031,734), 71.5 prescriptions (SD: 68.0; total=5,074,178), and 21 (SD: 13.0) different drugs; 58% of patients had at least one referral covering all main clinical specialities. More comorbid conditions, prostate cancer and having palliative care needs recognised were associated with more primary care consultations, more prescriptions and a higher chance of referral (aRRs 1.07-2.03). Increasing age was related to fewer consultations (aRRs: 0.77-0.96), less prescriptions (aRR 1.09-1.44), and a higher chance of referral (aRRs 1.08-1.16) but less likely to have palliative care needs recognised (aRRs 0.53-0.89).

Conclusions GPs are very involved in the end of life care of cancer patients, most of whom having complex care needs, i.e. older age, comorbidity and polypharmacy. This highlights
the importance of enhancing primary palliative care skills among GPs and the imperative of a greater integration of primary care with other healthcare professionals including oncologists, palliative care specialists, geriatricians and pharmacists. Research into the potential of deprescribing is warranted. Older patients have poorer access to both primary care and palliative care need to be addressed in future practices.

Background

End of life (EoL) care refers to care that is provided and delivered in the last year of life, which accounts for approximately 10 to 20% of healthcare costs[1]. As we live longer with more comorbidities, the complexity of need at the end of life is bound to increase. This coupled with the projected rise in numbers of people dying with cancer over the next two decades and people’s preference to be cared for and die at home or in a home-like environment[2, 3], highlights the importance that providing quality care and support to people with terminal cancer in the community care settings. It is also a policy priority for health care in many countries[2, 4, 5].

General practitioners (GPs, or family/primary care doctors), the primary care providers in the community, play an important role in EoL care which include, for example, care planning and coordination, and providing continuity of care. However, even in the United Kingdom (UK), where the quality of death ranked the best in the world[6], the EoL care is far from optimal. In a recent survey of bereaved people, one in four rated the overall quality of EoL care for their relatives as poor or fair. Care quality from GPs came as the second worst service provider among the 7 providers surveyed, with 30% poor or fair ratings, next to urgent care[7].

As GPs not only deliver end of life care but also act as a gatekeeper for patients to access
other health care services, how patients interact with GP services has a direct impact on their access to other healthcare services and with implications for health outcomes[8]. However, there is little data on the service use of primary care by end of life cancer patients, although this forms an essential step to understanding and identifying problems and gaps in service provision. Furthermore, palliative care is a care provided to seriously ill patients that aims to improve quality of life and reduce suffering. It is a holistic approach of care and deemed more appropriate for patients at the end of life. Primary care providers are particularly well positioned to deliver primary palliative care. It is unclear if a patient’s palliative care needs known to their GPs plays a role in the primary care service use of the patient.

Therefore, we developed this study in the UK primary care and aimed to: 1) describe the patterns of primary care service use among cancer patients in the last year of life, 2) evaluate the role of recognising patients’ palliative care needs in primary care service use, and 3) identify patient characteristics associated with the use of primary care services and with patients palliative care needs recognised by their GPs.

Methods

Study design and Setting
A nationwide, population based retrospective cohort study in UK primary care, 2001-2014.

Data sources
The data were extracted from the Clinical Practice Research Datalink (CPRD) – one of the world’s largest longitudinal primary care databases[9]. By the mid-year of 2013, the CPRD contained anonymized primary care health records for 4.4 million active (alive, currently registered) patients from 7.2% (n=674) of all UK general practices. Patients are broadly
representative of the UK general population in terms of age, sex and ethnicity. The CPRD contains data generated during the process of health care in general practices, with demographics, and longitudinal information on clinical aspects (e.g. diagnoses, symptoms, comorbidity), GP contacts, prescriptions, management and referrals and so on. CPRD has been widely applied to health service research.

**Patient cohort**

The inclusion criteria were patients who: 1) were diagnosed with a common cancer, as ascertained by Read codes (Lung – B22; Colorectal – B13, B14, B1z0.11; Female breast – B34, B36..00; Prostate – B46); and 2) had at least 6 months of registration with the practice before the cancer diagnosis; and 3) died between 01/01/2000 and 30/04/2014 inclusive; and 4) were registered at a general practice with acceptable data quality.

Patients who did not have a clear diagnostic code were excluded.

**Study variables**

The outcome variables were the service use in the last three months of life in three main categories: a) GP consultations (primary), b) medicines prescribed (using the CPRD unique product codes selected by GPs) and c) referral to secondary care or other care services. We included consultations involving patient contacts, either through face-to-face or telephone, irrespective of where the consultations taking place. We excluded the palliative care referral as this was used to identify patients having palliative care needs recognised (detailed as below).

The explanatory variables were: 1) socio-demographics – age (<50, 50-59, 60-69, 70-79,
80-89, 90+), gender (female, male), year of death, the region where the patient registered general practice was based; 2) clinical variables - cancer site (lung, colorectal, breast, prostate), number of comorbid conditions (0,1, 2, 3, 4+), survival (months) from cancer diagnosis to death (0-5, 6-12, 13-36,37-60, 61-120, 121+), the status of having palliative care needs recognised (PC group) or not (non-PC group) following the cancer diagnosis. A patient who was either on the palliative care register or had a referral record of palliative care after their cancer diagnosis was categorised as having palliative care needs recognised. The Quality and Outcomes Framework (QOF) was first introduced as part of the new General Medical Services contract in 2004.[10] The QOF incentivises general practices to identify and register patients with palliative care needs, regularly review, assess their needs and preferences and proactively planning care. Palliative care was endorsed as a new clinical area for improvement from 2006. The needs of palliative care were identified by Read codes (See Appendix 1 QOF_codes.txt). The palliative care referral was identified using the National Health Service (NHS) specialty field. This contains detailed information about the referring speciality but its completion by general practice staff is not compulsory.

The socio-economic status, measured by the quintile of the index of multiple deprivation (IMD2010) (1=least deprived to 5=most deprived) score of the area where the practice located, was also available as an extra explanatory variable to the patient data from practices in England. The IMD score is an UK government’s official measure.[11] It is a composite score derived from seven domains: income, employment, health and disability, education skills and training, barriers to housing and services, crime and disorder, and living environment.
Statistical analysis

Data were described using count and percentage for categorical variables and mean (standard deviation, SD) for continuous data where applicable. Temporal patterns of service use (consultation, prescribing and referral) in the last 12 months of life were explored using the line chart by plotting month to death against the following statistics: 1) the proportion of patients using a specific type of service with a pre-defined intensity; 2) mean number of a specific type of service. The service use pattern was explored by the status of having palliative care needs recognised or not.

