Factors affecting use of unscheduled care for people with advanced cancer: a retrospective cohort study in Scotland

INTRODUCTION
Cancer mortality is increasing, and anticipated to reach 14.6 million annual deaths worldwide by 2040.\(^1\) People with advanced cancer frequently experience unpleasant disease-related and treatment-related symptoms.\(^2\) The onset of acute, severe, or distressing symptoms outside of normal working hours may precipitate attendance with unscheduled care services.\(^3\) ‘Unscheduled care’ includes any medical service that can be accessed by the general public without prior arrangement.\(^4\)

In the UK, the majority of unscheduled care is delivered via the general practice out-of-hours (GPOOH) service or via hospital accident and emergency (A&E) departments. Unscheduled care is among the most pressurised sections of the NHS, and use of unscheduled care is increasing,\(^6\) particularly among people with advanced cancer.\(^7\)\(^8\) Much of the need for accessing unscheduled care by people with cancer is due to predictable situations, and is, therefore, potentially avoidable with good anticipatory care.\(^3\)\(^7\)\(^9\) Although unscheduled care remains an important part of comprehensive community care for people with advanced cancer, frequent use of unscheduled care has been suggested to be a marker for poor patient care.\(^7\)\(^9\)\(^11\)

It is increasingly important to optimise use of unscheduled care by people with cancer because of its impact on quality, manner, and location of end-of-life care.\(^8\)

Relatively little is known about the frequency and patterns with which people with advanced cancer use unscheduled care. Most research focuses on A&E and does not consider GPOOH services. This study aims to describe the frequency and patterns of any NHS unscheduled care use, by people with cancer in their last year of life, and to examine the associations of demographic and clinical factors with unscheduled care attendance.

METHOD
The overall design of this study is a retrospective cohort study of all 2443 residents of the Tayside region of Scotland (total population approximately 410 000)\(^12\) who died from cancer over a 30-month period from 2012 to 2015. The population was identified posthumously using General Register Office death registration data, and included all those whose cause of death was cancer in position 1 of the death certificate. Routinely collected clinical data for all attendances in the last year of life were linked using the Community Health Index (CHI) number, which is used as a single patient identifier throughout NHS Scotland. CHI-linked data were obtained from the Cancer Registry (Scottish Morbidity Records),\(^13\) Scottish Government Executive

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How this fits in

Unscheduled care use is common in people with advanced cancer, but previous research has focused largely on accident and emergency (A&E) attendances only; this has led to an underestimation of the frequency of unscheduled care use as use of general practice out-of-hours (GPOOH) services is significantly more common than A&E use. This study demonstrates that the percentage of people with cancer who use unscheduled care is significantly higher than previously shown, that demographic factors have relatively little influence on unscheduled care use, that unscheduled care attendance was linked to clinical factors including pain and palliative care, and that people who are 'frequent users' were a small proportion of the cohort but accounted for over half of unscheduled care consultations. This concentration of unscheduled care use at the end of life and among a small number of users implies that any unscheduled care use should trigger in-hours care review and anticipatory care planning. Identifying factors that affect unscheduled care use will enable clinicians to identify people at high risk of (frequent) unscheduled care and appropriately target resources and interventions to these individuals in order to optimise care and minimise avoidable unscheduled care use.

Urban Rural Classification (SEURC, which classifies postcodes in terms of remoteness and rurality),14 and Scottish Index of Multiple Deprivation (SIMD, categorises deprivation into quintiles from SIMD1 [most deprived] to SIMD5 [least deprived]).15 Data were cleaned, anonymised, stored, and analysed in the SafeHaven platform (a secure virtual platform for NHS electronic data, where datasets are stored and analysed, and exported results and data meet strict research governance criteria) in the Health Informatics Centre (HIC) at the University of Dundee. Coding of clinical attendances was carried out by clinicians at the time of attendance, and recorded in the medical notes. Frequent users were defined as those with ≥5 attendances per year; very frequent users were defined as those with ≥10 attendances per year.

