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Feasibility and acceptability of a community pharmacy referral service for suspected lung cancer symptoms

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ABSTRACT

Background Lung cancer survival rates in the UK are among the lowest in Europe, principally due to late-stage diagnosis. Alternative routes to earlier diagnosis of lung cancer are needed in socioeconomically deprived communities that are disproportionately affected by poor lung cancer outcomes. We assessed the feasibility and acceptability of a community-based pharmacy referral service to encourage earlier symptomatic referral for chest X-rays.

Methods Seventeen community pharmacies located in a deprived area of Wales participated between March 2019 and March 2020. Stakeholder interviews were conducted with four patients, seven pharmacy professionals and one general practitioner. Four focus groups were conducted, including one with healthcare professionals (n=6) and three with members of the public who were current and former smokers (n=13). Quantitative data regarding patient characteristics and clinical outcomes were collected from hospital records and patient referral questionnaires completed by pharmacists and analysed using descriptive statistics. Qualitative data sets were analysed thematically and triangulated.

Results Twelve patients used the pharmacy referral service, all of whom were male. Average length of the pharmacy consultation was 13 min, with a mean 3 days to accessing chest X-rays in secondary care. Patients experienced a mean 46-day wait for results, with no lung cancer detected. Participants found the service to be acceptable and considered the pharmacy element to be broadly feasible. Perceived barriers included low awareness of the service and concerns about the role and capacity of pharmacists to deliver the service. Facilitators included perceived approachability and accessibility of pharmacists. A well-publicised, multifaceted awareness campaign was recommended.

Conclusions A community pharmacy referral service for lung symptoms was considered an acceptable alternative pathway to symptomatic diagnosis of lung cancer in deprived communities. Wider implementation of the service would require workforce capacity and training to be addressed to ensure optimum utilisation and promotion of the service.

Key messages

- Is a community pharmacy referral service for lung cancer symptoms feasible and acceptable in socioeconomically deprived areas?
- The pharmacy-based referral service for lung cancer symptoms was considered acceptable but would require further improvements to be feasible for wider implementation.
- We conducted in-depth qualitative analysis to understand the barriers and facilitators to pharmacy referral for lung cancer symptoms in socioeconomically deprived areas.

INTRODUCTION

Globally, lung cancer is the leading cause of cancer mortality, principally due to later stage disease at diagnosis.[1] UK lung cancer survival rates are among the worst in Europe,[2–4] with higher mortality in more socioeconomically deprived areas.[5 6] The 1-year survival rate is 38% across England and Wales, with 17% of patients with lung cancer receiving surgery for curative treatment.[7 8] Lung cancer incidence rates across the UK are up to three times higher in the most deprived compared with the least deprived areas[9–12] and are linked to higher levels of smoking prevalence in these communities.[13 14]

At diagnosis, over 90% of patients with lung cancer are symptomatic[15] with an average 6 months duration between symptom discovery and the initial appointment with their general practitioner (GP).[16] Reasons for late presentation include low awareness and misattribution of lung symptoms to ageing, smoking habit or pre-existing comorbid conditions such as chronic obstructive pulmonary disease (COPD).[17–21] Psychosocial factors such as stigma, fear and fatalism regarding lung cancer may also deter patients from seeking medical help, particularly in lower socioeconomic groups and among smokers.[22–24]

Pharmacists are increasingly providing earlier and easier access to diagnostic and management services for chronic diseases.[25–27]