To facilitate interpretations of the findings and the comparability with other studies, we categorised all continuous variables. The generalised estimating equation (GEE) was used to account for the clustering effect within the practice, meaning that the patients from the same practice tended to have similar server use patterns. Three GEE regression models were constructed to evaluate variables independently associated with the outcomes. The GEE model was built with log link function, Poisson distribution and an exchangeable working correlation matrix.

The candidate explanatory variables were selected using a combination of prior clinical knowledge and statistical criteria. The important demographical variables (e.g. age, gender) and clinical variables (e.g. cancer site, number of comorbid conditions) were forced to stay in the model regardless their statistical significance. The multiple adjusted risk ratios (aRRs) were derived from the constructed multiple regression models to quantify the association strength between the explanatory and outcome variables. Two-way interactions of explanatory variables were explored.
A similar multiple regression modelling framework was applied to identify the patient demographic and clinical characteristics associated with if a patient having palliative care needs recognised or not.

We conducted four sensitivity analyses: 1) the service use patterns where outcome variables (number of consultations, number of prescriptions and number of referrals) were derived from the services used in the last 3 months of life; 2) using the data from practices in England only, it allowed to include IMD2010 as an extra explanatory variable; 3) using the post-2006 data only, as GP practices were incentivised from April 2006 to register patients with palliative care needs; 4) using all GP consultations involving direct patient contact only.

All analyses were performed with the Statistical Analysis Software, version 9.4 (SAS Institute, Cary, NC, USA). A two-sided p value of 0.05 was considered statistically significant.

Results

Socio-demographic and clinical characteristics of the study sample

68,735 patients meeting the inclusion criteria were extracted from the CPRD database. After exclusion of 212 patients with ambiguous date of diagnostic information, the final study sample comprised of 68,523 patients. 71% of the patients were aged 70 years or above and 45% were women (Table 1). Lung cancer comprised over one third of the study sample, followed by colorectal cancer (24.2%) and roughly equal number of breast and prostate cancer. 75.1% of the patients had one or more comorbid conditions. Among all patients, 29.4% survived less than 6 months from their cancer diagnosis and 4.3% survived longer than 10 years. The study participants were dominated by the patients died
in recent periods (2005-2014, 75.3%). Relatively more patients were from affluent regions (27.7% IMD1/2 vs 21.9% IMD 4/5). The study sample primarily comprised patients from practices in England (77.5%), followed by Scotland (10.3%), Wales (8.6%) and Northern Ireland (3.2%).

**Patients’ characteristics by status of palliative care needs recognised**

Nearly half of the patients (45.5%) were identified as having palliative care needs. Patients in the PC group died relatively young - 35% died before the age of 70 compared to 24% in non-PC group. There were more lung cancer patients in PC than in non-PC group (42.2 vs 32.1%). The gender distribution and median survival (15 months) were similar between two groups. Overall, approximately three in four (75.1%) patients had one or more comorbid conditions and patients in the PC group had slightly higher level of comorbidity (75.8%) than in non-PC group (74.6%). PC group had relatively more patients from more affluent areas (IMD 1+2: 28.8% versus 26.7%).

**Patterns of GP service use**

**GP consultations**

Of the 5,819,161 consultations happening in the last year of life, 3,031,734 (52.1%) were included in this analysis. The sample of analysis was formed after excluding those consultations that were primarily for administrative purpose (i.e. having no direct patient contacts or those unknown types of consultations (totalling 2,787,427, 47.9%). A patient on average received 43.0 consultations in the last year of life (Standard deviation (SD): 31.7; Median: 36, Interquartile range (IQR): 36). Consultations in the last year of a patient’s life rarely took place at the usual residences of patients (4.4%). Up to one third (29.5%) of the patients had 10 or more monthly consultations in the final year, and 15.7%
in the final month. Patients in PC group received more consultations than those in non-PC group (53.3, SD: 34.4 versus 34.9, SD: 26.3) and this remained true throughout the last 12 months of life (Figure 1). In both groups, the proportion of patients receiving 10+ consultations peaked at the last 2\textsuperscript{nd} month with a sharp drop in the month before death. The monthly mean number of consultations showed a similar pattern.

**GP prescriptions**

95.8\% of the 68,523 patients in total had 5,074,178 valid GP prescribing records in the last year of life. These patients were exposed to 1313 drug groups in the year before death. A patient received a total of 71.5 prescriptions (SD: 68.0; Median: 57, IQR: 63) and 21.3 different drugs (SD: 13.0; Median: 20, IQR: 17) in the final year. The top five commonly prescribed drug groups were opioid analgesics (6.4\%), proton pump inhibitors (4.5\%), Non-opioid and compound analgesics (4.0\%), antiplatelet drugs (3.9\%) and Statins (3.1\%). In the last 12 months, the proportion of patients receiving 10 or more monthly prescriptions from their GPs reached a peak (36.6\%) in the penultimate month before death, then fell to the lowest level (15.4\%) in the last month. Over the last 12 months, the GP prescribing rate was consistently higher in the PC group than in non-PC group (Figure 2).

**GP referrals**

58\% of the study participants had at least one referral in the last year (total N= 89,975). The referral rate showed a slight increasing trend along with the closeness to death but remained at a lower level (7.0 to 11.8\%) and dropped to the lowest (5.0\%) in the month before death (Figure 3). The average number of referral specialities fluctuated in a small range (1.2 to 1.3). Patients in PC group had a slightly higher percentage with at least one
end-of-life referral record and a higher average number of referring specialities than those in the non-PC group. Even with between 31 and 45% missing or non-specific specialty data, the referred specialities were broad and spanned two third (60 to 67) of the 93 listed specialties. The commonly referred specialties were general surgery or general medicine most of the time in the last year of life, and only in the last month palliative medicine became the second most referred specialty.