Analysis was descriptive, examining differences between unscheduled care users and non-users, and between users of one or other service (GPOOH or A&E), versus both, using χ² tests for categorical variables. Binary logistic regression was used to examine associations between any unscheduled care use, GPOOH use, and A&E use, and a range of demographical and clinical factors. Univariate and adjusted odds ratios (aOR) with their 95% confidence intervals [CIs] were calculated for each outcome using SPSS (version 25).

RESULTS

Population characteristics

In the population of 2443 people dying from cancer in the study period, the majority were males (n = 1278, 52.3%), most lived in urban areas (n = 1588, 65.3%), and the sample was evenly spread across the quintiles of deprivation. Lung cancer was the commonest cause of death (n = 672, 27.5%), with other common cancers including upper gastrointestinal (GI) malignancy (n = 514, 21.0%) and bowel cancer (n = 303, 12.4%), (Table 1). There was sizeable variation in the interval of diagnosis before death, with one-third of people (n = 831, 34.0%) being diagnosed <12 weeks before death, one-third (n = 877, 35.9%) diagnosed 12–51 weeks before death, and one-third (n = 735, 30.1%) diagnosed ≥52 weeks before death.

Patterns of use of unscheduled care

The majority (n = 1904, 77.9%) of people who died from cancer attended unscheduled care in their last year of life (Table 2). Many people attended only GPOOH (n = 1070, 43.8%); however, a substantial proportion attended both GPOOH and A&E (n = 630, 25.8%), and a minority attended A&E only (n = 204, 8.4%). The cohort of participants had 6914 contacts with unscheduled care in their year before death; the majority of these were with GPOOH (n = 5749, 83.2%) with only a small amount in A&E (n = 1165, 16.8%) (Figure 1). The number of attendances per patient in the last year of life ranged from 0 to 61 (Table 2). Among those attending, the range in total number of attendances was larger at GPOOH (1–60 attendances/year) than at A&E (1–11 attendances/year). All frequent users (n = 406, 16.6% of cohort) and very frequent users (n = 108, 4.4% of cohort) attended GPOOH, and most attended both GPOOH and A&E. There were no frequent or very frequent users who attended only A&E.

Attendance at unscheduled care was more frequent closer to the date of death, (Figure 1). Contacts with unscheduled care became more frequent during the terminal phase of illness; a substantial proportion of attendances with unscheduled care occurred in the participants’ last week (n = 1360, 19.7%), last 4 weeks (n = 2541, 36.8%), and last 12 weeks (n = 4174, 60.4%)
of life. This trend was seen in both GPOOH and A&E.

### Clinical reasons for unscheduled care use

Clinical data, a significant proportion of attendances were generically coded as 'unwell'. Regarding outcomes, very few GPOOH consultations out of all GPOOH attendances including those with missing clinical coding ($n = 31, 0.5\%$) resulted in a direct referral to other clinicians, and there was no coded breakdown of what proportion were referred directly to A&E. One in 10 GPOOH attendances resulted in admission to hospital ($n = 629, 10.9\%$). In this area, the majority of hospital admissions from GPOOH went directly to the medical admission unit or surgical admission unit; however, there was a possibility that more unwell patients could have been sent to hospital via A&E. One in five contacts with GPOOH were managed by district nurses, either as NHS24 phone advice ($n = 592,$ 