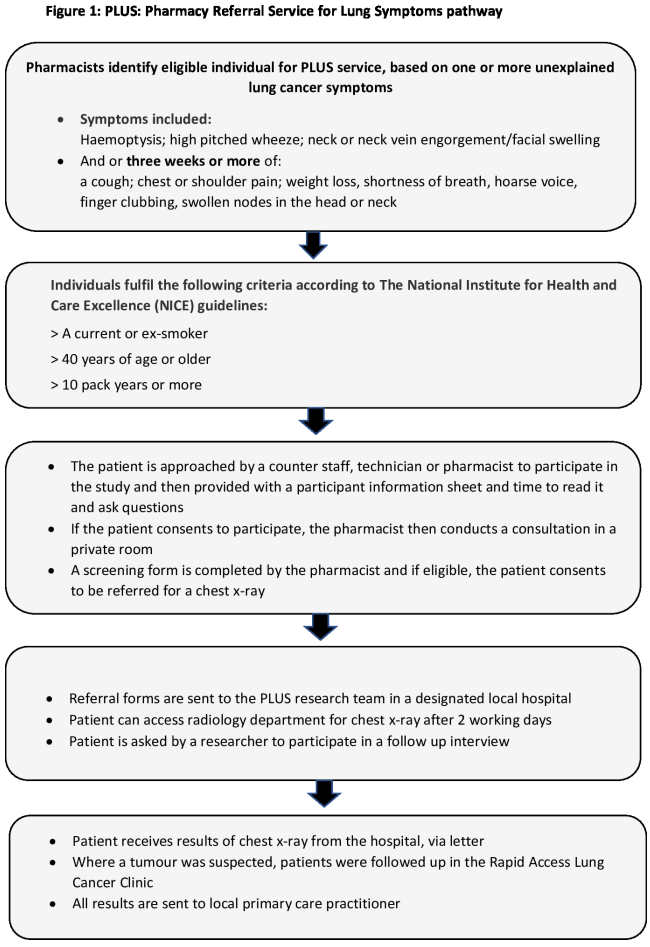

Figure 1 PLUS pharmacy referral service for lung symptoms pathway.

Small-scale pilot studies in areas of high socioeconomic deprivation in Doncaster[28] and London[29] have developed and tested alternative routes to earlier symptomatic diagnosis of lung cancer through pharmacy-based interventions. These studies demonstrated that pharmacies could provide targeted referral services for patients with lung symptoms for chest X-rays. However, no cases of lung cancer were found in either study largely due to low numbers of participants. There was also limited evidence that these services could successfully provide a viable alternative to primary care for patients accessing chest X-rays. Reported barriers to using these services included a lack of awareness of the legitimacy of the service and difficulty identifying patients meeting the referral criteria. Further evidence is required to understand the barriers and facilitators to implement a community-based pharmacy lung referral service in socioeconomically deprived areas.

METHODS

Design

Pharmacy referral for lung cancer symptoms was a mixed-methods feasibility study, which involved data collection with patients who used the service, members of the public (MoP), community pharmacists, pharmacy staff, GPs and secondary care healthcare professionals. This study aimed to test the feasibility of community pharmacies in the rapid symptomatic diagnosis of lung cancer in socioeconomically deprived areas and explore the potential for a future RCT. It also aimed to capture preferences regarding potential awareness campaigns to promote the service. This study was built on the work of previous campaigns and studies but with additional focus on factors influencing the implementation, utilisation and promotion of the service. This study followed the Medical Research Council framework for developing and evaluating complex interventions.[30]

Study setting and recruitment

The study was conducted in Hywel Dda University Health Board in a postindustrial area of Wales. Hywel Dda is organised into seven primary care clusters that bring together local services involved in health and care across a geographical area. One cluster comprising 17 community pharmacies was chosen due to its high levels of socioeconomic deprivation relating to lung cancer incidence and outcomes[31] and its location close to a hospital.

Pharmacy referral service pathway

The pharmacy referral service pathway (figure 1) entailed community pharmacists assessing patients with lung cancer symptoms and following The National Institute for Health and Care Excellence (NICE) guidelines to refer eligible patients to hospital for a rapid chest X-ray. This service was provided between May 2019 and March 2020. In response to pharmacists' preferences during service pathway development, pharmacists were not involved in follow-up appointments or in receiving or providing patients' results.

Pharmacists and GPs completed two initial group-based evening training sessions in April 2019, which detailed the processes and paperwork required for the study. Hospital clinicians and research staff took part in group training and one-to-one training was delivered as required. The protocol followed hospital processes as closely as possible, so that minimum training was required. A campaign advertising the pharmacy referral service and the study was launched in May 2019. Information about the service was provided on the Health Board's website and accompanied by community posters and promotional materials placed in participating pharmacies. Due to limited use of the service, the poster was redesigned in January 2020 based on initial findings from the focus groups, which aimed to inform future campaigns. One-to-one refresher training for pharmacists and counter staff was delivered by research team members and pharmacy area managers (SR, SB, AE and KW) between December 2019 and March 2020. This focused on explaining paperwork for the referral process and approaching potentially eligible patients for the service. In March 2020, recruitment was suspended due to the COVID-19 pandemic.