**Factors associated with GP service use and PC status**

**GP service use**

The magnitude of association between patient characteristics and service use as measured by the adjusted risk ratio (aRR) was shown in Table 2. Patients in PC group had more GP consultations (aRR 1.30, 1.29-1.32), prescriptions (aRR 1.17, 1.16-1.19) and more likely to be referred for other care services (aRR 1.22, 1.19-1.26) than those in non-PC group. Increasing age was associated with fewer GP consultations but more prescriptions and a higher chance of GP referral. The effect of age on consultation started from 50-59 age group (aRR 0.96, 0.93 to 0.99) to the strongest in 90+ group (aRR 0.77, 0.75 to 0.80). Compared to those under 50 years old, patients aged over 50 received more prescriptions with a clear dose-response relationship (aRRs 1.09 to 1.44); while those aged between 50 and 89 were more likely to be referred to other care services (aRRs 1.08 to 1.16). Men had less consultations (aRR 0.96, 0.95 to 0.97) and prescriptions (aRR 0.90, 0.89 and 0.92) than women.

Patients with prostate cancer received more consultations, more prescriptions and a higher chance of referral than patients with any other cancers (aRRs 1.14 to 1.21). Compared to lung cancer, colorectal cancer received more prescriptions and a higher
chance of being referred (aRRs 1.04-1.05. Comorbidity was positively associated with consultations, prescriptions and referrals (aRRs 1.07 to 2.03), all with a dose-response relationship (p for trend <0.0001).

Patients who survived less than 5 years since their cancer diagnosis received more GP consultations (aRRs 1.05 to 1.31) than those who survived more than 5 years. However, only those who survived in between 6 and 36 months had more prescriptions (aRRs 1.05-1.07) than those who survived less than 6 months or longer than 3 years. Patients with a shorter survival (<1 year) had a higher chance of being referred to other specialities (aRRs 1.41 to 1.53) than those who survived more than 1 year. Patients who died in earlier years (2000-2009) had fewer consultations (aRRs 0.64 to 0.86) and fewer prescriptions (aRRs 0.79 to 0.91) in comparison to those who died in the more recent period (2010-2014). However, patients who died in 2000-2004 had the highest chance (aRR 1.13, 1.01 to 1.25) and in 2005-2009 the lowest chance (aRR 0.93, 0.88 to 0.97) of GP referral.

Practices in Northern Ireland (aRR 1.34, 1.09 to 1.64) appeared to offer more and in Wales (aRR 0.85, 0.75-0.96) less consultations to their patients than practices in England or Scotland. GPs in Wales prescribed more (aRR 1.15, 1.08-1.22) and in Scotland prescribed less for their patients (aRR 0.87, 0.83-0.91) than GPs in England or Northern Ireland. Practices in Wales were more likely (aRR 1.23, 1.01-1.49) and in Scotland less likely (aRR 0.77, 0.61-0.97) to refer their patients than their counterparters in England or Northern Ireland.

**Palliative care needs recognised**

Older age (≥60 years), male gender and cancers of colorectal, prostate or breast were
associated with a lower chance of having palliative care needs recognised. There was a
dose-response relationship between age at death and the chance of PC group membership – aRRs ranging from 0.53 in 90+ to 0.89 in 60-69 age group. Patients with comorbidities were more likely to be in the PC group (aRRs 1.07 to 1.08). Patients who survived their cancer between 6 and 60 months had the highest chance of being in the PC group (aRRs 1.32 to 1.41), followed by those who survived less than 6 months or 5 to 10 years (aRRs 1.11 to 1.17). Those who died in 2000-2004 had half the probability of a patient having palliative care needs recognised (aRR versus 2010-2014: 0.48, 0.45 to 0.51), while the period 2005-2009 was associated with approximately 20% reduction of that chance (aRR 0.81, 0.78 to 0.83). There was no geographical differences in the chance of having palliative care needs recognised.

Sensitivity analyses

Sensitivity analyses (Appendix Tables 1-4) demonstrated similar results. Patients living in the deprived areas were less likely to having palliative care needs recognised and they also received less prescriptions from their GPs. There was no statistically significant difference in the number of consultations or referrals by social economic status.

Discussion

Main findings and implications

In this large and nationally representative, retrospective cohort study, we found that most cancer patients managed by GPs have complex care needs[12], i.e. ≥70 years and with comorbidities. GPs maintain active contacts with terminal cancer patients towards the very end of their lives, though their involvement reaching a peak at the penultimate month before a sharp drop in the last month. GP consultations at the end of life rarely take place at a patient’s home or their usual place of residence. Polypharmacy is common.
Patients over 70 years have fewer GP consultations but more prescriptions and a higher chance of referral to other specialities, suggesting their care needs may not be sufficiently met by primary care teams. Patients of prostate or colorectal cancer, with comorbidities, or with a shorter survival are high users of GP services. Having palliative care needs recognised increases the use of GP services, however, patients of old age have a significantly lower chance of use palliative care services.

Over the next several decades, it is anticipated that primary care teams will take more pressure to deliver care to those who are dying, as the patients with complex care needs will continue to rise and increasingly more people will die in the community settings.[13] Most people prefer to be cared for and die at home or in a home-like environment, should they have a choice.[14] Our data together with these projected trends and people’s preferences highlight the importance to enhance provision of primary palliative care. As most cancer patients have one or more comorbidities, our data also challenge the single-disease oriented primary care system, particularly the appropriateness of the widely implemented 10 minutes’ consultation model and some UK practices’ policy of one problem per consultation.

The skill sets for primary palliative care include basic symptom management and psychological support, basic discussions about prognosis, treatment goals and advance care planning.[15] A previous study involving 513 GPs found that more than a quarter of the respondents reported receiving no or inadequate training in the delivery of end of life care.[16] A Danish study on GPs’ self-reported competences in end of life care (n=573) found a similar proportion of the respondents don’t feel confident about being a key care provider.[17] Another qualitative study concerning GPs’ educational needs also reported a
widespread lack of confidence in end of life care amongst both qualified and trainee GPs. [18] Our data support these findings and prompt actions to address the gaps in primary care providers.

A finding worth noting is the diverse needs of care among terminal cancer patients, as evident by a broad range of referral specialities throughout the last year of life. The primary care teams maintain active contacts with patients towards the very end of their lives, which offers opportunities for a greater integration of primary care with specialist palliative care, oncology, geriatrics and other healthcare specialities. In fact, the primary plus specialist palliative care has been proposed as a sustainable model to meet the high demand for palliative care.[15] Furthermore, GPs are well positioned and should play a key role to coordinate patients’ care among multiple healthcare teams.[19] A system called Coordinate My Care, developed in the UK seeks to improve the communications among healthcare professionals and also patients’ end of life care outcomes[20, 21], though this and other approaches need robust evaluation.

