

BMJ Open Rural and Urban patients' Requirements and Experiences of Out-of-hours medical care after cancer (RUREO): a questionnaire study

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ABSTRACT

Objective To investigate how individuals diagnosed with cancer use out-of-hours (OOH) medical services, describe the behavioural determinants of OOH service use and explore whether there are differences between urban and rural dwellers.

Design and setting A cross-sectional questionnaire study conducted in Northeast Scotland.

Participants The questionnaire was sent to 2549 individuals diagnosed with cancer in the preceding 12 months identified through the National Health Service Grampian Cancer Care Pathway database. 490 individuals returned the questionnaire (19.2% response rate), 61.8% were urban and 34.9% were rural.

Outcomes Outcomes were differences in frequency of medical service use and attitudes towards OOH services between urban and rural participants. Patient experience (qualitative data) was compared.

Results Daytime services were used much more frequently than OOH services—83.3% of participants had never contacted an OOH primary care service in the preceding 12 months but 44.2% had used their daytime general practitioner at least four times. There were no significant differences between urban and rural dwellers in the patterns of OOH or daytime service use, the behavioural determinants of service use or the experiences of OOH services. Rural dwellers were significantly less likely to agree that OOH services were close by and more likely to agree that where they lived made it difficult to access these services. Rural dwellers were no more likely to agree or disagree that distance would affect their decision to contact OOH services. Qualitative results highlighted barriers to accessing OOH services exist for all patients but that long travel distances can be offset by service configuration, travel infrastructure and access to a car.

Conclusions Urban and rural dwellers have similar beliefs, attitudes towards and patterns of OOH service use. In Northeast Scotland, place of residence is unlikely to be the most important factor in influencing decisions about whether to access OOH medical care.

BACKGROUND

Individuals who live rurally are at risk of poorer cancer survival compared with

STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ The questionnaire was systematically designed using behavioural theories and piloted among key stakeholders.
- ⇒ The questionnaire asked about a wide range of attitudes and beliefs that could influence out-of-hours use.
- ⇒ Both quantitative and qualitative data were collected and analysed.
- ⇒ The response rate of the study was relatively low (19.2%), but the whole population of interest was sampled.
- ⇒ The study was conducted in a single region in Northeast Scotland, and most participants were white, Scottish, retired and affluent.

those living in urban areas.^{1–7} The reasons for inequalities in rural and urban cancer outcomes are poorly understood.^{4 5} In the UK National Health Service (NHS), existing research suggests that rural dwellers do not experience diagnostic or treatment delays compared with their urban counterparts.⁵ This raises the possibility that there are differences between rural and urban dwellers in how postdiagnosis medical care is accessed and used.

Rural dwellers may face increased difficulty accessing out-of-hours (OOH) medical services compared with daytime primary care services. Most UK residents live within a 20 min walk of their daytime general practitioner (GP),⁸ but rural dwellers can face much longer travelling distances, particularly to centralised emergency departments and OOH medical services. OOH services provide care when daytime general practices are closed (typically, between 18:00 and 8:00 hours on weekdays, weekends and public holidays). People with cancer can experience a range of problems necessitating OOH and emergency service use,^{9–11} and those with

cancer have increased contacts with emergency services, particularly towards the end of life.^{12 13} Limited research has been conducted exploring differences in OOH care between urban and rural dwellers with cancer.¹³

Qualitative research has highlighted several barriers to seeking help from OOH services among both non-cancer^{14–16} and cancer populations¹⁷ including concerns about travel distances, worries about burdening an over-stretched service, and uncertainty about how to contact OOH services. Retrospective cohort studies have compared OOH service use between urban and rural dwellers with cancer. A study of cancer decedents in Scotland reported that those living in less accessible areas had more frequent OOH attendance in the last year of life.¹⁸ Similar results were reported among people with cancer in Norway.¹⁹ However, one study of individuals with advanced cancer reported that rural residents in Scotland made less frequent use of unscheduled care.¹³

Existing research hints at significant differences between urban and rural cancer patients' use of OOH services but does not give clear insights into the magnitude of any differences or the mechanisms and behavioural determinants driving them. If rural dwellers experience specific barriers to accessing OOH care, these could contribute to geographical cancer outcome inequity but be potentially modifiable.

The aims of this study were to investigate how individuals diagnosed with cancer in the preceding 12 months use OOH medical services, describe the behavioural determinants of OOH service use, and explore whether there are differences between urban and rural dwellers. OOH medical services were defined as any contact with a health professional (whether face to face in a healthcare setting or at home, or over the telephone) when participants' general practice was closed. In this study, urban and rural areas were defined according to the Scottish Government Urban-Rural Classification 2020.²⁰ This classification is based on two factors—population of the area (rural areas have populations less than 3000), and accessibility (drive time to an area with a population of more than 10 000 people).

METHODS

Design and setting

A cross-sectional questionnaire was distributed to all eligible individuals in NHS Grampian diagnosed with cancer in the preceding 12 months. OOH medical services were defined as 'any contact with a healthcare professional when (your) usual general practice is closed'.

Grampian is a region of Northeast Scotland with a 2011 census population of 569 061,²¹ 32.8% of whom live rurally.²⁰ OOH primary care services in Grampian are provided by the Grampian Medical Emergency Department, accessible through NHS111 (a national telephone advice and triage line).²²

The NHS Grampian Cancer Care Pathway database (CCPd) was used to identify eligible individuals for this

study. This is an electronic database which collects and records secondary care activity data (eg, referral, diagnosis, treatment) for individuals diagnosed with cancer.

Questionnaire design and content

The questionnaire was informed by a previous interview study exploring patients' experiences of using OOH primary care services for cancer pain¹⁷ and designed with input from a health psychologist with expertise on health behaviour theories. A group of health psychologists provided feedback on a draft of the questionnaire and revisions were made accordingly. The questionnaire was then piloted by academics from the University of Aberdeen. Further details on questionnaire design and content can be found in online supplemental file 1.

The questionnaire contained 89 questions within five sections, labelled A–E, with varying numbers of questions in each section. Section D contained five free-text questions embedded into the questionnaire. The full questionnaire is shown in online supplemental file 2.

Patient and public involvement

Volunteers and patients from CLAN cancer support (www.clancancersupport.org), a charity organisation based in North Scotland, piloted the questionnaire and gave feedback on wording and content. Patients were also asked to comment on study design and ethical issues. The NHS Grampian CCPd used to identify participants is updated as soon as a pathological diagnosis is recorded. The researchers were keen to avoid the situation that a patient received a questionnaire about cancer before they had been informed about their diagnosis. Patients agreed that cancer should not be mentioned in the questionnaire or its supporting materials. The aims of the study were to investigate OOH service use (for both cancer-related and non-cancer related matters) by individuals with cancer, and it was judged at the design stage of this study (with patient input) that not mentioning cancer would still allow patients to reflect on their full range of experiences of OOH care.

Eligibility and recruitment

The NHS Grampian Cancer Health Intelligence team searched the CCPd to identify eligible individuals and screened electronic medical records to identify relevant exclusion criteria.

Eligible participants were adults aged 18 and over with a confirmed diagnosis of any cancer, except non-melanoma skin cancer in the preceding 12 months in NHS Grampian. This group of eligible participants was chosen as it was assumed these individuals would have current or recent experience of either active treatment, surveillance, or palliative care or have recent experience of using OOH services while managing cancer, and therefore be able to reliably recall and comment on service use. People with dementia or learning difficulties who might have difficulties providing informed consent to participate were excluded. We also excluded those living

in residential or nursing homes because it was deemed likely that caregivers would often instigate OOH medical attention and to avoid burdening these individuals. It was beyond the scope of this study to examine caregivers' opinions about OOH care.

Because cancer was not mentioned in the questionnaire and supporting materials, additional measures were taken to ensure that the individual completing the questionnaire had a cancer diagnosis. Participants were asked to self-report whether or not they had cancer and other specific medical conditions (demographics section), and medical records were reviewed for patients who consented to this.

Invitation letters, information sheets and paper questionnaires were mailed to eligible individuals with a reply-paid envelope. There was the option to return the questionnaire by post, or to complete the questionnaire online. Reminders were not sent to participants to avoid potentially burdening individuals with a recent cancer diagnosis.

Questionnaires were posted in batches in 2019 and 2020, with some delays due to the COVID-19 pandemic.