Table 1 Characteristics of patients referred through the pharmacy referral service (n=12)

Variable	Number of patients
Gender	
Male	12
Female	0
Age (years)	
40–49	1
50–59	4
60–69	4
70–70	1
80+	2
Smoking status	
Smoker	7
Ex-smoker	4
Never smoked	1
Smoking pack years	
0	1
1–10	3
11–20	1
21–30	0
31–40	1
41–49	2
50+	1
Missing	3
Symptoms discussed during consultation	
Cough	11
Chest or shoulder pain	7
Breathing difficulties	5
Hoarse voice	4
Haemoptysis	3
Chest infections	3
Finger clubbing	2
Swollen nodes	1
Weight loss	1
Neck vein engorgement/facial swelling	1
COPD/asthma history	
No	10
Yes	1
Missing	1
Smoking cessation advice offered	
None	8
Referred to All Wales Stop Smoking Service or local service	2
Not applicable (never smoker)	1
Missing	1

COPD, chronic obstructive pulmonary disease.

Participant recruitment

All community pharmacies (n=17) in a cluster were approached by the pharmacy area manager. All 17 pharmacies agreed to participate in the study, of which only five pharmacies went on to refer patients to the service. Pharmacies received £35 per patient referral. While GPs were notified of patients' referrals and X-ray results, they were not involved in this referral pathway and therefore did not receive payments for this service. Patients who were referred through the service, pharmacists, other pharmacy staff and GPs were approached to participate in interviews. After reading the participant information sheet (available on request), pharmacists consented patients to the main study and to be contacted for the interviews. Patients were contacted by telephone to participate in interviews and where no answer was received, followed up by letter. Interviews took place at the participant's home or via telephone. In one interview, a partner accompanying the patient was also consented. Patient interviewees received a £20 shopping voucher. Pharmacies were provided with £80 per interview and a GP was provided with £90 to cover their time during interviews.

One focus group with six healthcare professionals including secondary care nurses, pharmacists, pharmacy staff and a GP and three focus groups with MoP (including one with two current smokers, one with three former smokers and one with eight current and former smokers) were conducted. MoP who were aged over 40, current or former smokers and living within the remit of the Health Board, were approached to participate in focus groups through a population research online platform (HealthWise Wales https://www.healthwisewales.gov.wales),[32] community poster campaign, face-to-face recruitment at community venues and Health Board contacts. Vouchers worth £25 and travel expenses were offered to public participants. All healthcare professionals and pharmacy staff participating in the study were recruited through Health Board contacts and offered payments to compensate for their time, in line with their hourly rates.

Public and patient involvement

Two patient representatives were involved in the design of the study through regular steering group meetings. Each step of the study development including reviewing topic guides, implementation, evaluation and interpretation of the results incorporated patient views and experiences.

Data collection

Qualitative data

Semistructured interviews were conducted with patients, pharmacy staff and healthcare professionals. The topic guides were developed and informed by previous studies[33 34] and then tested and reviewed by the study team in partnership with patient representatives. Topics included acceptability and feasibility of the pharmacy service and recommendations for encouraging symptomatic presentation to the pharmacy. Focus groups were conducted with MoP and healthcare professionals.