Polypharmacy is common in our study population. In the 2nd month of life GPs were still actively prescribing for patients, as high as 36% of the patient received 10 or more prescriptions from their GPs. A Swedish study using linked data covering all settings reported a slightly higher number (10+) of medications[22] than our figures, particularly towards end of life. It may be primarily due to the CPRD data only including the medications prescribed by the GPs. Polypharmacy around the end of life has been shown to increase the symptom burden, the risk of adverse drug effects and even mortality[23], future research should be directed to safe and effective deprescribing for end of life care.
patients. Tools like the Drug Burden Index[24], which measures cumulative exposure to anticholinergic and sedative drugs or other measures of anticholinergic burden, may help guide drug choices at the end of life.

Proton pump inhibitors (PPIs) as the second most prescribed drug in the last year of life, next to opioid analgesics, was a surprising finding. To our knowledge, it is the first time reported in terminal cancer population. PPIs are used to treat acid reflux and gastric ulcers through inhibiting gastric acid secretion. The use of PPIs may be associated with various adverse effects, for example C. difficile-associated diarrhoea, enteric infection.[25, 26] Overprescribing of PPIs has been raised as a major concern. In end of life care setting, observational studies and expert consensus in older adults have highlighted prescribing PPIs may not be appropriate.[27, 28] We found no similar studies or expert attentions in cancer populations. Future research should fill this evidence gap.

Older patients had more complex care needs at the end of life. However, they had poorer access to healthcare care services, including primary care and palliative care, than their younger peers. Although age-related inequalities in end of life care are reported extensively in the literature[29, 30], this study provides to date the largest population-based evidence from the primary care setting. Eradicating inequalities in access to care and providing person-centered, coordinated high quality end of life care to everyone is a central commitment of our health and social care systems[31]. A recent study (N= 2479) using the local cancer registry database linked to GP and hospital activity data found that access to and longer duration with palliative care were associated with better end-of-life quality indicators.[32] Our data showed that palliative care was associated with the increased use of primary care services, but older people were less like to utilise palliative
care services. This needs to be investigated further in future studies to inform the design of effective interventions to improve the situation.

**Strengths and Limitations**

This is the largest evaluation study of primary care service use at the end of life in cancer patients. Due to the strength of the database, we were able to track all the interactions between patients and primary care in the last year of life. However, we could not assess the service utilisation in the context of non-GP health care activities due to the restrictions of record linkage at the time of our data access application. The capacity of the CPRD linking to other data sources has been greatly enhanced in recent years. The primary care database can now be linked to the whole spectrum of hospital episode statistics, cancer data and mental health data. Future studies should maximise the opportunities to acquire linked datasets to gain a more comprehensive picture of services patients received during the end of life.

**Conclusions**

In this large-scale national retrospective cohort study, we found most terminal cancer patients managed by GPs have complex care needs, i.e. ≥70 years, three quarters with comorbidities. GPs maintain active contacts with terminal cancer patients towards the very end of their lives, though their involvement reaching a peak at the penultimate month before a sharp drop in the last month. Polypharmacy is common and referral happen even in the last month of life. Patients aged over 70 years have fewer GP consultations but more prescriptions and a higher chance of end of life referral to other specialities. Patients of prostate or colorectal cancer, with comorbidities, or with a shorter survival are high users of GP services. Having palliative care needs recognised increases the use of GP services, however, patients of old age have a significantly lower chance of
being in the PC group. Our data highlight the importance of enhancing primary palliative care provision and the needs for a greater integration of primary care, and other healthcare professionals. Age-related inequalities in EoL care - older patients have poorer access to both primary care and palliative care - need to be addressed in future studies.

List Of Abbreviations

CPRD - The Clinical Practice Research DataLink
EoL - End of Life
GEE - The Generalised Estimation Equation
GP - General Practice
GPs - General Practitioners
IMD - The Index of Multiple Deprivation
ISAC - The Independent Scientific Advisory Committee
MHRA - The Medicines and Healthcare Products Regulatory Agency
NHS - The National Health Service
QOF - The Quality and Outcomes Framework
PC - Palliative Care

Declarations

Ethics approval and consent to participate

The CPRD has broad National Research Ethics Service Committee (NRES) ethics approval for purely observational research. This study was approved by the Independent Scientific Advisory Committee (ISAC) for Medicines and Healthcare Products Regulatory Agency (MHRA) database research permission (Approval number: 09_035RMn). No further ethical approval was required for the analysis of the data as it was purely observational research using anonymised CPRD data.
**Consent for publication**

Not applicable.

**Availability of data and material**

According to the data agreement we signed with the data provider, we are not allowed to share our data. The access to the data would need special approvals from the CPRD office.

**Competing interests**

None declared.

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The protocol was approved by the Independent Scientific Advisory Committee (ISAC) of the General Practice Research Database (GPRD, 09_035RMn). The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

**Authors’ contributions**

Conceived and designed the experiments: WG MG IJH. Analyzed the data & wrote the first draft: WG. Provided critical feedback: MM MG IJH. Approved the final version of the manuscript: All authors.
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Tables