Sample size and analysis

The questionnaire was sent to the entire population of eligible individuals. The questionnaire collected different types of data relevant to the study objectives, including categorical and continuous variables and qualitative data. There was no single sample size calculation that would be entirely suitable. To our knowledge, there have been no previous questionnaire studies on the same or similar topics.

A search of the CCPd during study design revealed a potentially eligible sample population of 2498 (before exclusion criteria were applied).

Sample size was not calculated a priori. The statistician member of the study team suggested that in questionnaires of this nature, at least a 10% response rate is required to describe participant responses quantitatively when the whole population of interest is being sampled. Sample size calculators are available (eg, http://www.raosoft.com/sample_size.html) and suggest that to estimate a quantitative value for a population (eg, percentage of the population who agree/disagree with an item), 334 participants would be required from a population of 2498 with a 5% margin of error and 95% confidence levels.

Frequencies and percentages were used to describe participant demographics, OOH service use and Likert item responses. Participants' postcodes were used to determine urban or rural status according to the Scottish Government's Urban Rural 2-fold Classification²⁰ and socioeconomic status using the Scottish Government's Index of Multiple Deprivation (SIMD) quintiles.²³

Differences in urban and rural patients' demographics and use of different OOH services were compared using χ^2 tests. Ordinal (proportional odds) logistic regressions were used to compare differences in Likert item responses between urban and rural patients, adjusting

for potential confounders. Confounders were chosen a priori to account for factors which may differ systematically between urban and rural patients or affect health service use. Confounders were age,²⁴ number of comorbidities,^{25 26} socioeconomic status²⁴ and gender.²⁷ Quantitative data were analysed using R (R Core Team, 2020²⁸).

Free-text responses were copied into Microsoft Word Version 2205 and imported into NVivo V.12 (QSR International). Content analysis²⁹ was used to code and analyse free-text responses. Codes were short descriptors that summarised the key points raised by participants. These were initially derived inductively by one author (RA) and then checked by a second author (LD) to ensure that codes accurately reflected the data, and no key concepts were missed.

RESULTS

Participants

There were 2549 individuals in Grampian with a diagnosis of cancer within the preceding 12 months. Four hundred and ninety responses were received, indicating a minimum response rate of 19.2%. A complete response rate could not be calculated because NHS Health Intelligence did not keep records of number of participants excluded after the initial database search. The majority (88%) of questionnaires were returned by post. Most participants (n=482, 98.4%) resided in mainland North-east Scotland, with a minority of participants living in the Shetland Isles (n=4, 0.8%) or Orkney (n=4, 0.8%). Questionnaires were completed between December 2019 and November 2021.

Participants' demographic information, distance to medical services and comparisons between urban and rural patients are presented in [table 1](#). Participants were aged between 20 and 94, with a mean age of 67.4 years (SD=11.4). There were an equal number of men and women (n=244, 50.2% and n=242, 49.8%, respectively). Most participants (n=303, 61.8%) lived in an urban area and 171 (34.9%) lived in a rural area. Most participants (n=331, 69.6%) lived in areas with low levels of socioeconomic deprivation (SIMD quintiles 4 or 5) and 175 participants (36%) reported three or more comorbidities including cancer. Most participants were white (n=470, 98.1%), had at least high school education (n=398, 83.8%) and were retired (n=318, 66.5%).

Most (n=256, 84.5%) urban participants self-reported that they lived in a city or town, and most (n=160, 94.7%) rural residents self-reported that they lived in a village or rural location. Rural participants were significantly less likely to live in areas of high socioeconomic deprivation than urban participants and had significantly increased distance to their closest GP practice (p<0.001), OOH service (p<0.001) and Accident and Emergency (A&E) department (p<0.001) compared with urban participants (see [table 1](#)).

Almost all individuals (94.7%) were able to travel to their own general practice and most (63.2%) usually

**Table 1** Demographics of sample and comparison between urban and rural participants

Demographic information	Total N (%) 490 (100%)	Urban N (%) 303 (61.8%)	Rural N (%) 171 (34.9%)	P value
Age	N=470*	N=193	N=165	0.359†
Mean (SD)	67.4 (11.4)	67.8 (11.3)	66.7 (11.8)	
Range	20–94	24–94	20–92	
Sex	N=486	N=303	N=169	0.158‡
Male	244 (50.2%)	160 (52.8%)	77 (45.6%)	
Female	242 (49.8%)	143 (47.2%)	92 (54.4%)	
Level of deprivation (SIMD)	N=476	N=303	N=171	<0.001§
1 (highest deprivation)	7 (1.5%)	7 (2.3%)	0 (0%)	
2	56 (11.8%)	49 (16.2%)	7 (4.1%)	
3	82 (17.2%)	49 (16.2%)	33 (19.3%)	
4	147 (30.9%)	50 (16.5%)	96 (56.1%)	
5 (lowest deprivation)	184 (38.7%)	148 (48.8%)	35 (20.5%)	
No of comorbidities (inc. cancer)	N=486	N=301	N=169	0.145§
0	10 (2.1%)	7 (2.3%)	1 (0.6%)	
1	152 (31.3%)	88 (29.2%)	58 (34.3%)	
2	149 (30.7%)	102 (33.9%)	44 (26%)	
3 or more	175 (36%)	104 (34.6%)	66 (39.1%)	
Ethnicity	N=479	N=299	N=167	0.728§
White British, Scottish, Irish, other	470 (98.1%)	294 (98.3%)	163 (97.6%)	
Other	9 (1.9%)	5 (1.7%)	4 (2.4%)	
Highest level of education	N=475	N=288	N=163	0.587‡
No educational qualification	67 (14.4%)	42 (14.6%)	21 (12.9%)	
High school/secondary school	128 (27.5%)	78 (27.1%)	48 (29.4%)	
Degree/postgraduate qualifications	109 (23.4%)	71 (24.7%)	36 (22.1%)	
Apprenticeship	34 (7.3%)	25 (8.7%)	9 (5.5%)	
Professional qualification	102 (21.9%)	60 (20.8%)	38 (23.3%)	
Other	25 (5.4%)	12 (4.2%)	11 (6.8%)	
Employment status	N=473	N=291	N=168	0.253‡
Working full time	65 (13.6%)	37 (12.7%)	27 (16.1%)	
Working part time	39 (8.2%)	26 (8.9%)	12 (7.1%)	
Unable to work due to illness/disability	33 (6.9%)	17 (5.8%)	13 (7.7%)	
Retired	318 (66.5%)	203 (69.8%)	106 (63.1%)	
Other	18 (4.8%)	8 (2.7%)	10 (6%)	
Smoking status	N=484	N=298	N=170	0.443§
Never smoked	253 (52.3%)	158 (53%)	85 (50%)	
Previous smoker	192 (39.7%)	115 (38.6%)	71 (41.8%)	
Regular smoker	31 (6.4%)	18 (6%)	13 (7.6%)	
Occasional smoker	8 (1.7%)	7 (2.3%)	1 (0.6%)	
Weekly alcohol consumption	N=477	N=294	N=167	0.623§
Does not drink alcohol	151 (31.7%)	93 (31.6%)	53 (31.7%)	
1–4 units	157 (32.9%)	95 (32.3%)	58 (34.7%)	
5–14 units	127 (26.6%)	83 (28.2%)	38 (22.8%)	
15–30 units	35 (7.3%)	19 (6.5%)	15 (9%)	
31 or more units	7 (1.5%)	4 (1.4%)	3 (1.8%)	