Table 2 Pathway referral data

Question	Number of patients
Length of consultation with pharmacist (min)	
1–5	2
6–10	4
11–15	3
16–20	2
21–25	1
Patient previously spoken to a healthcare professional about their symptoms	
No	8
Yes	4
Patients who declined referral during consultation	
No	12
Attended chest X-ray	
No	1
Yes	11
Days between date referred and date of chest X-ray	
0–1	3
2–3	3
4–5	2
6–7	2
8–9	1
Days to reporting chest X-ray results in secondary care	
1	3
2	1
3	2
4	2
5	2
6	0
7	1
Results	
Clear chest X-ray	9
Clear chest X-ray referred to Ear Nose and Throat (ENT) clinic	1
Did not attend	1
Diagnosed with pulmonary fibrosis	1
Patient did not receive results	0
Days between chest X-ray and results letter to patient	
0–20	4
21–40	1
41–60	2
61–89	2
90+	2
Not applicable (did not attend chest X-ray)	1

These involved discussions of initial perceptions of a pharmacy referral service and suggestions for future promotional campaigns. Topic guides are available (online supplemental files 1–4). Audio-recordings were transcribed verbatim for analysis. A Consolidated criteria for reporting qualitative research (COREQ) checklist is available (online supplemental file 5).

Quantitative data

Screening and referral questionnaires were completed by pharmacists during patient consultations. Data collected comprised demographic and clinical information including age, gender, symptoms, smoking status and pack years, history of COPD or asthma, whether the patient had previously spoken to health professional about their symptoms, length of consultation, whether the patient declined referral during consultation and whether smoking cessation advice was offered. Data regarding the number and outcome of chest X-rays and time to patients receiving the results were derived from patient's hospital records. These data were used to describe patient characteristics and pathway variables.

Analysis

Questionnaires were analysed descriptively. Qualitative data were analysed using inductive thematic analysis.[35 36] At least 20% of the interviews and focus groups were dual coded, with coding frameworks reviewed by the researchers (DH-H, GMMC, KB) for consensus.[37 38]

A process of triangulation was carried out between two researchers (DH-H and GMMC) drawing on the Farmer *et al*[39] triangulation framework. This process involved independently sorting the findings from each of the data sources, then using convergence coding to identify themes from each data source. The degree of convergence, partial agreement/complimentary data and dissonance were then assessed across the data sets. Convergence of the main themes was agreed between the researchers.

RESULTS

Participant characteristics

As shown in table 1, 12 patients were referred through the pharmacy referral service. All patients were male, with a mean age of 64 years (range 45–85). Most reported coughing, chest or shoulder pain. Seven out of the 12 patients were current smokers, with a mean 31 pack years (range 0–87.5), and one patient had never smoked. Smoking cessation advice was offered to two smokers. One patient had a comorbid lung condition.

Table 2 illustrates that the average length of the pharmacy consultation was 13 min (range 1–25 min). Four patients had previously spoken to another healthcare professional about their symptoms before using the pharmacy referral service. For 11 patients who attended chest X-ray, the mean time to reporting chest X-ray results in secondary care was 3 days (range 1–7). There were no cases of lung cancer detected, but a rare lung condition (pulmonary fibrosis) was diagnosed in one patient. The mean waiting time between the pharmacy consultation

and chest x-ray was 3 days (range 0–9). There was a mean 46-day wait (range 0–96) for 10 patients who received their chest X-ray results.

Qualitative findings

Four focus groups were conducted, one with healthcare professionals (n=6) (HCP FG) and three with MoP (n=13, of whom four were female and nine were male). The public focus group included one group of smokers (FG1 MoP), one group of former smokers (FG2 MoP) and one combined group of current smokers and former smokers (FG3 MoP).

Seven pharmacy professionals were interviewed, including four pharmacists and one pharmacy technician. Pharmacist (1) and counter staff (1) were from non-participating pharmacies, one GP and four patients were interviewed. Ten patients initially consented to the qualitative element; of these, three patients subsequently declined to participate, two were not contactable and four were interviewed. Two patients stated a lack of time for declining interview participation, and another stated that, as a non-smoker, they had been incorrectly referred.

Three main themes were established from the data—*acceptability, feasibility and campaign promotion*. Subthemes included barriers to implementing the service and facilitators to the service. These were identified based on initial analysis of the three separate data sets (patient interviews, interviews with health professionals and focus groups). Data saturation was achieved for themes relating to acceptability of the service and campaign promotion, as no new ideas were emerging. Due to the low number of patients who used the service, data saturation was not achieved for themes relating to the feasibility of the service.

Acceptability

The service was perceived as an acceptable initiative among patients, pharmacists and healthcare professionals and focus group participants.