Table 1 Characteristics* of the study population by the status of palliative care service use
| Variable                    | Value                        | All        | No PC      | PC         |
|-----------------------------|------------------------------|------------|------------|------------|
| N (row%)                    | --                           | 68,523(100.0) | 37330(54.5) | 31193(45.5) |
| Age at death                | Median (min, max)            | 77 (6, 111) | 78 (6, 110) | 74 (18, 111) |
| <50                         | 2010(2.9)                    |             | 873(2.3)    | 1137(3.6)   |
| 50-59                       | 5287(7.7)                    |             | 2253(6.0)   | 3034(9.7)   |
| 60-69                       | 12702(18.5)                  |             | 5906(15.8)  | 6796(21.8)  |
| 70-79                       | 21282(31.1)                  |             | 11258(30.2) | 10024(32.1) |
| 80-89                       | 21206(30.9)                  |             | 12844(34.4) | 8362(26.8)  |
| 90+                         | 6036(8.8)                    |             | 4196(11.2)  | 1840(5.9)   |
| Gender                      | Female                       | 31138(45.4) |             | 14333(45.9) |
|                             | Male                         | 37385(54.6) |             | 16860(54.1) |
| Cancer site                 | Lung                         | 25154(36.7) | 11983(32.1) | 13171(42.2) |
|                             | Colorectal                   | 16560(24.2) | 8740(23.4)  | 7820(25.1)  |
|                             | Breast                       | 13682(20.0) | 8254(22.1)  | 5428(17.4)  |
|                             | Prostate                     | 13127(19.2) | 8353(22.4)  | 4774(15.3)  |
| No. of comorbid conditions  | 0                            | 17028(24.9) |             | 7542(24.2)  |
|                             | 1                            | 22774(33.2) | 12094(32.4) | 10680(34.2) |
|                             | 2                            | 15338(22.4) | 8286(22.2)  | 7052(22.6)  |
|                             | 3                            | 7903(11.5)  | 4335(11.6)  | 3568(11.4)  |
|                             | 4+                           | 5480(8.0)   | 3129(8.4)   | 2351(7.5)   |
| Survival (months)           | Median (min, max)            | 15 (0, 292) |             | 15 (0, 273) |
|                             | <6                           | 20172(29.4) | 11809(31.6) | 8363(26.8)  |
|                             | 6-12                         | 11245(16.4) | 5334(14.3)  | 5911(18.9)  |
|                             | 13-36                        | 17679(25.8) | 8674(23.2)  | 9005(28.9)  |
|                             | 37-60                        | 7802(11.4)  | 4283(11.5)  | 3519(11.3)  |
|                             | 61-120                       | 8657(12.6)  | 5279(14.1)  | 3378(10.8)  |
|                             | 121+                         | 2968(4.3)   | 1951(5.2)   | 1017(3.3)   |
| Year of death               | 2000-2004                    | 16884(24.6) | 12264(32.9) | 4620(14.8)  |
|                             | 2005-2009                    | 26892(39.2) | 14346(38.4) | 12546(40.2) |
|                             | 2010-2014                    | 24747(36.1) | 10720(28.7) | 14027(45.0) |
| IMD quintile**              | 1 (Least deprived)           | 8956(13.1)  | 4678(12.5)  | 4278(13.7)  |
|                             | 2                            | 10019(14.6) | 5295(14.2)  | 4724(15.1)  |
|                             | 3                            | 8766(12.8)  | 4763(12.8)  | 4003(12.8)  |
|                             | 4                            | 8076(11.8)  | 4422(11.8)  | 3654(11.7)  |
|                             | 5 (Most deprived)            | 6953(10.1)  | 3843(10.3)  | 3110(10.0)  |
|                             | Not available                | 25753(37.6) | 14329(38.4) | 11424(36.6) |
| Region                      | England                      | 53377(77.9) | 29214(78.3) | 24163(77.5) |
|                             | Wales                        | 5921(8.6)   | 3285(8.8)   | 2636(8.5)   |
|                             | Scotland                     | 7044(10.3)  | 3668(9.8)   | 3376(10.8)  |
|                             | Northern Ireland             | 2181(3.2)   | 1163(3.1)   | 1018(3.3)   |

* expressed as N (column %) unless stated otherwise. The comparisons of the two groups were all statistically significant (P<0.05).
| Variable                        | Value                          | Consultation | Prescription | Referral | Palliative care |
|--------------------------------|--------------------------------|--------------|--------------|----------|-----------------|
| Palliative care                | Yes                            | 1.30(1.29 to 1.32) | 1.17(1.16 to 1.19) | 1.22(1.19 to 1.26) | <0.0001          |
| Age at death (ref: <50)        | 50-59                          | 0.96(0.93 to 0.99) | <0.0001 | 1.09(1.03 to 1.14) | <0.0001          |
|                                | 60-69                          | 0.94(0.91 to 0.96) | 1.18(1.12 to 1.24) | 1.13(1.04 to 1.23) | 0.89(0.86 to 0.93) |
|                                | 70-79                          | 0.92(0.89 to 0.94) | 1.24(1.18 to 1.30) | 1.16(1.07 to 1.25) | 0.81(0.78 to 0.84) |
|                                | 80-89                          | 0.85(0.83 to 0.88) | 1.32(1.25 to 1.39) | 1.13(1.04 to 1.22) | 0.69(0.66 to 0.72) |
|                                | 90+                            | 0.77(0.75 to 0.80) | 1.44(1.36 to 1.52) | 0.99(0.91 to 1.09) | 0.53(0.50 to 0.56) |
| Gender (ref: female)           | Male                           | 0.96(0.95 to 0.97) | <0.0001 | 0.90(0.89 to 0.92) | <0.0001          |
| Cancer site (ref: Lung)        | Colorectal                     | 0.98(0.97 to 1.00) | <0.0001 | 1.05(1.03 to 1.08) | <0.0001          |
|                                | Breast                         | 1.01(1.00 to 1.02) | 0.96(0.95 to 0.98) | 1.00(0.97 to 1.03) | 0.91(0.89 to 0.93) |
|                                | Prostate                       | 1.19(1.17 to 1.21) | 1.14(1.12 to 1.17) | 1.21(1.17 to 1.26) | 0.76(0.74 to 0.79) |
| No. comorbid conditions (ref: 0) | 1                             | 1.09(1.08 to 1.11) | <0.0001 | 1.21(1.18 to 1.23) | <0.0001          |
|                                | 2                              | 1.20(1.19 to 1.22) | 1.45(1.42 to 1.48) | 1.14(1.10 to 1.18) | 1.08(1.05 to 1.10) |
|                                | 3                              | 1.17(1.15 to 1.19) | 1.68(1.64 to 1.72) | 1.24(1.19 to 1.29) | 1.08(1.04 to 1.11) |
|                                | 4+                             | 1.26(1.24 to 1.28) | 2.03(1.98 to 2.09) | 1.32(1.25 to 1.39) | 1.01(0.97 to 1.05) |
| Survival (ref: 120+)           | 0-5                            | 1.07(1.04 to 1.11) | 0.95(0.91 to 0.99) | 1.53(1.42 to 1.65) | <0.0001          |
|                                | 6-12                           | 1.31(1.27 to 1.35) | 1.07(1.02 to 1.12) | 1.41(1.30 to 1.52) | 1.38(1.31 to 1.45) |
|                                | 13-36                          | 1.10(1.07 to 1.13) | 1.05(1.01 to 1.09) | 0.92(0.86 to 0.99) | 1.41(1.34 to 1.49) |
|                                | 37-60                          | 1.05(1.01 to 1.08) | 1.03(0.98 to 1.07) | 0.96(0.89 to 1.05) | 1.32(1.25 to 1.39) |
|                                | 61-120                         | 1.01(0.98 to 1.03) | 0.98(0.94 to 1.02) | 0.98(0.91 to 1.05) | 1.17(1.11 to 1.23) |
| Year of death (ref: 2010-2014) | 2000-2004                      | 0.64(0.62 to 0.66) | <0.0001 | 0.79(0.77 to 0.80) | <0.0001          |
|                                | 2005-2009                      | 0.86(0.84 to 0.88) | 0.91(0.89 to 0.93) | 0.93(0.88 to 0.97) | 0.81(0.78 to 0.83) |
| Region (ref: England) | Wales         | 0.85 (0.75 to 0.96) | 0.05 | 1.15 (1.08 to 1.22) | <0.001 | 1.23 (1.01 to 1.49) | 0.007 | 0.98 (0.91 to 1.06) | 0.62 |
|----------------------|---------------|---------------------|------|--------------------|---------|---------------------|------|---------------------|------|
| Scotland             | 1.06 (0.96 to 1.17) | 0.87 (0.83 to 0.91) |      | 0.77 (0.61 to 0.97) |         |                     |      | 0.99 (0.93 to 1.05) |      |
| Northern Ireland     | 1.34 (1.09 to 1.64) | 1.01 (0.93 to 1.09) |      | 1.14 (0.95 to 1.35) |         |                     |      | 0.91 (0.78 to 1.06) |      |