Continued

Table 1 Continued

Demographic information	Total N (%) 490 (100%)	Urban N (%) 303 (61.8%)	Rural N (%) 171 (34.9%)	P value
Living circumstances	N=488	N=303	N=171	0.052§
Living with partner/spouse/family	395 (80.9%)	237 (78.2%)	147 (86%)	
Living alone	89 (18.2%)	64 (21.1%)	22 (12.9%)	
Other	4 (0.8%)	2 (0.7%)	2 (1.2%)	
Self-reported place of residence	N=487	N=303	N=169	< 0.001§
City	139 (28.5%)	132 (43.6%)	2 (1.2%)	
Town	136 (27.9%)	124 (40.9%)	7 (4.1%)	
Village	130 (26.7%)	41 (13.5%)	85 (50.3%)	
Rural	82 (16.8%)	6 (2%)	75 (44.4%)	
Self-reported cancer diagnosis**	N=486	N=301	N=169	0.046‡
Yes	430 (88.5%)	260 (86.4%)	157 (92.9%)	
No	56 (11.5%)	41 (13.6%)	12 (7.1%)	
Distance to GP practice	N=477	N=294	N=168	< 0.001¶
Less than 1 mile	212 (44.4%)	164 (55.8%)	41 (24.4%)	
1–5 miles	224 (47%)	127 (43.2%)	91 (54.2%)	
6–10 miles	34 (7.1%)	2 (0.7%)	31 (18.5%)	
11+ miles	7 (1.5%)	1 (0.3%)	5 (3%)	
Distance to closest OOH GP service	N=454	N=282	N=159	< 0.001‡
Up to five miles	169 (37.2%)	138 (48.9%)	24 (15.1%)	
6–10 miles	64 (14.1%)	30 (10.6%)	32 (20.1%)	
11+ miles	91 (20%)	37 (13.1%)	52 (32.7%)	
I don't know	130 (28.6%)	77 (27.3%)	51 (32.1%)	
Distance to closest A+E	N=469	N=238	N=134	< 0.001¶
Up to five miles	201 (42.9%)	179 (61.3%)	16 (9.7%)	
6–10 miles	67 (14.3%)	39 (13.4%)	25 (15.2%)	
11+ miles	201 (42.9%)	74 (25.3%)	124 (75.2%)	
Usual mode of transport to GP	N=462	N=284	N=163	0.001‡
Walk	89 (19.3%)	69 (24.3%)	16 (9.8%)	
Drive own car	292 (63.2%)	167 (58.8%)	117 (71.8%)	
Driven by someone else	65 (14.1%)	37 (13%)	25 (15.3%)	
Public transport	10 (2.2%)	8 (2.8%)	2 (1.2%)	
Other	6 (1.3%)	3 (1.1%)	3 (1.8%)	

*There were 490 individuals who completed the questionnaire but not all participants completed every question. Total N's for participants for each question are shown for each row/column. 'Prefer not to say' response is considered as missing and percentages and comparison test *p*-values relate to non-missing data. Urban/rural columns do not sum to total when data is missing from more than one variable.

†Independent samples *t*-test.

‡Pearson's chi-square test.

§Fisher's exact test.

¶Cochrane Armitage test.

**56 participants (11.5%) did not self-report a diagnosis of cancer, and data were missing for four individuals. Of these 56 participants, 34 had consented to have their medical records reviewed, which revealed that 4 participants had a non-malignant mass (3 prostate and 1 uterine), and 3 had suspected cancer which had not been fully investigated or where treatment had been declined. Sensitivity analysis was conducted to compare ordinal regression results for those who did/did not report having cancer. Only one regression result changed marginally, which is reported below. Results are, therefore, presented for all 490 participants who completed the questionnaire.

GP, general practitioner; OOH, out-of-hours; SIMD, Scottish Index of Multiple Deprivation.



drove their own car. Rural participants were significantly more likely to drive their own car and less likely to walk to their GP than urban participants (two-tailed $p=0.001$, see [table 1](#)).

Use of medical services

Medical services were used more frequently during daytime hours than OOH. For example, 354 out of 425 participants (83.3%) indicated that they had never used OOH primary care services during the preceding 12 months, but 215 out of 486 (44.2%) indicated that they had used their daytime GP four or more times and 179 (36.8%) had used their daytime GP 2–3 times during those 12 months. A&E department and ‘999’ calls were infrequent, with over 90% of participants having never phoned 999 out of hours, and 75.4% having never used A&E OOH. Full data on the use of daytime and OOH general practice, NHS 24, pharmacy services, special helplines and A&E departments are shown in online supplemental table 1.

There were no significant differences between urban and rural participants in the frequency of contact with any medical services, either during daytime hours or OOH (see online supplemental table 1). Rural participants were no more likely to have accessed care provided by their own GP during the OOH period than urban participants.

Information about participants’ last experience of using OOH general practice or A&E is provided in online supplemental table 2. Comparisons are made by urban/rural status. Most people who used OOH GP or A&E services ($n=120$, 42.4%) were seen by a health professional or given advice in less than an hour from their first contact with the service and 35 out of 283 participants (12.4%) were seen or given advice straight away. Most participants ($n=129$, 45.6%) were driven by someone else to the service, a minority ($n=47$, 16.6%) were taken by ambulance or drove themselves ($n=36$, 12.7%).

There were no significant differences between urban and rural patients regarding the type of OOH service used, when the service was used, the duration of wait from first contact with service to being seen or given advice, the mode of travel to the service, or whether their decision to contact OOH services was influenced by others or by their previous experiences (see online supplemental table 2).

Attitudes and beliefs and their influence on OOH use

The numbers and percentages of urban and rural participants who agreed or disagreed with statements about behavioural determinants that might affect their decisions to use OOH services and results of ordinal regressions are presented in [table 2](#).

A total of 203/301 (67.4%) of urban and 112/169 (66.3%) of rural participants knew which services were available to them and over 75% of both urban and rural participants felt confident about telephoning for advice about their health. Both urban and rural participants (282/302, 93.4% urban, 156/168, 92.9% rural) reported

having good social support and over 80% of both urban and rural participants had a relative, friend or partner who helped them with their health decisions.

Participants were mainly confident about OOH services’ ability to help them (205/300 urban 68.3%, and 98/169 rural, 58%). Most participants (90.6% urban, 86.4% rural) reported that they only used OOH services if they really needed to and that OOH services were for emergencies (74.7% of urban participants, 81.7% of rural participants). A total of 177/298 (59.4%) of urban and 109/167 (65.3%) of rural participants agreed that other people used OOH services for things that they should not. Difficulty getting an appointment with a daytime GP affected decisions to contact OOH for 122/298 (40.9%) urban and 56/168 (33.3%) rural participants.

Symptoms were a strong driver of help-seeking in all participants with over half of urban and rural participants agreeing that experiencing new symptoms would influence their decision to contact OOH. Over 85% of both urban and rural participants agreed that experiencing pain would affect their decision to contact OOH services. Most rural and urban participants agreed that a long duration of symptoms (66.4% of urban participants, 66.1% of rural participants) and finding symptoms worrying (76.6% of urban participants, 76.9% of rural participants) would affect their decision to contact OOH services.

In the regression analyses, there were two significantly different results between urban and rural participants. Rural participants were significantly more likely to disagree that OOH services were close by (adjusted OR (adj. OR) 3.32, 95% CI 2.19 to 5.07, $p<0.001$) and significantly less likely to disagree that where they lived made it difficult to access OOH care (adj. OR 0.27, 95% CI 0.18 to 0.41, $p<0.001$). Despite this, there was no evidence that the service being far away affected rural participants’ decision to contact OOH services (adj. OR 0.91, 95% CI 0.60 to 1.35).

Qualitative results

Four hundred and twenty-two participants (86.1%) provided at least one response to the five free-text questions within the questionnaire. The remainder of participants (13.9%) either provided no free-text responses or reported that they had not used the service so either could not comment, did not know, or the question was not applicable to them. The percentage of free-text responders was similar for urban and rural participants (85.1% urban and 87.7% rural) and for males and females (84% of males and 88.4% of females). The percentage of participants who provided at least one free-text response differed slightly according to socioeconomic status (SIMD 1=71.4%, SIMD 2=91.1%, SIMD 3=86.5%, SIMD 4=85%, SIMD 5=85.9%).

Analysis of free-text responses revealed high levels of satisfaction with OOH services among both urban and rural participants.