> I think it's a brilliant idea. (FG1 MoP)
> Absolutely fantastic. (GP interview)
> I think it is a good idea… it's a good way of getting to the people who don't tend to go to the GP as often. (Pharmacist interview, 1)

It was felt that the service could enable earlier referrals and diagnosis compared with using the GP.

> The referral from the pharmacy was a lot quicker. (Patient interview, 4)
> It enables earlier detection… it takes out all the waiting times in GPs and referral letters. And it just gets that initial stage started for treatment, potentially started, much quicker. (Pharmacist interview, 2)

Most patients were already familiar with their pharmacist and good rapport enabled them to feel comfortable with discussing their symptoms with them.

> PAR2: I've got a very good rapport with my pharmacist and I know for a fact I could go in at any time, and anybody locally can do the same. (FG3 MoP)
> [The Pharmacist] really knew about my health, … because, I go there regular. (Patient interview, 3)

Pharmacy staff found it acceptable to approach patients, discuss symptoms and deliver the service, as it was perceived to be an extension to their usual service.

> If someone came in to buy a cough mixture, we would always check through with them to see what sort of cough it was, how long the cough seemed and check any other symptoms, that would be part of the normal process. (Pharmacy staff, interview 1)
> I think people do generally come in and have a chat and kind of give us an idea of their symptoms. (Pharmacist interview, 1)

Most patients became aware of the service due to the discussions with pharmacy staff or signposting from other healthcare services.

> Well, I knew nothing at all about the service, until the pharmacist talked to me. (Patient interview, 3)
> I think one of the ladies told me from the surgery. (Patient interview, 1)

Feasibility

Satisfaction with the implementation of the pharmacy service was reported; patients usually received their X-ray within a week. However, several patients experienced confusion on their arrival at the hospital due to some clinical staff being unaware of pharmacy referrals. Pharmacists and patients were occasionally confused regarding the timing of the X-rays. Patients had expressed uncertainties regarding how and when they would receive their results and overall felt that they waited too long for the results.

> The initial service, fabulous but you cannot call it aftercare because I have not had the aftercare… the [Pharmacist] was extremely helpful. I found the whole fast track system exceptionally efficient… I went in to the [Name of hospital] and I was in there less than ten minutes, x-rayed and out… I said 'I had to come for a chest x-ray', they were a bit vague because I think it is a new service but they did track somebody down that knew what it was all about very quickly. (Patient interview, 4)
> Partner: They said that you should have waited really a few days, and they didn't know really that you were coming, and that was our fault though. (Patient interview, 3)

Capacity to deliver the service due to workload pressures and communication challenges between different healthcare professionals were raised as concerns. However, pharmacy staff felt there was capacity in their

role, providing adequate funding and training were available.

> There's going to be an increased workload with people having more chest x-rays. I don't know if anyone has spoken to radiology? (HCP FG)
> As long as it was funded in a way that allowed us to employ extra staff or had the time to see the patients. (Pharmacy staff interview, 1)
> Would there be communication between the pharmacists and doctors, or the pharmacists and the hospitals? (FG3, MoP)
> The communication needs to be clear, and everybody needs to be involved, at every step. (GP interview)

Pharmacists contrasted their initial group-based training with the more intensive refresher training that was delivered one-to-one in the pharmacies. Clear, accessible, face to face training was perceived to be essential to implement the pathway effectively.

> Paperwork was quite complicated… I had about five follow-up calls telling me I'd done something wrong or I'd sent it to the wrong place or someone hadn't received it. (Pharmacist interview, 5)
> When the second training took place, coming to pharmacy was a lot better. Explaining of the paperwork was better, paperwork in file was pulled together and signposted. (Pharmacist interview, 2)

Barriers to implementing the service

Patients and public participants expressed initial concerns regarding the authority of pharmacists to deliver the service, as some assumed that they would not be appropriately qualified and that referral for chest X-rays was limited to the remit of GPs. However, most felt comfortable with the idea, once it was explained that pharmacists received appropriate training. Participants suggested methods to promote their credibility, such as displaying training certification. Pharmacists also recognised that they would not automatically be considered authorised to deliver the service.