| Table 1. Patient-level factors related to unscheduled care use |
|---------------------------------------------------------------|
| Factor | All patients ($N = 5443,$ $n%)$ | Non-users $N = 539 (22.1\%$ of all patients), $n%)$ | Users $N = 1904 (77.9\%$ of all patients), $n%)$ | $P$-value (users versus non-users) | GPOOH only users $N = 1070 (43.8\%$ of all patients), $n%)$ | A&E only users $N = 204 (8.4\%$ of all patients), $n%)$ | Users of both $N = 630 (25.8\%$ of all patients), $n%)$ | $P$-value (GPOOH versus A&E versus users of both) |
|--------|---------------------------------|----------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|
| Age, years |
| $<65$ | 478 (19.6) | 114 (21.2) | 364 (19.1) | 0.12 | 214 (20.0) | 35 (17.2) | 115 (18.3) | 0.27 |
| 65–74 | 662 (27.1) | 160 (29.7) | 502 (26.4) | 263 (24.6) | 58 (28.4) | 181 (28.7) |
| 75–84 | 809 (33.1) | 172 (31.9) | 637 (33.5) | 359 (33.4) | 72 (35.3) | 204 (32.7) |
| $\geq85$ | 494 (20.2) | 93 (17.3) | 401 (21.1) | 234 (21.9) | 39 (19.1) | 128 (20.3) |
| Sex |
| Female | 1165 (47.7) | 247 (45.8) | 918 (48.2) | 0.33 | 536 (46.0) | 81 (7.0) | 301 (25.8) | 0.04 |
| Male | 1278 (52.3) | 292 (54.2) | 986 (51.8) | 534 (41.8) | 129 (5.9) | 329 (25.7) |
| Remoteness |
| Urban | 1588 (65.9) | 320 (60.4) | 1268 (67.4) | $<0.001$ | 696 (66.0) | 144 (71.3) | 429 (68.6) | $<0.001$ |
| Accessible | 587 (24.4) | 166 (31.3) | 421 (22.4) | 242 (22.9) | 48 (23.8) | 131 (21.0) |
| Remote | 235 (9.8) | 44 (8.3) | 191 (10.2) | 116 (11.0) | 10 (5.0) | 65 (10.4) |
| Deprivation |
| SIMD1 (deprived) | 422 (17.3) | 97 (18.3) | 372 (19.5) | 0.04 | 183 (17.4) | 53 (26.2) | 136 (21.8) | 0.03 |
| SIMD2 | 392 (16.0) | 98 (18.5) | 430 (22.6) | 244 (23.1) | 46 (22.8) | 140 (22.4) |
| SIMD3 | 444 (18.2) | 118 (22.3) | 326 (17.3) | 187 (17.7) | 34 (16.8) | 108 (17.3) |
| SIMD4 | 731 (29.9) | 103 (19.4) | 637 (20.6) | 232 (22.0) | 30 (14.9) | 130 (20.8) |
| SIMD5 (affluent) | 421 (17.2) | 114 (21.5) | 307 (16.8) | 206 (19.7) | 39 (19.3) | 110 (17.6) |
| Cancer type |
| Lung | 672 (27.5) | 142 (21.3) | 529 (78.7) | 0.06 | 246 (39.6) | 67 (10.0) | 194 (29.2) | 0.002 |
| Upper GI | 514 (21.0) | 120 (25.1) | 384 (74.9) | 231 (44.9) | 38 (7.4) | 116 (22.6) |
| Bowel | 303 (12.4) | 59 (19.5) | 244 (80.5) | 156 (52.1) | 17 (5.6) | 69 (22.8) |
| Breast and ovarian | 237 (9.7) | 56 (23.4) | 181 (76.6) | 114 (48.1) | 14 (5.9) | 53 (22.4) |
| Prostate | 99 (4.1) | 18 (18.2) | 81 (81.8) | 48 (48.5) | 10 (10.1) | 23 (23.2) |
| Haematological | 241 (9.9) | 65 (27.0) | 176 (73.0) | 88 (36.5) | 26 (10.8) | 62 (25.7) |
| Other | 377 (15.4) | 69 (18.3) | 308 (81.7) | 165 (43.8) | 32 (8.5) | 111 (29.4) |
| Diagnosed in the last year of life |
| Yes | 1709 (70.0) | 375 (21.9) | 1334 (78.1) | 0.827 | 727 (42.5) | 155 (9.1) | 452 (26.4) | 0.09 |
| No | 734 (30.0) | 164 (22.3) | 570 (77.7) | 343 (44.7) | 49 (6.7) | 178 (24.3) |

*Data for remoteness and deprivation missing for 33 patients. The denominator for remoteness and deprivation for non-users: 530. The denominator for remoteness and deprivation for GPOOH-only users: 1054. The denominator for remoteness and deprivation for A&E-only users: 202. The denominator for remoteness and deprivation for GPOOH and A&E users: 624. A&E = accident and emergency services. GI = gastrointestinal. GPOOH = GP out-of-hours service. SIMD = Scottish Index of Multiple Deprivation.15
10.3%) or as district nurse home visits (n = 548, 9.5%).