Table 2 Number and percentages of participants agreeing/disagreeing with items relating to behavioural determinants of OOH use by rurality

Questionnaire item	No (%) urban participants agreeing or strongly agreeing	No (%) of rural participants agreeing or strongly agreeing	No (%) of urban participants disagreeing or strongly disagreeing	No (%) of rural participants disagreeing or strongly disagreeing	P value	Adj. OR (95% CI) that rural participants are more likely to disagree/ strongly disagree than urban participants
Capability						
I know which services are available to me	203 (67.4)	112 (66.3)	38 (12.6)	22 (13)	0.933	0.98 (0.65 to 1.49)
I have a list of numbers I can call for help	178 (59.3)	103 (61.7)	75 (25)	42 (25.1)	0.383	0.84 (0.56 to 1.25)
I would use the internet to help me with my health decisions	130 (44.1)	66 (39.1)	113 (38.3)	67 (39.6)	0.484	0.86 (0.57 to 1.30)
I worry about having to use public transport in general	88 (29.5)	52 (31)	149 (50)	81 (48.2)	0.133	0.74 (0.50 to 1.09)
Having to use the telephone (would affect my decision to contact OOH)	49 (16.5)	22 (13)	199 (67)	107 (69.2)	0.626	1.11 (0.74 to 1.66)
I would feel confident telephoning for advice about my health	230 (79.9)	126 (75.9)	37 (12.4)	14 (8.4)	0.949	0.99 (0.64 to 1.51)
Social support and opportunity						
I have good support around me (family/friends/partner)	282 (93.4)	156 (92.9)	9 (3)	9 (5.4)	0.965	1.01 (0.64 to 1.57)
I have a relative/friend/partner who helps me with my health decisions	245 (81.4)	147 (87)	26 (8.6)	9 (5.3)	0.270	0.79 (0.52 to 1.20)
I would ask a relative/friend/partner for advice before contacting OOH services	184 (61.3)	106 (63.1)	67 (22.3)	30 (17.9)	0.366	0.83 (0.55 to 1.25)
What my family/friends/partner say (would affect my decision to contact OOH)	96 (32.3)	51 (30)	133 (44.8)	73 (42.9)	0.975	0.99 (0.67 to 1.47)
Whether I have help from family/friends/partner (would affect my decision to contact OOH)	128 (43)	73 (42.9)	95 (31.9)	51 (30)	0.738	0.94 (0.63 to 1.38)
Motivation						
I am confident in out-of-hours services' ability to help me	205 (68.3)	98 (58)	24 (8)	23 (13.6)	0.042	1.54 (1.02 to 2.34)*
I try to use out-of-hours services only if I really need to	269 (90.6)	146 (86.4)	4 (1.3)	7 (4.1)	0.715	0.92 (0.58 to 1.44)
Other people use out-of-hours services for things that they shouldn't	177 (59.4)	109 (65.3)	10 (3.4)	3 (1.8)	0.287	0.80 (0.53 to 1.20)
Out-of-hours services are there to be used	173 (58.6)	90 (53.3)	63 (21.4)	40 (23.7)	0.511	1.15 (0.76 to 1.72)
Out-of-hours services are for emergencies	222 (74.7)	138 (81.7)	37 (12.5)	14 (8.3)	0.195	0.76 (0.51 to 1.15)
Who is working in my GP practice (would affect my decision to contact OOH)	52 (17.6)	27 (69.6)	181 (61.4)	105 (62.1)	0.879	1.03 (0.69 to 1.54)

Continued



Table 2 Continued

Questionnaire item	No (%) urban participants agreeing or strongly agreeing	No (%) of rural participants agreeing or strongly agreeing	No (%) of urban participants disagreeing or strongly disagreeing	No (%) of rural participants disagreeing or strongly disagreeing	P value	Adj. OR (95% CI) that rural participants are more likely to disagree/ strongly disagree than urban participants
Wanting a second opinion (would affect my decision to contact OOH)	42 (14.3)	20 (12)	169 (57.7)	98 (59)	0.669	0.92 (0.61 to 0.37)
Feeling foolish for asking for help (would affect my decision to contact OOH)	65 (22)	35 (21)	173 (58.4)	90 (53.9)	0.861	1.04 (0.69 to 1.56)
Who is working in out-of-hours (would affect my decision to contact OOH)	34 (11.4)	15 (8.8)	191 (64.3)	108 (63.5)	0.835	0.96 (0.64 to 1.43)
How busy the out-of-hours service is at that moment (would affect my decision to contact OOH)	84 (28.7)	43 (25.6)	148 (50.5)	85 (50.6)	0.663	1.09 (0.73 to 1.63)
Difficulty getting appointment with my GP (would affect my decision to contact OOH)	122 (40.9)	56 (33.3)	137 (46)	81 (48.2)	0.711	1.08 (0.73 to 1.59)
If I think nothing will be done (would affect my decision to contact OOH)	47 (16)	24 (14.3)	147 (50.2)	83 (49.4)	0.659	0.91 (0.61 to 1.37)
Symptoms						
If my symptoms are new (would affect my decision to contact OOH)	178 (59.9)	96 (56.5)	44 (15.9)	29 (17.1)	0.244	1.27 (0.85 to 1.91)
How much pain I am in (would affect my decision to contact OOH)	257 (86.5)	147 (87)	20 (6.7)	9 (5.3)	0.855	0.96 (0.62 to 1.48)
If my symptoms are lasting a long time (would affect my decision to contact OOH)	198 (66.4)	111 (66.1)	48 (16.1)	29 (17.3)	0.746	0.93 (0.61 to 1.42)
If my symptoms worry me (would affect my decision to contact OOH)	226 (76.6)	130 (76.9)	34 (11.5)	16 (9.5)	0.378	0.82 (0.54 to 1.27)
Opportunity						
OOH services are easy to access	150 (50.8)	71 (43.6)	43 (22.4)	29 (17.8)	0.789	1.06 (0.70 to 1.60)
OOH services are close by	163 (55.6)	42 (25.9)	45 (18.4)	64 (39.5)	<0.001	3.32 (2.19 to 5.07)
Where I live makes it difficult to access OOH care	34 (11.5)	45 (27.1)	203 (68.6)	60 (36.1)	<0.001	0.27 (0.18 to 0.41)
How far away the service is (would affect my decision to contact OOH)	68 (23.1)	42 (25)	150 (71.7)	87 (31.1)	0.627	0.91 (0.60 to 1.35)
Public transport options (would affect my decision to contact OOH)	70 (23.7)	42 (24.9)	149 (50.5)	80 (47.3)	0.295	0.81 (0.54 to 1.20)
The cost of travelling (would affect my decision to contact OOH)	38 (12.9)	20 (11.8)	199 (67.7)	111 (65.7)	0.61	1.11 (0.74 to 1.67)
How busy I am (would affect my decision to contact OOH)	33 (11.2)	14 (8.4)	207 (70.2)	117 (70.1)	0.989	1.00 (0.66 to 1.51)

Continued

Table 2 Continued

Questionnaire item	No (%) urban participants agreeing or strongly agreeing	No (%) of rural participants agreeing or strongly agreeing	No (%) of urban participants disagreeing or strongly disagreeing	No (%) of rural participants disagreeing or strongly disagreeing	P value	Adj. OR (95% CI) that rural participants are more likely to disagree/ strongly disagree than urban participants
Having to care for others for example, children (would affect my decision to contact OOH)	57 (19.3)	28 (16.8)	151 (51.2)	93 (55.7)	0.387	1.19 (0.80 to 1.77)
The time of day (would affect my decision to contact OOH)	195 (65.4)	107 (64.1)	67 (22.5)	42 (25.2)	0.16	1.33 (0.89 to 1.99)
The weather (would affect my decision to contact OOH)	30 (10.1)	24 (14.3)	206 (69.1)	114 (67.9)	0.582	0.89 (0.59 to 1.35)

*In sensitivity analyses, when only including those who self-reported cancer, this result is no longer statistically significant (adj. OR 1.39, 95% CI 0.89 to 2.17).

Adj. OR, Adjusted odds ratio; OOH, out-of-hours.

Knowing that a very good service is available. Up until age 77 I was fortunate in not requiring a great deal of health-care, however since developing cancer in the last 2 years things have changed. On the occasion out of hours service has been brilliant. Participant 158, 79-year-old female, urban.

Participants felt reassured by the 24-hour availability of medical care and several participants described OOH services in terms of a ‘safety net’ for when their own medical practice was closed.

For those who voiced frustrations about the service, there were several recurring concerns among both urban and rural participants, including long waiting times, long travel times, lack of continuity and the rigmarole of telephone triage. There were additional barriers to using the service, including lack of knowledge about available services, and moral concerns about using the service appropriately/wasting the doctor’s time.

Travel time or long waiting times to access services were not specifically urban or rural issues. One rural resident reflected on a quick response from paramedics and a doctor:

I was impressed with the Ambulance crew and then the Doctor who came to give medication. They were all very caring. All of them came quite quickly, given that I live out in the countryside nearly a mile up a farm track! Hugely impressive. I was extremely grateful. Participant 1672, 63-year-old female, rural.