> I think in the back of my mind, I was more likely to have gone to see a doctor, or probably I wouldn't have gone to see the pharmacist, because I wouldn't have thought of them being able to recommend me to go and get an x-rays… I suppose having some kind of certificate that sort of states this pharmacist is able to refer. (Patient interview, 2)
> [Patients] don't always associate pharmacy as somewhere that you can maybe help with X-rays. (Pharmacist, interview, 5)

Participants suggested that the remit of the service could be expanded to include younger people, non-smokers and to offer a comprehensive lung health check for lung cancer and non-cancer respiratory conditions, as it was felt that lung diseases in general could be detected earlier.

> If this is covering all respiratory, right and not just 'damn nuisance' smokers but any respiratory problems. (Patient interview, 4)
> There were one or two who were under 40… There was a couple, then, who had the symptoms, of chest complaint, coughing but…hadn't smoked in the past… A lot of lung cancer is missed because people don't smoke… could be a secondary cancer. (Pharmacist interview, 4)

Facilitators to the service

The fast-track nature of the service was perceived as being the most beneficial element. The service was considered to offer easy access with no appointment required, and an expedited pathway for patients who were less able to access GP appointments or secondary care services.

> You go for an x-ray and you'll be fast tracked', well we went that day for an x-ray, and we were fast tracked, we were no time. (Patient interview, 3)
> It just streamlines the whole process and it means they can… get checked out and get an x-ray done, fairly soon-ish, so usually 48–72 hours, after seeing us. (Pharmacist interview, 2)

Obtaining access to the service outside of normal working or GP hours was perceived as useful, especially for people with jobs or responsibilities with non-standard hours. It was recognised that this was particularly important for people from lower socioeconomic backgrounds.

> I thought well that is good, I can make that, as there is no fixed time… Especially with my profession, cause the worst part is … you can never predict what the motorway is going to be like or the delays when you are doing deliveries. (Patient interview, 4)
> Patients of the more lower socioeconomic scale, the patients who do manual working jobs…and things like that… they can have the attitude… they don't want to see a doctor and they just want to be patched up quickly and on the way to go back to work. (Pharmacy professional interview, 1)

The physical accessibility offered by community pharmacies was thought to be well suited to geographically dispersed populations and people without access to private transport.

> It's a very rural area with a very small population and getting people to go to their GP is very difficult… I'm seeing people constantly that are stage four… you don't get a lot of symptoms necessarily with lung cancer. (HCP FG)
> It would suit a lot of elderly people if they know about it… They might have a pharmacy that is quite close that does it, but they might have to catch a bus, two buses to see their GP. (Patient interview, 4)

It was perceived that the service would benefit the overall healthcare system by reducing the burden on GPs

and saving money, providing that the service was fully communicated with all healthcare providers.

> So, it may save the NHS money then in the long run and help more patients get the treatment they need quicker…, potentially, maybe get cured of lung cancer. (Pharmacist interview, 2)
> GP's are keen to share their workload… GPs should be informed of x-rays results, clearly stating if further actions are needed. (GP interview)

Campaign promotion

Participants thought that the poster campaign to promote the service could be more visible and widespread within the community. A lack of awareness of the service was considered a significant barrier to its use.

> I think it could be put out there more to the public like you know, advertise it more. Because a lot of people don't know. (Patient interview, 1)
> It needs a bit more of a push… to make people aware of it. (Pharmacy staff, interview 2)

A targeted and multifaceted campaign aimed at engaging different groups throughout the community was advocated. This included focusing on patients who already received prescriptions for lung symptoms or other illnesses.

> PAR9: I think you need to have a band for different target groups. Some people will look at posters and then other people will get a message from the nurse or something or pharmacist and will check that. (FG3 MoP)
> We could mark prescriptions… with…a sticker to say that they're a potential candidate. (Pharmacist, interview 5)

Health services and community venues were felt to be the most valuable places to promote the service. Among the suggestions were promotional days and using health services' answering machine messages.