Demographic and clinical characteristics associated with unscheduled care use

Demographic data showed little association with unscheduled care attendance (Table 4). Age, sex, cancer type, and deprivation were not significantly associated with whether or not people attended unscheduled care. People living in rural areas were significantly less likely to use unscheduled care than their urban counterparts (aOR 0.64, 95% CI = 0.50 to 0.82). Recency of diagnosis was not significantly associated with whether or not people used unscheduled care, nor with the kind of unscheduled care that they used (Table 4).

Certain demographic factors affected A&E and GPOOH use differently (Table 5). Males were less likely to use GPOOH (adjusted OR 0.81, 95% CI = 0.67 to 0.98) than females, but sex did not significantly affect A&E use. Cancer type did not

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Table 2. Unscheduled care attendance numbers in the last year of life

| Unscheduled care attendance | All patients (N= 2443), n(%) | GPOOH only, n(%) | A&E only, n(%) | Both GPOOH and A&E, n(%) |
|-----------------------------|------------------------------|-----------------|----------------|-------------------------|
| Patients using each type of unscheduled care | 1904 (77.9) | 1070 (43.8) | 204 (8.4) | 630 (25.8) |
| Unscheduled care attendances per person in the last year of life | | | | |
| 0 | 539 (100)a | — | — | — |
| 1 | 487 (25.6)b | 340 (31.8) | 147 (72.1) | — |
| 2 | 413 (21.7)b | 260 (24.3) | 36 (18.6) | 116 (18.4) |
| 3 | 281 (14.8)b | 151 (14.2) | 14 (6.9) | 115 (18.3) |
| 4 | 209 (11.0)b | 95 (8.9) | 5 (2.5) | 109 (17.3) |
| 5–9 (frequent users) | 406 (21.3)b | 187 (17.4) | 0 | 219 (34.8) |
| ≥10 (very frequent users) | 108 (5.7)b | 37 (3.5) | 0 | 71 (11.3) |

*aPercentage of non-users. A&E = accident and emergency services. bPercentage of patients using unscheduled care (n = 1904). GPOOH = GP out-of-hours service.

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Figure 1. Unscheduled care attendances at GPOOH and A&E, in total and per week, over the last year of life. A&E = accident and emergency services. GPOOH = GP out-of-hours service.
appear to affect GPOOH attendances, but had a significant association with A&E attendances: people with lung cancer were 1.5 times more likely to attend A&E than those with upper GI and bowel cancers. This difference may be because of different cancer types influencing the nature and severity of presenting complaints, and therefore affecting the urgency of care required, and the choice between A&E and GPOOH. However, the authors are unable to confirm this with the data available, and more research is required. People from less deprived (SIMD3) and least deprived (SIMD5) backgrounds were less likely to use A&E than those from deprived (SIMD1) backgrounds; however, deprivation had no effect on GPOOH use. Although rurality had no significant impact on A&E use, people living rurally were significantly less likely to attend GPOOH (aOR 0.66, CI = 0.53 to 0.83) than those living in urban areas.

### DISCUSSION

#### Summary

The majority of people with advanced cancer used unscheduled care in their last year of life, with attendances occurring predominantly in the last weeks of life. People who used unscheduled care were much more likely to use GPOOH than A&E. One in four people who used unscheduled care attended ≥5 times (frequent users) and one in 20 attended ≥10 (very frequent users). Attendances increased dramatically close to date of death, with 60.3% occurring in the last 12 weeks of life and 19.7% in the last 4 weeks. Rurality was the only demographic factor to be consistently associated with unscheduled care use, with people living in rural areas less likely to attend any unscheduled care. Pain, breathlessness, infections, and GI symptoms were the commonest specific coded reasons for people presenting to unscheduled care.