In contrast, urban participants could struggle with longer travelling times if they had limited access to a car or if public transport infrastructure was poor.

[I] do not want to use the services unless I was very ill. Brought up to believe that [I should] only use these services if it is an emergency. Also, as I do not drive, it would be difficult to get to out-of-hours services as public transport is very

limited and it is located at the edge of the town. Participant 2535, 68-year-old female, urban.

OOH service organisation played a role in travel times and ease of access. For example, one urban dweller reflected that access to their nearest emergency centre was administered centrally and by referral. Sometimes she would be directed to services further away.

Having to often travel at least 20 miles to be seen, even when there is a local hospital less than one mile away. This hospital has an A & E Department but refuses to see people even if it’s an emergency. You can’t walk in, you have to have been referred through out of hour services or 999! Participant 478, 50-year-old female, urban.

DISCUSSION

Main findings

There were no significant differences in patterns of OOH use, the behavioural determinants of service use, or in the experiences of OOH services between urban and rural participants with cancer in this study.

Daytime general practice was used more than OOH services and there were no differences in the frequency of contact with OOH or daytime services between urban and rural dwellers. Urban and rural dwellers reported similar waiting times from first contact with OOH to receiving advice or care. Most urban and rural participants travelled to OOH services by car.

Across 37 questions probing capability, opportunity and motivation for contacting OOH services, urban and rural dwellers only differed in their responses to items asking about distance to services and whether place of residence made it more difficult to access OOH care. Rural dwellers were significantly less likely to agree that services were close by and significantly more likely to agree that where



they lived made it difficult to access care. Despite this, rural residents were no more likely to agree or disagree that the distance to OOH services would affect their decision to contact OOH than urban residents.

Other factors may be more important in influencing decisions to use OOH services than urban/rural residence, particularly experiencing new or severe symptoms, or symptoms that cause worry. Qualitative data highlight that problems with access are multifactorial and that long travel distances can be offset by service configuration and access to a car.

Strengths and limitations

The questionnaire was designed using behavioural theories^{30 31} and assessed a wide range of beliefs, attitudes and perceptions that could contribute to OOH use. The combination of quantitative and qualitative data from almost 500 individuals provided rich data and allowed for a deep exploration of the use and accessibility of OOH services. Grampian has a high proportion of rural residents (34.9% in this study) and this was representative of region as a whole.²¹ Important confounders, such as socioeconomic status, were controlled for in the analysis.

The response rate for the study was low (19.2%). However, this is likely to be an underestimation because complete data on the number of exclusions is not available. The findings of the study are limited to a single geographical location in Scotland and the majority of the sample are white, Scottish, retired and from areas of higher socioeconomic status. This limits generalisability and is a common issue in surveys of this type.³²

The Scottish Government Urban-Rural Classification 2-fold²⁰ was used to categorise individuals as 'urban' or 'rural' according to population density, but these broad categories will encompass individuals from diverse geographical areas. Our sample size was insufficient to use more granular categories of rurality and it is possible that we have missed important differences between individuals living in very remote locations and their urban counterparts. Including a self-rating response whereby urban and rural residents could self-identify as urban or rural increased our confidence that the twofold classification was valid in our sample.

Due to the exploratory nature of the study, and the testing of multiple hypotheses, statistically significant results should be interpreted with caution. Corrections for multiple tests were not applied due to the lack of statistically significant results and the conservative nature of these corrections.

The Rural and Urban patients' Requirements and Experiences of Out-of-hours (RUREO) questionnaire is not cancer specific and could be used to study OOH service use in different populations. Ethically, cancer was not mentioned in the questionnaire or participant materials so that participants were not inadvertently informed of a cancer diagnosis before they had been diagnosed by a clinician. It is difficult to determine whether mentioning cancer might have influenced the response rate or

content of participant responses. Cancer can elicit strong negative emotions such as fear,³³ which may have discouraged participation. Conversely, people with cancer are known to participate in cancer-related research in order to help others with cancer, or to give something back to the health service.^{34 35}

We were unable to ask cancer-specific questions and may have missed insights into services such as chemotherapy helplines (although we were able to ask about 'special helplines'). Nevertheless, the decision not to mention cancer may have encouraged more holistic and general responses about OOH services by individuals with cancer. Most of our respondents had comorbidities. A previous qualitative study reported that cancer is not always the primary health concern for individuals with multimorbidity.³⁶ Finally, questionnaires were distributed and completed across periods of COVID-19 restrictions. Use of health services (particularly A&E attendance), referrals to emergency care and hospital admissions fell during this time in Scotland.³⁷⁻⁴⁰ It was beyond the scope of this study to investigate the influence of the COVID-19 pandemic on OOH use, but this will be explored further in a secondary analysis of this important dataset.

Comparison with existing literature

Previous literature has reported mixed results regarding OOH service use comparing urban and rural populations.^{18 19 41-46} Some studies report increased attendance at unscheduled care among rural patients with cancer^{18 19} compared with urban residents, whereas others report lower use of OOH services and unscheduled care among those living rurally.^{13 42-46} In this study, we did not find any significant differences in the self-reported use of OOH services between urban and rural dwellers. It is possible that the effect of rurality on access to medical care depends on context. Other studies reporting differences in health service use and access have been conducted in the Netherlands,⁴³ Norway,^{19 44} England,^{45 46} Australia⁴⁷ and other regions in Scotland,^{13 18} where geography or topography might be different from that of Northeast Scotland. Most participants in this study lived less than 30 miles from A&E and most also had access to a car, which may have reduced the impact of living rurally on OOH service use.

How individuals decide to access (or not access) healthcare can be complex and influenced by multiple factors.^{48 49} Previous studies have reported that access to transportation increases service utilisation. For example, a study in North Carolina, USA reported that those who had a driver's license or had family/friends who could drive were more likely to visit healthcare services than those who did not.⁵⁰

A systematic review reported that sex (being male), age (being older), having more comorbidities and poor continuity of care were all factors associated with increased use of unscheduled care in cancer decedents.⁴⁹ Individuals' social context and network can also influence help-seeking behaviours related to cancer.⁵¹ Individuals who

face social isolation or feel stigmatised may be less likely to seek timely help for symptoms.⁵¹

Significantly more rural individuals lived in areas of low socioeconomic deprivation compared with the urban participants in our study. This trend exists across Scotland,²⁴ but it is also important to note that deprivation and rurality do coexist in Scotland and rural individuals residing in areas of high socioeconomic deprivation are likely to be under-represented in research studies but particularly at risk of inequalities in health outcomes.⁵² Interactions between rurality and poverty have been demonstrated in other countries and accentuate inequalities in health outcomes.^{53 54} There are also differences in the way that rurality has been measured in previous studies but there is no universally accepted definition of rurality.⁵⁵ Qualitative results in our study highlight barriers to contacting OOH, which are experienced by both urban and rural residents. Many of these, including lack of knowledge about services, concerns about being a nuisance to an overburdened service, and the perception that others use the service inappropriately, have been reported previously.^{14 17 45 56 57} These results highlight tensions between being a ‘good patient’ in a health system with finite resources and seeking care at the right time.⁵⁶

Implications

This work can reassure policy-makers that there is no major perception of differential access to OOH healthcare between urban and rural patients in Northeast Scotland. It will be important to confirm these findings in a larger, more diverse sample, across wider geographical areas and to include more granular categories of rurality.

The RUREO questionnaire was sent to people diagnosed with cancer but is not cancer specific. It would be potentially important to investigate whether individuals with cancer have different attitudes and patterns of healthcare use compared with those diagnosed with other chronic conditions.

This study highlights a need for improved information provision about OOH services at cancer diagnosis and throughout treatment to ensure patients know how to seek timely care during the OOH period.

Policy-makers should consider access to healthcare as a multidimensional concept that can be influenced by multiple factors. Importantly, aspects of service configuration, such as telephone triage processes, the strategic use of resources close to patients and transport infrastructure are modifiable factors which can improve access to OOH care.

Telephone triage can be supported and improved by standardised decision tools and protocols^{58–61} and through training or education of staff responsible for triage.⁶¹ Patients value access to knowledgeable human operators with good communication skills.⁶²

Digital interventions could add value in addressing inequality of healthcare service access in rural populations^{63–66} by reducing the need for travel to services.