> PAR1: Have like a day where they all wear a badge and they speak to everyone about it, in all the pharmacies. (FG1 MoP)
> Answering machine messages can be used to promote service. (Pharmacist interview, 4)

Campaign messages needed to be simple and clear, emphasising the fast-track nature of the service.

> If I had a letter that didn't say fast tracked, I would have probably contacted my doctor and asked him about it. (Patient 3)
> Jump the queue' 'save time', no appointment. (Pharmacist interview, 4)

There were differing views regarding the inclusion of the wording *lung cancer*, as some felt it would deter them from using the service. Participants felt that positive and non-judgemental messaging highlighting early diagnosis could help to modify negative beliefs about cancer.

> PAR1: The cancer may be put people off… Don't put the fear of God into everybody just say I'm approachable… we are willing to listen, we will hear you, we can refer you… A non-judgemental attitude is very important. (FG1 MoP)
> Early diagnosis, means better prognosis. (GP, interview)

Posters were generally considered to be an important method to promote the service. Against a backdrop of multiple health campaigns in pharmacies, posters would need to stand out through using distinctive messaging and images.

> PAR2: You could have a member of the public having like a conversation with a pharmacist. (FG3 MoP)
> It's about getting just the right kind of poster… anything with pictures or like an x-rays of … a set of lungs, that would stand out to them. (Pharmacist, interview, 2)

Participants had varying perspectives regarding the most appropriate method of advertising. However, using pharmacy bags for prescriptions was popular and the training of pharmacy delivery drivers was considered useful to engage those unlikely to attend pharmacies.

> PAR1: If you put a piece of paper in, it's going to be discarded with the bag. It would be better if it was printed on the bag. (FG1 MoP)
> Train drivers up to provide information to patients when delivering prescriptions. They can explain the service face to face, as they don't see anyone, so the driver is their main point of contact. (Pharmacist interview, 4)

DISCUSSION

Main findings

Our study assessed the acceptability and feasibility of a community-based pharmacy referral service designed to support prompt symptomatic diagnosis of lung cancer in socioeconomically deprived communities. Participants considered the pharmacy referral service to be acceptable and the pharmacy element to be potentially feasible. A joined-up and standardised approach to training and service delivery for pharmacists, counter staff and technicians, primary and secondary care providers would be needed prior to considering the development of an RCT and wider implementation, in particular, to ensure that patients receive chest X-ray results without delay. Perceived barriers to uptake included insufficient service awareness and concerns about the credentials of pharmacists to deliver the service. Facilitators included the familiarity and ease of access of pharmacists relative to other healthcare practitioners, particularly within deprived and rural populations. However, low numbers of patient referrals observed in the feasibility study emphasise the

need for improvements to service promotion and integration with secondary care provision.

Strengths and limitations

The main strength of the study was that in-depth views and perceptions were drawn from multiple stakeholders and data were triangulated to determine convergent themes. Proactive recruitment methods for the focus groups were successfully implemented to engage people from deprived communities. Although the purpose of the study was to inform (rather than evaluate) the delivery and content of a campaign to raise awareness of the pharmacy lung referral service, the initial community-based campaign had limited reach and may have contributed to the low number of patients referred, in addition to delayed roll out of the pathway. Subsequently, the breadth of views expressed in patient interviews and data concerning the feasibility of the service were limited. Opportunistic recruitment of patients, MoP and healthcare professionals may also have increased the likelihood that study participants were favourably disposed towards the concept of pharmacy referral for lung symptoms. Data regarding the number of patients who were approached by pharmacy staff but did not participate in the lung referral service were not available and would be important in assessing service uptake.

Comparison with the existing literature

Consistent with earlier pharmacy referral pilots, there is limited evidence that pharmacy referral services are a viable alternative to primary care for patients accessing chest X-rays for lung cancer symptoms. No cases of lung cancer were detected in the current study, although the potential to diagnose other clinically significant lung conditions when testing for lung cancer was demonstrated despite the small number of patients referred.[40–42]

Uptake of the community pharmacy referral service was hindered by lack of awareness and limited promotion. Consistent with other studies, we found that targeted, multifaceted[43 44] approaches using community-focused strategies to promote the pharmacy referral service[45 46] were preferred. Information to raise awareness of cancer symptoms[47] alongside clear, positive messages[48] emphasising the benefits of earlier diagnosis[49] and the fast-track nature of the service were considered important.[50]