**Appendix Tables**

**Appendix Table 1**  Factors associated with primary care service use in the last 3 months of life, N=68523
| Variable                                | Value                      | Consultation | Prescription | Referral    |
|-----------------------------------------|----------------------------|--------------|--------------|-------------|
| **Palliative care**                     | Yes                        | 1.39 (1.37 to 1.42) | <0.0001      | 1.26 (1.20 to 1.33) | <0.0001 |
| Age at death (ref: <50)                 | 50-59                      | 0.99 (0.95 to 1.02) | <0.0001      | 1.04 (0.98 to 1.10) | <0.0001 |
|                                         | 60-69                      | 0.97 (0.94 to 1.01) | 1.05 (0.99 to 1.10) | 1.24 (1.09 to 1.41) | <0.0001 |
|                                         | 70-79                      | 0.93 (0.90 to 0.96) | 1.03 (0.97 to 1.08) | 1.23 (1.09 to 1.40) | <0.0001 |
|                                         | 80-89                      | 0.86 (0.83 to 0.90) | 1.04 (0.98 to 1.10) | 1.23 (1.08 to 1.39) | <0.0001 |
|                                         | 90+                        | 0.81 (0.78 to 0.84) | 1.12 (1.06 to 1.20) | 1.12 (0.97 to 1.28) | <0.0001 |
| **Gender (ref: female)**                | Male                       | 0.97 (0.96 to 0.98) | 0.90 (0.89 to 0.92) | 1.04 (1.00 to 1.08) | 0.05    |
| **Cancer site (ref: Lung)**            | Colorectal                 | 0.99 (0.97 to 1.01) | 1.01 (0.98 to 1.04) | 1.10 (1.04 to 1.16) | <0.0001 |
|                                         | Breast                     | 1.00 (0.98 to 1.02) | 0.95 (0.93 to 0.98) | 0.99 (0.95 to 1.04) | <0.0001 |
|                                         | Prostate                   | 1.10 (1.08 to 1.12) | 1.11 (1.08 to 1.13) | 1.15 (1.09 to 1.22) | <0.0001 |
| **No. comorbiditiy conditions (ref: 0)**| 1                          | 1.03 (1.01 to 1.04) | 1.11 (1.09 to 1.14) | 1.02 (0.96 to 1.08) | <0.0001 |
|                                         | 2                          | 1.08 (1.06 to 1.10) | 1.26 (1.23 to 1.28) | 1.05 (0.99 to 1.11) | <0.0001 |
|                                         | 3                          | 1.10 (1.08 to 1.12) | 1.39 (1.35 to 1.43) | 1.09 (1.02 to 1.16) | <0.0001 |
|                                         | 4+                         | 1.18 (1.16 to 1.20) | 1.58 (1.53 to 1.63) | 1.17 (1.07 to 1.27) | <0.0001 |
| **Survival (months) (ref: 120+)**       | <6                         | 1.40 (1.35 to 1.45) | 1.15 (1.10 to 1.21) | 1.81 (1.62 to 2.02) | <0.0001 |
|                                         | 6-12                       | 1.14 (1.10 to 1.19) | 1.12 (1.07 to 1.18) | 1.04 (0.93 to 1.17) | <0.0001 |
|                                         | 13-36                      | 1.09 (1.05 to 1.13) | 1.07 (1.03 to 1.12) | 1.01 (0.91 to 1.13) | <0.0001 |
|                                         | 37-60                      | 1.06 (1.02 to 1.10) | 1.05 (1.00 to 1.10) | 1.03 (0.91 to 1.16) | <0.0001 |
|                                         | 61-120                     | 1.00 (0.96 to 1.04) | 1.00 (0.95 to 1.04) | 1.06 (0.95 to 1.18) | <0.0001 |
| **Year of death (ref: 2010-2014)**      | 2000-2004                  | 0.66 (0.63 to 0.69) | 0.88 (0.85 to 0.90) | 1.16 (1.03 to 1.31) | <0.0001 |
|                                         | 2005-2009                  | 0.85 (0.83 to 0.88) | 0.93 (0.91 to 0.96) | 0.92 (0.86 to 0.99) | <0.0001 |
| **Region (ref: England)**              | Wales                      | 0.91 (0.81 to 1.02) | 1.10 (1.03 to 1.17) | 1.23 (1.00 to 1.51) | 0.029   |
|                                         | Scotland                   | 0.99 (0.88 to 1.10) | 0.86 (0.81 to 0.92) | 0.83 (0.64 to 1.07) | <0.0001 |
|                                         | NI                         | 1.22 (1.00 to 1.48) | 1.07 (0.95 to 1.20) | 1.21 (1.01 to 1.46) | <0.0001 |
## Appendix Table 2 Factors associated with primary care service use in the last 12 months of life, sensitivity analysis with IMD, N=42770