Similarly, strategic use of resources close to patients such as community hospitals, patient navigators⁶⁴ or community and family healthcare programmes in rural communities,⁶⁶ could also improve equitable access to OOH services.

In this study, road and transport infrastructure was an important aspect of OOH service accessibility for all patients. Transport infrastructure can be successfully modified to improve healthcare access. A Health Impact Assessment conducted in the USA reported that a newly implemented bus transport system in rural communities was frequently used for accessing healthcare services among those without cars.⁶⁷ Individuals who did not currently have access to the bus service reported they would use it to access healthcare if it was available.⁶⁷

Conclusion

OOH services are used infrequently in comparison to daytime primary care services by individuals with cancer in Northeast Scotland. However, barriers exist to accessing OOH care which appear common to both urban and rural patients in the region. Some of these, such as inefficient telephone systems and patient knowledge deficits, are potentially modifiable. Further research is needed to confirm these findings in a larger and more diverse sample, and across wider geographical areas. Urban and rural dwellers have similar beliefs and attitudes towards OOH service use in Grampian and place of residence is unlikely to be the most important factor in influencing decisions about whether to access OOH medical care.

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Supplementary File 1. Questionnaire Design and Content.

Interview transcripts were reviewed from a previous study that investigated patients' experience of using OOH primary care services for assistance with cancer pain [17].

Participants in that study described barriers and facilitators to using OOH services [17]. These were integrated into the questionnaire. A health psychologist was consulted about theoretical models that might inform the range, content, and wording of the questionnaire items. The questionnaire was not based around one specific theoretical model but was informed by the premise that participants would need to have the capability (physical and psychological), opportunity (social/cultural norms and cues, and physical opportunities provided by the environment such as time, and resources), and motivation (including internal decision-making processes, planning, evaluative, and automatic) to interact with OOH services [30]. A high proportion of OOH contacts by individuals with cancer are for symptom control [13, 17]. Questions about help-seeking behaviours in response to symptoms were informed by the Levanthal common sense model of Self-regulation (CSM) [31].

A draft of the questionnaire was presented to a team of health psychologists and written feedback was obtained. The questionnaire was then piloted by academics from the University of Aberdeen medical school via email, who gave written feedback.

The final questionnaire is shown in Supplementary File 1. The questionnaire consisted of five sections (A through E). In section A, participants were asked about their use of general practice, pharmacist, accident and emergency (A&E) departments, NHS 24, special medical helplines (e.g., chemotherapy helpline), and telephone calls to 999 over the preceding 12 months, both in hours, and out of hours. Individuals were asked to estimate the distances from their home to certain services. Section A also contained statements that assessed factors influencing decisions to contact OOH services.

Section B asked for details of the medical services the participant had available to them, their usual mode of transport, and whether they had previously received instructions about how and when to access OOH services, and if so, by whom.

Section C contained quantitative and free-text response items relating to the last time the individual used an OOH service, including their reason for using the service, their decision-making processes leading them to access OOH care, and outcomes of the consultation.

Section D also contained free-text response items to enable participants to record their opinions about positive and negative aspects of OOH medical care, barriers and facilitators to using OOH services, and any changes they would like to see.

Section E collected demographic details, including date of birth, gender, postcode, participants' own perception of whether they lived in an urban or rural setting, social support, educational attainment, employment status, ethnicity, comorbidities, smoking status and alcohol intake. Section F asked about consent for medical record review, to use quotations, to share anonymous data with other researchers, and to participate in future related research.

Participant code: <<xxxx>>



RUREO Study

Rural and Urban patients' Requirements and Experiences of Out-of-hours medical services

This questionnaire will help to find out what you think about the NHS out-of-hours medical services. There are questions about when you used out-of-hours services and what you think about using out-of-hours services.

By out-of-hours medical services we mean any contact with a healthcare professional when your usual GP is closed. For most people this is between 6pm and 8am on Monday to Friday and at any time during the weekend or public holidays. This can be contacts with out-of-hours general practice, visits to Accident and Emergency (A&E), discussions with a pharmacist/chemist, calls to 999 and calls to medical helplines such as NHS 24.

Please read the enclosed study information sheet before completing the questionnaire and contact the research team if you have any questions. All information that you provide will be kept **STRICTLY CONFIDENTIAL.**

This questionnaire is about what **YOU** think. There are no right or wrong answers.

Thank you for considering taking part in this study.

If you need help completing the questionnaire or have any questions, please contact:

RUREO Study

Telephone: 01224 437906

Email: RUREO@abdn.ac.uk

Participant code: <<xxxx>>

SECTION A. Your use of medical services and how you feel about using them

A1. Participant code <<xxxx>>

A2. **In the last year**, roughly how many times have you used the following services **during out-of-hours**? Please tick **one** for each service.

	Never	Once	2-3 times	4 or more times
A GP from your own practice out-of-hours				
Out-of-hours GP services (e.g. GMED)				
Advice from a pharmacist				
Accident and Emergency (A&E)				
Calls to NHS 24				
Calls to special medical helpline				
Calls to 999				

A3. Roughly, how far are these places from your home? Please tick **one** for each service.

	Less than 1 mile	1-5 miles	6-10 miles	11-30 miles	More than 30 miles	I don't know
Your GP Practice						
Your closest out-of-hours GP service (e.g. GMED)						
Your closest A&E						

A4. **In the last year**, roughly how many times have you used the following services **during usual GP opening hours**? Please tick **one** for each service.

	Never	Once	2-3 times	4 or more times
A GP from your own practice				
Advice from a pharmacist				
Accident and Emergency (A&E)				
Calls to NHS 24				
Calls to special medical helpline				
Calls to 999				

Participant code: <<xxxx>>

A5. The following statements are things that some people say about using out-of-hours services. Thinking about **out-of-hours services rather than routine medical care**, please tick **one option for each statement** to show how much you agree or disagree with it.

	Strongly Agree	Agree	Neither agree nor disagree	Disagree	Strongly Disagree
I know which services are available to me					
I have a list of numbers I can call for medical help					
Out-of-hours services are easy to access					
Out-of-hours services are close by					
Where I live makes it difficult for me to access out-of-hours care					
I am confident in out-of-hours services' ability to help me					
I have good support around me (family/friends/partner)					
I have a relative/friend/partner who helps me with my health decisions					
I would use the internet to help me with my health decisions					
I would ask a relative/friend/partner for advice before contacting out-of-hours services					
I would feel confident telephoning for advice about health					
I worry about having to use public transport in general					
I try to use out-of-hours services only if I really need to					
Other people use out-of-hours services for things that they shouldn't					

Participant code: <<xxxx>>

A6. Below are things that some people think about when deciding whether or not to contact out-of-hours medical services. Please tick **one option for each**, to show how much you agree or disagree that it would affect **your decision** on whether to contact **out-of-hours medical services**.

	Strongly Agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
The time of day					
The weather					
How far away the service is					
Public transport options					
The cost of travelling					
Having to use the telephone					
Who is working in out-of-hours					
How busy the out-of-hours service is at that moment					
Difficulty getting appointment with my GP					
Who is working in my GP practice					
Wanting a second opinion					
Out-of-hours services are there to be used					
Out-of-hours services are for emergencies					
How much pain I am in					
If my symptoms are new					
If my symptoms are lasting a long time					
If my symptoms worry me					
If I think that nothing will be done					
Feeling foolish for asking for help					
How busy I am					
Having to care for others e.g. children					
What my family/friends/partner say					
Whether I have help from family/friends/partner					

Participant code: <<xxxx>>

SECTION B. The services that you have around you

B1. Name of your medical (GP) practice

B2. Are you able to travel to **your GP practice**? Please tick **one**. Yes No Maybe/sometimesB3. If yes, how do you **usually** travel there? Please tick **one** answer that best describes how you usually travel to your GP. Walk Taxi
 Drive own car Ambulance or other NHS transport
 Driven by someone else Other (please specify):
 Public transport (e.g. bus, train)B4. Does your own GP practice provide out-of-hours services? Please tick **one**. Yes No Don't knowB5. Have you ever been told **how** to access out-of-hours services? Please tick **one**. Yes No Don't knowB6. If yes, who told you how to? Please tick **all** that apply. Own GP Relative/friend/partner
 Hospital doctor Other (please specify):
 Pharmacist
 NurseB7. Have you ever been told about **when** you should access out-of-hours services? Please tick **one**. Yes No Don't knowB8. If yes, who gave you this information? Please tick **all** that apply. Own GP Relative/friend/partner
 Hospital doctor Other (please specify):
 Pharmacist
 Nurse

Participant code: <<xxxx>>

SECTION C. The LAST TIME that you used out-of-hours medical services**This section is about the LAST TIME that you used out-of-hours GP services or out-of-hours A&E.**

C1. Thinking about **the last time** that you used one of the out-of-hours services below, which one did you use? Please tick **one**.