#### Table 3. Unscheduled care contact reasons, attendance types, and clinical priorities

| GPOOH (N = 5749 attendances), n (%) | A&E (N = 1165 attendances), n (%) | A&E attendances, n (%) |
|------------------------------------|----------------------------------|------------------------|
| Coded reason for contact*          |                                  |                        |
| Palliative care                    | 1109 (24.2)                      | 216 (18.5)             |
| Pain                               | 482 (10.5)                       | 336 (28.8)             |
| Breathlessness                     | 105 (2.3)                        | 143 (12.3)             |
| Infection                          | 561 (12.2)                       | 30 (2.6)               |
| GI symptom                         | 330 (7.2)                        | 28 (2.4)               |
| Acute neurological symptoms        | 50 (1.1)                         | 164 (14.1)             |
| Mental health                      | 20 (0.4)                         | 1 (0.1)                |
| Medication request                 | 257 (5.6)                        | 172 (14.8)             |
| Other                              | 1673 (36.5)                      | 75 (6.4)               |
| Missing                            | 1162 (20.2)                      | 0                      |
| **Attendance type and setting**    |                                  |                        |
| **for GP contact**                 |                                  |                        |
| Home visit                         | 2876 (50.0)                      | 848 (72.8)             |
| NHS24 nurse advice                 | 592 (10.3)                       | 305 (26.2)             |
| District nurse visit               | 548 (9.5)                        | 6 (0.5)                |
| In-person attendance for           | 410 (7.1)                        | 6 (0.5)                |
| appointment at OOH centre          |                                  |                        |
| See and treat                      | 297 (5.2)                        | —                      |
| Telephone advice from GP           | 934 (16.2)                       | —                      |
| Other                              | 92 (1.6)                         | —                      |
| **Clinical priority ascribed**     |                                  |                        |
| Emergency                          | 342 (5.9)                        | 227 (19.5)             |
| Urgent                             | 1854 (32.2)                      | 613 (52.6)             |
| Routine                            | 3110 (54.1)                      | 325 (27.9)             |
| NHS24 Advice                       | 443 (7.7)                        | —                      |

*Contacts with missing clinical coding, n = 1162, were excluded from the denominator when calculating percentage. There are 5749 total GPOOH consultations and 4987 ‘coded’ GP OOH consultations (consultations for which there is a clinical Read Code given, which excludes the 1162 consultations that are ‘missing’ Read Codes/uncoded). The percentages given use 4987 as the denominator in order to give the percentage of coded contacts. A&E = accident and emergency services. GI = gastrointestinal. GPOOH = GP out-of-hours service.
Strengths and limitations
To the authors’ knowledge this is the first time that a cohort study has been used to examine UK unscheduled care use by people with cancer in both A&E and GPOOH. Using population data, compared with previous studies examining unscheduled care attenders, gives a more comprehensive and accurate picture of unscheduled care use.

The demographic and cancer diagnosis data were >98.5% complete; however, clinical coding of reason for attendance was more variable, with 20.2% missing in GPOOH and a similar proportion of A&E coding being non-specific ('unwell').

Comparison with existing literature
Frequency of use of unscheduled care. This study suggests that people who die from cancer use unscheduled care significantly more than has been previously reported. Current literature examining unscheduled care has suggested that approximately 30–35% of people with cancer use unscheduled care services.3,16,17 However, these estimates3,16–28 are often limited in terms of scope and applicability because they are not based on the population of people with cancer, but typically only examine people attending A&E whose attendance is coded as being for cancer. They therefore cannot accurately examine unscheduled care use in the whole population because they cannot observe those people who do not present to unscheduled care, or those where their presentation is not specifically coded as ‘cancer’ but who may be there for cancer-related reasons.

There was a wide range in the number of presentations per person to unscheduled care in the last year of life, particularly to GPOOH. Importantly, frequent users and very frequent users were 21.0% of the total cohort population, yet accounted for over half (n = 3990, 57.7%) of the cohort’s 6914 attendances with unscheduled care.