|                                | Consultation          | Prescription         | Referral          |
|--------------------------------|-----------------------|----------------------|-------------------|
| **Palliative care**            |                       |                      |                   |
| Yes                            | 1.29 (1.27 to 1.31)   | <0.0001              | 1.16 (1.14 to 1.18) | <0.0001 | 1.21 (1.17 to 1.25) |
| **Age at death**               |                       |                      |                   |
| (ref: <50)                     |                       |                      |                   |
| 50-59                          | 0.96 (0.93 to 1.00)   | <0.0001              | 1.08 (1.00 to 1.15) | <0.0001 | 1.10 (0.99 to 1.22) |
| 60-69                          | 0.94 (0.91 to 0.97)   | <0.0001              | 1.20 (1.13 to 1.28) |        | 1.15 (1.04 to 1.27) |
| 70-79                          | 0.92 (0.90 to 0.95)   | <0.0001              | 1.28 (1.20 to 1.36) |        | 1.16 (1.05 to 1.27) |
| 80-89                          | 0.86 (0.83 to 0.89)   | <0.0001              | 1.37 (1.28 to 1.46) |        | 1.14 (1.03 to 1.25) |
| 90+                            | 0.79 (0.76 to 0.82)   |                      | 1.50 (1.39 to 1.61) |        | 0.99 (0.88 to 1.10) |
| **Gender (ref: female)**       |                       |                      |                   |
| Male                           | 0.96 (0.95 to 0.97)   | <0.0001              | 0.91 (0.89 to 0.92) | <0.0001 | 0.98 (0.95 to 1.01) |
| **Cancer site**                |                       |                      |                   |
| (ref: Lung)                    |                       |                      |                   |
| Colorectal                     | 0.99 (0.97 to 1.01)   | <0.0001              | 1.07 (1.04 to 1.10) | <0.0001 | 1.05 (1.00 to 1.10) |
| Breast                         | 1.01 (1.00 to 1.02)   | <0.0001              | 0.97 (0.94 to 0.99) | <0.0001 | 1.02 (0.98 to 1.06) |
| Prostate                       | 1.20 (1.18 to 1.22)   | <0.0001              | 1.16 (1.13 to 1.19) | <0.0001 | 1.24 (1.18 to 1.30) |
| **No. comorbid conditions**   |                       |                      |                   |
| (ref: 0)                       |                       |                      |                   |
| 1                              | 1.09 (1.07 to 1.10)   | <0.0001              | 1.19 (1.17 to 1.22) | <0.0001 | 1.07 (1.03 to 1.12) |
| 2                              | 1.20 (1.18 to 1.22)   | <0.0001              | 1.45 (1.41 to 1.49) | <0.0001 | 1.15 (1.10 to 1.21) |
| 3                              | 1.17 (1.14 to 1.19)   | <0.0001              | 1.66 (1.61 to 1.72) | <0.0001 | 1.24 (1.18 to 1.31) |
| 4+                             | 1.25 (1.23 to 1.28)   | <0.0001              | 2.07 (2.00 to 2.15) | <0.0001 | 1.38 (1.29 to 1.48) |
| **Survival**                   |                       |                      |                   |
| (ref: 120+)                    |                       |                      |                   |
| 0-5                            | 1.08 (1.04 to 1.11)   | <0.0001              | 0.96 (0.91 to 1.01) | <0.0001 | 1.56 (1.43 to 1.71) |
| 6-12                           | 1.31 (1.26 to 1.35)   | <0.0001              | 1.07 (1.01 to 1.13) | <0.0001 | 1.47 (1.34 to 1.61) |
| 13-36                          | 1.09 (1.06 to 1.13)   | <0.0001              | 1.04 (1.00 to 1.10) | <0.0001 | 0.95 (0.87 to 1.04) |
| 37-60                          | 1.05 (1.01 to 1.08)   | <0.0001              | 1.03 (0.98 to 1.09) | <0.0001 | 1.00 (0.91 to 1.10) |
| 61-120                         | 1.01 (0.97 to 1.04)   | <0.0001              | 0.97 (0.92 to 1.02) | <0.0001 | 1.02 (0.93 to 1.11) |
| **Year of death**              |                       |                      |                   |
| (ref: 2010-2014)               |                       |                      |                   |
| 2000-2004                      | 0.64 (0.61 to 0.67)   | <0.0001              | 0.77 (0.75 to 0.80) | <0.0001 | 1.07 (0.94 to 1.22) |
| 2005-2009                      | 0.85 (0.82 to 0.87)   | <0.0001              | 0.90 (0.87 to 0.92) | <0.0001 | 0.89 (0.84 to 0.94) |
| **IMD (ref: most deprived)**  |                       |                      |                   |
| Least depr                     | 1.02 (0.99 to 1.04)   | 0.24                 | 0.86 (0.83 to 0.89) | <0.0001 | 1.07 (0.99 to 1.14) |
| 2                              | 1.02 (1.00 to 1.04)   | <0.0001              | 0.89 (0.87 to 0.92) | <0.0001 | 1.06 (0.99 to 1.13) |
| 3                              | 1.02 (0.99 to 1.04)   | <0.0001              | 0.91 (0.88 to 0.94) | <0.0001 | 1.03 (0.96 to 1.10) |
| 4                              | 1.00 (0.98 to 1.02)   | <0.0001              | 0.93 (0.90 to 0.96) | <0.0001 | 1.01 (0.95 to 1.07) |
Appendix Table 3 Factors associated with primary care service use in the last 12 months of life, using all deaths post QoF, N=46703
|                                | Consultation | Prescription | Referral | PC  |
|--------------------------------|--------------|--------------|----------|-----|
| **Palliative care (ref: Yes)** |              |              |          |     |
| No                             | 1.32(1.31 to 1.34) | <0.0 001     | 1.17(1.15 to 1.19) | <0.0 001 |
| **Age at death (ref: <50)**    |              |              |          |     |
| 50-59                          | 0.95(0.92 to 0.99) | <0.0 001     | 1.13(1.06 to 1.20) | <0.0 001 |
| 60-69                          | 0.93(0.90 to 0.97) |              | 1.19(1.12 to 1.26) | <0.0 001 |
| 70-79                          | 0.90(0.87 to 0.94) |              | 1.27(1.20 to 1.34) | <0.0 001 |
| 80-89                          | 0.84(0.81 to 0.87) |              | 1.36(1.29 to 1.44) | <0.0 001 |
| 90+                            | 0.78(0.75 to 0.81) |              | 1.49(1.40 to 1.59) | <0.0 001 |
| **Gender (ref: female)**       |              |              |          |     |
| Male                           | 0.95(0.94 to 0.96) | <0.0 001     | 0.90(0.88 to 0.91) | <0.0 001 |
| **Cancer site (ref: Lung)**    |              |              |          |     |
| Colorectal                     | 1.00(1.02 to 1.02) | <0.0 001     | 1.06(1.03 to 1.09) | <0.0 001 |
| Breast                         | 1.03(1.02 to 1.04) | <0.0 001     | 0.97(0.95 to 0.99) | <0.0 001 |
| Prostate                       | 1.21(1.19 to 1.23) | <0.0 001     | 1.14(1.11 to 1.17) | <0.0 001 |
| **No. comorbid conditions (ref: 0)** |              |              |          |     |
| 1                              | 1.09(1.06 to 1.13) | <0.0 001     | 1.20(1.17 to 1.23) | <0.0 001 |
| 2                              | 1.33(1.29 to 1.37) | <0.0 001     | 1.45(1.42 to 1.49) | <0.0 001 |
| 3                              | 1.11(1.07 to 1.14) | <0.0 001     | 1.69(1.64 to 1.74) | <0.0 001 |
| 4+                             | 1.06(1.03 to 1.10) | <0.0 001     | 2.04(1.97 to 2.10) | <0.0 001 |
| **Survival (ref: 120+)**       |              |              |          |     |
| <6                             | 1.01(0.98 to 1.04) | <0.0 001     | 0.97(0.93 to 1.02) | <0.0 001 |
| 6-12                           | 0.79(0.77 to 0.81) | <0.0 001     | 1.08(1.03 to 1.13) | <0.0 001 |
| 13-36                          | 0.89(0.81 to 0.98) | <0.0 001     | 1.06(1.01 to 1.10) | <0.0 001 |
| 37-60                          | 1.04(0.95 to 1.14) | <0.0 001     | 1.03(0.98 to 1.08) | <0.0 001 |
| 61-120                         | 1.30(1.09 to 1.54) | <0.0 001     | 0.98(0.94 to 1.03) | <0.0 001 |
| **Year of death (ref: 2010-2014)** |              |              |          |     |
| 2006-09                        | 1.18(1.16 to 1.19) | <0.0 001     | 0.92(0.90 to 0.94) | <0.0 001 |
| **Region (ref: England)**      |              |              |          |     |
| Wales                          | 1.24(1.22 to 1.26) | <0.0 001     | 1.14(1.07 to 1.22) | <0.0 001 |
| Scotland                       | 1.07(1.06 to 1.09) | <0.0 001     | 0.85(0.80 to 0.89) | <0.0 001 |
| NI                             | 1.34(1.31 to 1.37) | <0.0 001     | 1.00(0.92 to 1.08) | <0.0 001 |