- Out-of-hours GP services (e.g. GMED)
- My own GP who has agreed to provide an out-of-hours service to patients
- A&E during out-of-hours
- I have never used any of these services out-of-hours

Please answer all of the other questions in this section about the service that you chose in Question C1 above. If you have never used these services please skip to Section D.

C2. At what time of day did you use this service? Please tick **one**.

- Weekday evening before 10 p.m.
- Weekday overnight after 10 p.m. and before routine surgery opens in the morning
- Weekend or public holiday

C3. Why did you want medical care? Please describe briefly.

C4. Why did you choose this specific service (e.g. out-of-hours GP services or A&E)? Please describe briefly.

C5. Did your friends/family/partner affect your decision to contact the out-of-hours service? Please tick **one**.

- Yes No Don't know

C6. If yes, **in what way** did they affect your decision? Please describe briefly.

Participant code: <<xxxx>>

C7. Did a previous experience of out-of-hours services affect your decision this time around?
Please tick **one**.

- Yes No Don't know

C8. If yes, **in what way** did your previous experience affect your decision? Please describe briefly.

C9. How long did you have to wait from the first contact until you were seen by a healthcare professional or given advice? Please tick **one**.

- Straight away 2-4 hours
 Less than 1 hour More than 4 hours
 1-2 hours

C10. How did you get to that service? Please tick **one**.

- I did not need to travel Public transport
 Walked Taxi
 Drove my own car Ambulance or other NHS transport
 Driven by someone else Other (please specify):
 Doctor/other healthcare professional came to me

C11. Did any of the following things happen during your out-of-hours experience? Please tick **all** that apply.

- Advice given over the phone Advised to see my GP in routine hours
 Visit at home by healthcare professional Admitted to hospital
 I visited an out-of-hours centre or hospital (e.g. GMED or A&E) Other (please specify):

Participant code: <<xxxx>>

SECTION D. Your opinions about out-of-hours services

These questions are about YOUR thoughts and experience. We are interested in what you think about out-of-hours services. There are no right or wrong answers.

D1. What, if anything, is good about out-of-hours medical services?

D2. What, if anything, is bad about out-of-hours medical services?

D3. What, if anything, puts you off using out-of-hours medical services?

D4. What, if anything, would make it easier for you to access out-of-hours medical services?

D5. What changes, if any, would you like to see in out-of-hours medical services?

Participant code: <<xxxx>>

E9. Which ethnic group would you say that you belong to? Please tick **one**.

- White British, Scottish, Irish, other
- Mixed/multiple ethnic background
- Asian/Asian British (Indian, Pakistani, Bangladeshi, Chinese, other)
- Black/African/Caribbean/Black British
- Prefer not to say
- Other ethnic group (please specify):

E10. Have you ever been diagnosed with any of these conditions? Please tick **all** that apply.

- | | | |
|--|---|---|
| <input type="checkbox"/> Asthma | <input type="checkbox"/> Heart disorder | <input type="checkbox"/> Arthritis/rheumatic disorder |
| <input type="checkbox"/> COPD/Bronchitis | <input type="checkbox"/> High blood pressure | <input type="checkbox"/> Mental health disorder |
| <input type="checkbox"/> Other chest condition | <input type="checkbox"/> Stroke | <input type="checkbox"/> None of these |
| <input type="checkbox"/> Cancer | <input type="checkbox"/> Stomach/bowel disorder | <input type="checkbox"/> Other (please specify): |
| <input type="checkbox"/> Diabetes | <input type="checkbox"/> Epilepsy | |
| <input type="checkbox"/> Thyroid disorder | <input type="checkbox"/> Liver disease | |

E11. Which of the following best describes your smoking habit? Please tick **one**.

- Never smoked
- Previous smoker
- Regular smoker (at least one cigarette a day for at least one year)
- Occasional smoker

E12. Roughly, how much alcohol do you drink in a **week**? Please tick **one**.

- | | | |
|---|--|---|
| <input type="checkbox"/> I do not drink alcohol | <input type="checkbox"/> 15-30 units | <u>As a rough guide:</u>
1 unit = 25ml of spirit (40% strength)
1.5 units = small glass of wine (125ml)
2 units = pint/can of standard strength beer
3 units = pint of stronger beer or large glass of wine |
| <input type="checkbox"/> 1-4 units | <input type="checkbox"/> 31 or more units | |
| <input type="checkbox"/> 5-14 units | <input type="checkbox"/> Prefer not to say | |

Participant code: <<xxxx>>

SECTION F. Further research

To help us understand more about how people use and experience out-of-hours services, we would like to ask for your help with some further research.

F1. Medical record review

We would like to review some out-of-hours medical records so that we can understand how people use out-of-hours services. If you agree, a study researcher would review your out-of-hours notes. They will not be able to see your full GP notes. You would not need to attend and no personal identifiable information would be recorded. Please show whether or not you agree to us reviewing your out-of-hours notes by **WRITING YOUR INITIALS** in **one** box.

I agree to you reviewing my medical records for this study. I understand that the relevant sections of my out-of-hours records will be looked at by a member of the research team. I give permission for that individual to have access to my records.

Yes No

F2. Quotations

We would like to use some phrases and sentences that people have put into their questionnaire answers so that readers of our presentations and publications can understand exactly what people think about out-of-hours services. If you agree, some quotations from your answers may be put into the publication of the results. It will not be possible to identify you from any quotations used. Please show whether or not you agree to us using quotations from your answers by **WRITING YOUR INITIALS** in **one** box.

I agree to quotations from my answers being used in the results. I understand that my answers might be printed in the publication of results.

Yes No

F3. Sharing my anonymous questionnaire answers with other researchers

We think that other researchers may be interested in using the answers from this questionnaire to do additional research. Other researchers may ask us to share your ANONYMISED answers with them. It would not be possible for the researchers to identify you from any information we give them and we would not share your postcode, date of birth, or the name of your GP practice. Please show whether you agree to us sharing your anonymised answers with other researchers by **WRITING YOUR INITIALS** in **one** box.

I agree to the research team sharing my anonymised answers with other researchers. I understand that it will not be possible for the other researchers to identify me from the information they are given.

Yes No

Participant code: <<xxxx>>

F4. Future studies about out-of-hours services

We hope to conduct more research into out-of-hours services in the future. Please show whether you agree to us contacting you with information about future studies by **WRITING YOUR INITIALS** in **one** box.

I agree to you contacting me again with information about future studies about out-of-hours services. I understand that I would not have to take part in these studies if I do not want to.

Yes

No

At present we do not have your name or address. This initial contact has been through NHS Grampian. If you have answered **yes** to Questions F1 or F4 above, please complete the contact details below.

Name: _____

Address: _____

Telephone number/s: _____

Best time to call: _____

Email address: _____

Thank you very much for completing this questionnaire

Please return it to us in the reply-paid envelope

Supplementary Table 1. Frequency of use of different OOH and daytime healthcare services for urban and rural participants.