Table 4. Logistic regression comparing factors associated with those who attended unscheduled care in the last year of life and those who did not

| Factor                        | N       | Unscheduled care users n(%) | Univariate OR (95% CI) | Adjusted OR (95% CI) |
|-------------------------------|---------|-----------------------------|------------------------|----------------------|
| Age, per year                 | 2443    | 1904 (77.9)                 | 1.01 (1.00 to 1.02)    | 1.01 (1.00 to 1.02)  |
| Sex                           |         |                             |                        |                      |
| Female                        | 1165    | 918 (48.2)                  | 1                      | 1                    |
| Male                          | 1278    | 986 (51.8)                  | 0.91 (0.75 to 1.10)    | 0.88 (0.71 to 1.09)  |
| Remoteness*                   |         |                             |                        |                      |
| Urban                         | 1988    | 1268 (79.8)                 | 1                      | 1                    |
| Rural                         | 587     | 421 (71.7)                  | 0.64 (0.52 to 0.80)    | 0.64 (0.50 to 0.82)  |
| Remote                        | 235     | 191 (81.3)                  | 1.10 (0.77 to 1.55)    | 1.09 (0.76 to 1.57)  |
| Deprivation*                  |         |                             |                        |                      |
| SIMD1 (deprived)              | 469     | 372 (79.3)                  | 1                      | 1                    |
| SIMD2                         | 528     | 430 (81.4)                  | 1.47 (0.66 to 3.27)    | 1.17 (0.82 to 1.67)  |
| SIMD3                         | 447     | 329 (73.6)                  | 1.70 (0.76 to 3.80)    | 0.90 (0.64 to 1.26)  |
| SIMD4                         | 495     | 392 (79.2)                  | 1.17 (0.53 to 2.59)    | 1.05 (0.75 to 1.46)  |
| SIMD5 (affluent)              | 471     | 357 (75.8)                  | 1.32 (0.60 to 2.89)    | 0.85 (0.61 to 1.19)  |
| Cancer type                   |         |                             |                        |                      |
| Lung                          | 872     | 529 (78.7)                  | 1                      | 1                    |
| Upper GI                      | 514     | 385 (74.9)                  | 0.83 (0.60 to 1.14)    | 0.82 (0.62 to 1.09)  |
| Bowel                         | 303     | 244 (80.5)                  | 0.67 (0.48 to 0.93)    | 1.14 (0.80 to 1.62)  |
| Breast and ovarian            | 237     | 181 (76.4)                  | 0.93 (0.63 to 1.34)    | 0.84 (0.57 to 1.23)  |
| Prostate                      | 99      | 81 (81.8)                   | 0.72 (0.49 to 1.08)    | 1.32 (0.75 to 2.33)  |
| Haematological                | 241     | 176 (73.0)                  | 1.01 (0.57 to 1.79)    | 0.74 (0.52 to 1.04)  |
| Other                         | 377     | 308 (81.7)                  | 0.61 (0.41 to 0.89)    | 1.27 (0.91 to 1.76)  |

| Diagnosed in the last year of life | N       | Unscheduled care users n(%) | Univariate OR (95% CI) | Adjusted OR (95% CI) |
|-----------------------------------|---------|-----------------------------|------------------------|----------------------|
| Yes                               | 1709    | 1334 (78.1)                 | 1                      | 1                    |
| No                                | 734     | 570 (77.7)                  | 1.02 (0.83 to 1.26)    | 0.99 (0.79 to 1.24)  |

*aAge is used as a continuous variable, and the unit used was ‘per year’ with the odds ratio given being the change in odds per year of life. bData for deprivation and remoteness missing for 33 patients. GI = gastrointestinal. OR = odds ratio. SIMD = Scottish Index of Multiple Deprivation.15
Clinical reasons for unscheduled care use. Pain was the single commonest presenting complaint in both GPOOH and A&E, representing one-third of A&E attendances, and 1 in 10 presentations to GPOOH. While still substantial, this figure may under-represent the true effect of pain, as pain is likely to have featured in a significant proportion of GPOOH attendances coded as ‘palliative care’ (only a single clinical code could be applied at each attendance). Breathlessness, infections, and GI symptoms were also common reasons for presenting to GPOOH or A&E. These results are consistent with the findings of other studies, which found that pain, breathlessness, and gastrointestinal symptoms are the commonest reasons for unscheduled care use.