- PC: Palliative care (ref: Yes)
Appendix table 4 Factors associated with service use in the 12 months of life, N=68523

| Variable                        | Value | Consultation* | Prescription** |
|---------------------------------|-------|---------------|---------------|
| Palliative care                 | Yes   | 1.30(1.29 to 1.32) | 1.17(1.16 to 1.18) |
| Age at death (ref: <50)         | 50-59 | 0.98(0.95 to 1.01) | 1.09(1.04 to 1.13) |
|                                 | 60-69 | 0.97(0.95 to 1.00) | 1.21(1.16 to 1.25) |
|                                 | 70-79 | 0.95(0.93 to 0.98) | 1.26(1.22 to 1.31) |
|                                 | 80-89 | 0.90(0.88 to 0.93) | 1.28(1.23 to 1.33) |
|                                 | 90+   | 0.85(0.83 to 0.88) | 1.34(1.29 to 1.40) |
| Gender (ref: female)            | Male  | 0.96(0.95 to 0.97) | 0.93(0.91 to 0.94) |
| Cancer site (ref: Lung)         | Colorectal | 1.01(1.00 to 1.03) | 1.06(1.04 to 1.08) |
|                                 | Breast | 1.04(1.03 to 1.05) | 0.97(0.96 to 0.99) |
|                                 | Prostate | 1.22(1.20 to 1.24) | 1.15(1.13 to 1.17) |
| No. comorbidity conditions (ref: 0) | 1 | 1.09(1.08 to 1.11) | 1.20(1.18 to 1.22) |
|                                 | 2     | 1.21(1.19 to 1.22) | 1.43(1.40 to 1.45) |
|                                 | 3     | 1.30(1.28 to 1.32) | 1.62(1.59 to 1.65) |
|                                 | 4+    | 1.42(1.39 to 1.44) | 1.92(1.88 to 1.95) |
| Survival (months) (ref: 120+)   | <6    | 1.06(1.03 to 1.09) | 0.99(0.95 to 1.02) |
|                                 | 6-12  | 1.27(1.23 to 1.31) | 1.09(1.05 to 1.12) |
|                                 | 13-36 | 1.09(1.06 to 1.11) | 1.06(1.03 to 1.10) |
|                                 | 37-60 | 1.04(1.01 to 1.07) | 1.04(1.01 to 1.07) |
|                                 | 61-120| 1.00(0.97 to 1.03) | 1.00(0.97 to 1.03) |
| Year of death (ref: 2010-2014)  | 2000-2004 | 0.63(0.61 to 0.65) | 0.82(0.81 to 0.84) |
|                                 | 2005-2009 | 0.87(0.85 to 0.88) | 0.93(0.91 to 0.94) |
| Region (ref: England)           | Wales | 0.98(0.92 to 1.04) | 1.14(1.09 to 1.19) |
|                                 | Scotland | 1.13(1.06 to 1.20) | 0.98(0.94 to 1.02) |
|                                 | NI    | 1.57(1.43 to 1.71) | 1.15(1.07 to 1.24) |

* including all consultations (i.e. direct & indirect patient contacts); **prescriptions of unique products only.

Figures
Figure 1

The pattern of GP consultations in the last year of life
Figure 2

The pattern of GP prescribing in the last year of life
Figure 3

The pattern of GP referrals in the last year of life

Supplementary Files

This is a list of supplementary files associated with the primary manuscript. Click to download.

CPRD - appendix 1 QoF codes.txt