Service and time used	Utilisation within the last 12 months	Total N (%) N=490	Urban N (%) N=303	Rural N (%) N=171	p-value ^b
Own GP OOH	Never	N=431^a 408 (94.7%)	N=268 254 (94.8%)	N=151 143 (94.7%)	0.934
	Once	10 (2.3%)	6 (2.2%)	4 (2.6%)	
	2-3 times	10 (2.3%)	6 (2.2%)	3 (2%)	
	4 or more times	3 (0.7%)	2 (0.7%)	1 (0.7%)	
Own GP Daytime	Never	N=486 33 (6.8%)	N=300 20 (6.7%)	N=170 12 (7%)	0.714
	Once	59 (12.1%)	35 (11.7%)	21 (12.3%)	
	2-3 times	179 (36.8%)	118 (39.3%)	58 (33.9%)	
	4 or more times	215 (44.2%)	127 (42.3%)	80 (46.8%)	
OOH primary care service	Never	N=425 354 (83.3%)	N=263 213 (81%)	N=150 132 (88%)	0.338
	Once	42 (9.9%)	32 (12.2%)	8 (5.3%)	
	2-3 times	24 (5.6%)	16 (6.1%)	7 (4.7%)	
	4 or more times	5 (1.2%)	2 (0.8%)	3 (2%)	
Pharmacist OOH	Never	N=422 326 (77.3%)	N=259 204 (78.8%)	N=152 115 (75.7%)	0.891
	Once	47 (11.1%)	24 (9.3%)	21 (13.8%)	
	2-3 times	34 (8.1%)	21 (8.1%)	11 (7.2%)	
	4 or more times	15 (3.6%)	10 (3.9%)	5 (3.3%)	
Pharmacist Daytime	Never	N=453 240 (53%)	N=280 152 (54.3%)	N=159 82 (51.3%)	0.324
	Once	105 (23.2%)	69 (24.6%)	35 (21.9%)	
	2-3 times	84 (18.5%)	44 (15.7%)	34 (21.3%)	
	4 or more times	24 (5.3%)	15 (5.4%)	9 (5.6%)	
A&E OOH	Never	N=435 328 (75.4%)	N=271 205 (75.6%)	N=152 115 (75.7%)	0.674
	Once	68 (15.6%)	40 (14.8%)	26 (17.1%)	
	2-3 times	34 (7.8%)	23 (8.5%)	10 (6.6%)	
	4 or more times	5 (1.1%)	3 (1.1%)	1 (0.7%)	
A&E Daytime	Never	N=450 362 (80.4%)	N=280 225 (80.4%)	N=159 130 (81.8%)	0.702
	Once	61 (13.6%)	37 (13.2%)	22 (13.8%)	
	2-3 times	21 (4.7%)	16 (5.7%)	4 (2.5%)	
	4 or more times	6 (1.3%)	2 (0.7%)	3 (1.9%)	
NHS 24 OOH	Never	N=434 329 (75.8%)	N=265 203 (76.6%)	N=156 116 (74.4%)	0.478
	Once	65 (15%)	41 (15.5%)	23 (14.7%)	
	2-3 times	27 (6.2%)	14 (5.3%)	13 (8.3%)	
	4 or more times	13 (3%)	7 (2.6%)	4 (2.6%)	
NHS24 Daytime	Never	N=439 375 (85.4%)	N=271 238 (87.8%)	N=157 129 (82.2%)	0.091
	Once	37 (8.4%)	19 (7%)	16 (10.2%)	
	2-3 times	23 (5.2%)	13 (4.8%)	9 (5.7%)	
	4 or more times	4 (0.9%)	1 (0.4%)	3 (1.9%)	
Special Helpline OOH	Never	N=431 341 (79.1%)	N=272 215 (79%)	N=148 118 (79.7%)	0.680
	Once	41 (9.5%)	27 (9.9%)	13 (8.8%)	
	2-3 times				

	4 or more times	33 (7.7%) 16 (3.7%)	23 (8.5%) 7 (2.6%)	8 (5.4%) 9 (6.1%)	
Special Helpline Daytime	Never	N=447	N=277	N=158	0.340
	Once	327 (73.2%)	204 (73.6%)	115 (72.8%)	
	2-3 times	45 (10.1%)	30 (10.8%)	14 (8.9%)	
	4 or more times	55 (12.3%) 20 (4.5%)	24 (12.3%) 9 (3.2%)	18 (11.4%) 11 (7%)	
999 OOH	Never	N=420	N=258	N=151	0.462
	Once	379 (90.2%)	234 (90.7%)	135 (89.4%)	
	2-3 times	33 (7.9%)	21 (8.1%)	12 (7.9%)	
	4 or more times	8 (1.9%) 0 (0%)	3 (1.2%) 0 (0%)	4 (2.6%) 0 (0%)	
999 Daytime	Never	N=438	N=270	N=157	0.818
	Once	415 (94.7%)	256 (94.8%)	149 (94.9%)	
	2-3 times	17 (3.9%)	11 (4.1%)	6 (3.8%)	
	4 or more times	5 (1.1%) 1 (0.2%)	3 (1.1%) 0 (0%)	1 (0.6%) 1 (0.6%)	

^aNot all participants completed every question. Total N's for participants for each question are shown for each row/column. 'Prefer not to say' response is considered as missing and percentages and comparison test *p*-values relate to non-missing data. Urban/rural columns do not sum to total when data is missing from more than one variable. ^b*p*-value for Cochran-Armitage test for trend.

Supplementary Table 2. Information about participants' last time using out-of-hours services.

Factors during the last use of out-of-hours services	Total N (%) N=490	Urban N (%) N=303	Rural N (%) N=171	Fisher's test p-value
Which service was used?	N=474^b	N=288	N=171	0.441
Never used OOH ^a	185 (39%)	119 (41.3%)	63 (36.8%)	
OOH GP	129 (27.2%)	73 (25.3%)	51 (29.8%)	
Own GP OOH	8 (1.7%)	3 (1%)	4 (2.3%)	
A&E	152 (32.1%)	93 (32.3%)	53 (31%)	
When the service was used	N=278	N=165	N=103	0.199
Weekend/public holiday	112 (40.3%)	60 (36.4%)	47 (45.6%)	
Weekday before 10pm	90 (32.4%)	55 (33.3%)	34 (33%)	
Weekday after 10pm	76 (27.3%)	50 (30.3%)	22 (21.4%)	
Someone else influenced decision	N=286	N=167	N=107	0.570
Yes	137 (47.9%)	76 (45.5%)	55 (51.4%)	
No	145 (50.7%)	88 (52.7%)	51 (47.7%)	
Don't Know	4 (1.4%)	3 (1.8%)	1 (0.9%)	
Decision affected by previous experience	N=286	N=166	N=108	0.767
Yes	42 (14.7%)	26 (15.7%)	14 (13%)	
No	235 (82.2%)	134 (80.7%)	91 (84.3%)	
Don't Know	9 (3.1%)	6 (3.6%)	3 (2.8%)	
Duration of wait from first contact	N=283	N=167	N=105	0.259
Straight away	35 (12.4%)	25 (15%)	7 (6.6%)	
Less than 1 hour	120 (42.4%)	69 (41.3%)	47 (44.8%)	
1-2 hours	73 (25.8%)	43 (25.7%)	28 (26.7%)	
2-4 hours	36 (12.7%)	19 (11.4%)	17 (16.2%)	
More than 4 hours	19 (6.7%)	11 (6.6%)	6 (5.7%)	
Mode of travel to service	N=283	N=167	N=105	0.267
I did not need to travel	21 (7.4%)	13 (7.8%)	8 (7.6%)	
Walked	5 (1.8%)	3 (1.8%)	2 (1.9%)	
Drove my own car	36 (12.7%)	27 (16.2%)	8 (7.6%)	
Driven by someone else	129 (45.6%)	76 (45.5%)	47 (44.8%)	
Doctor/other health prof came to me	35 (12.4%)	17 (10.2%)	16 (15.2%)	
Public transport	1 (0.4%)	0 (0%)	1 (1%)	
Taxi	5 (1.8%)	4 (2.4%)	1 (1%)	
Ambulance	47 (16.6%)	26 (15.6%)	19 (18.1%)	
Other	4 (1.4%)	1 (0.6%)	3 (2.9%)	
Outcome of OOH experience^c	N=280	N=168	N=101	NA
Advice given over the phone	71 (25.4%)	39 (23.2%)	31 (30.7%)	
Visit at home by healthcare professional	58 (20.7%)	29 (17.3%)	28 (27.7%)	
Visited out-of-hours centre or hospital	167 (59.6%)	105 (62.5%)	56 (55.4%)	
Advised to see my GP in routine hours	22 (7.9%)	16 (9.5%)	5 (5%)	
Admitted to hospital	105 (37.5%)	64 (38.1%)	38 (37.6%)	
Other	15 (5.4%)	6 (3.6%)	6 (5.9%)	

^aParticipants who answered they had never used OOH services were asked to skip the subsequent questions. If any participant answered subsequent questions, they were excluded from those questions. Ns for each variable shows total number of complete and percentages and comparison test *p*-values relate to non-missing data. ^bTotal Ns for each column relate to those who selected at least one of the options and percentages are out of total number that selected at least one option. No Fisher's test for this variable as participants were able to choose more than one option.