Patient characteristics and unscheduled care use. Previous studies have reported that unscheduled care use is more common in older adults with cancer, but this study found no strong evidence of an association with age. This is possibly because previous studies only examined attenders at A&E or GPOOH, whereas this study examined a cohort of people who died from cancer, or because previous studies looked at larger, for example, 10-year effect, sizes, rather than effect per year. A possible explanation is that age is not associated with unscheduled care use in people with cancer who are dying, but is in the wider population because older people are more likely to die from their cancer. Previous studies based on people with cancer attending A&E found that more A&E attenders with cancer are males than females, whereas this cohort study found no significant association between sex and A&E use but did determine that females are more likely than males to use GPOOH.

Past research has suggested that people with lung cancer are more likely to use unscheduled care. These studies focus on attendance-level rather than...
population-level data, and often incorrectly infer from the fact that people with cancer who attend unscheduled care are most likely to have lung cancer, that people with lung cancer are more likely to attend unscheduled care than those without other cancers. They also tend to focus solely on A&E and ignore GPOOH. Although this study did find that the plurality of attendances in GPOOH and A&E were by people with lung cancer, and that people with lung cancer were more likely to attend A&E than those with upper GI, bowel, and breast and ovarian cancers, this was not true of other cancer types. Moreover, people with lung cancer were not more likely to use GPOOH, or unscheduled care overall, than those with other cancers.

The present study demonstrates that people in rural areas use unscheduled care less than people in urban areas; previous research in this area suggests otherwise, but is largely based on A&E use in non-UK populations.

Earlier studies indicate that people living in deprived areas are more likely to use unscheduled care; this study supports this finding for A&E attendance but not for GPOOH or unscheduled care as a whole. These differences underscore the importance of not applying A&E-specific findings to unscheduled care as a whole, and on not conflating attendance-level data with population-level behaviour.

**Implications for research and practice**

This analysis finds that the extent of unscheduled care use by people who die from cancer is significantly greater than previously estimated, and that the majority of this care is delivered in GPOOH. This implies that unscheduled care use is a larger issue and more worthy of consideration and attention than previously thought, and that GPOOH should be at the forefront of service planning, design, and delivery for any unscheduled care interventions or policies.

There were significant variations between GPOOH use and A&E use, which underscores the importance of using GPOOH data for policies and service delivery relating to GPOOH, rather than assuming A&E data to be universally applicable to all unscheduled care. Over one-third of all unscheduled care attendances are due to pain and other palliative symptoms. Targeted interventions to improve symptom control and management could reduce unscheduled care use, minimise distress, and provide timely relief without the delays inherent in attending unscheduled care.

The clustering of unscheduled care attendances in the last weeks of life, and dramatic increase just before death, suggests that clinicians could use unscheduled care attendance as a predictor for imminence of death in people who die from cancer, and that such attendance should trigger clinicians to review patients’ palliative care needs, including symptom control and anticipatory care planning. This could be useful for both providers of unscheduled care, who may feel more enabled to suggest a care review by the regular medical provider, and by the regular medical provider, who, on becoming aware of unscheduled care use, may wish to review the patients themselves.

A relatively small number of people account for over half of all unscheduled care consultations; focusing support on these people may have a significant impact on improving overall care and reduce unscheduled care use. Using unscheduled care attendance, particularly frequent attendance, as a proxy for unmet palliative care needs would allow clinicians to target support to these people in order to improve symptom control, enhance community care, and optimise information sharing between primary, secondary, and unscheduled care services.

Interventions targeted at improving anticipatory care planning, improving community support, and streamlining care pathways may help ensure that unscheduled care attendances only occur when they are appropriate and unavoidable.

This paper did not examine variation by GP practice, which could influence unscheduled care attendance, and would demonstrate the effect of in-hours care. Future research could focus on this. Also, different cancer types influence the nature and severity of presenting complaints, and therefore affect the urgency of care required, and the choice between A&E and GPOOH, but, because the authors are unable to confirm this with the data available, more research is also required on this.

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**Ethical approval**

The study was approved by the Tayside Research Ethics Committee (REC reference 14/ES/0015) and Caldicott Guardian [reference Caldicott/CSAppSM1952].

**Provenance**

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**Competing interests**

The authors have declared no competing interests.

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