Pharmacy staff proactively engaged customers from socioeconomically deprived communities and pharmacies were considered particularly accessible to the target populations, especially within rural settings, and well suited to delivering this service and other health interventions.[51] Despite this, some public participants queried the credentials of pharmacists to discuss lung symptoms and refer for diagnostic testing, similarly to previous unpublished findings.[52] Further work could be undertaken to promote the authority of pharmacists to provide these services to the public.[53]

Implications

Although the pharmacy referral service was perceived to be acceptable, changes prior to the development of an RCT and potential wider implementation would be required. These could include embedding a more robust tracking service in secondary care to expedite provision of results to patients, and standardised training for the service providers. Where service level barriers are addressed, a well-publicised multifaceted awareness campaign could be developed and evaluated in parallel.

The broader context of the role of community pharmacy services in meeting the changing healthcare needs of the population should also be considered.[54] While current NICE guidance recommends referral for chest X-ray for patients with lung cancer symptoms, approximately 25% of early stage lung cancers may be missed through false-negative results.[55] Recent evidence highlights the effectiveness of low-dose CT (LDCT) lung screening in reducing lung cancer mortality among high-risk groups (aged 55–80 with a significant and recent smoking history).[56 57] Future research could consider the potential role of community pharmacy in referring high-risk patients into LDCT screening delivered via targeted lung health check pilots,[58] with broader eligibility criteria should LDCT lung screening become routinely implemented in the UK.

CONCLUSION

This study demonstrated that a pharmacy lung referral service is acceptable but would require improvements to workforce training and promotion before being considered feasible for wider implementation. Future studies could explore the clinical and cost-effectiveness of pharmacy lung referral services.

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PLUS: Pharmacy referral for Lung cancer Symptoms

Interview schedule (Health Care Professionals)
DRAFT V 2.0 23.08.2018

Interview:

1. We will start by going all the way back to the start – how did you feel about being approached to take part in this study?
    a. What were your first feelings about the new service?
    b. Was there anything that you were nervous about or made you feel unsure?
    c. How did you feel about patients being referred through this service?
    d. Do you think that there is a need for this service? Why? Why not?
2. What did you think about the information and training provided to you?
    a. How can we improve this information and training?
3. How many people did you talk to about their symptoms?
    a. How did you feel about identifying patients?
        i. Do you think you have a clear understanding of the eligibility criteria?
        ii. Do you think the patients you spoke to had a clear understanding of the eligibility criteria?
    b. How did you feel about having those discussions?
    c. How did patients react to being approached for this study/service?
    d. When patients found out that it was part of a research study did their opinions change at all?
    e. How did you feel taking consent?
    f. Was there anything that put people off talking to you?
    g. Why do you think people came to talk to you?
    h. Do you find lots of people come to the pharmacy to talk to you about lung or other symptoms in general?
        i. Why do you think they do that?
4. Can you remember roughly how many people did you refer on for an x-ray?
    a. How did you feel about doing this?
    b. Were patients ever shocked by being referred, or anything you discussed with them?
        i. How did you handle that situation?
        ii. What concerns did patients discuss about chest x-ray for lung cancer?
        iii. Was radiation a concern?
    c. Did you feel comfortable having these discussions?
5. How do you think the referral pathway ran? Were there any barriers or hiccups?
    a. Is there anything we could do to improve the service for yourself or the patients?
    b. Was there anything that you felt worked particularly well?

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c. What are your views on the feedback and communication received between all those involved in the referral pathway?
   i. For example, do you think communication between the pharmacies, GP practices and secondary care teams was achieved?
   ii. Do you feel that a lack of communication delayed the process?
   iii. Was the feedback from other healthcare professionals helpful?

d. Were there clear procedures in place to ensure everyone understood and knew their role and involvement?

e. Did you find the different services involved to be engaging and supportive of this pathway?
   i. For example, were the GPs accepting of this?
   ii. Did the pharmacists back this new process?
   iii. How did the secondary care team help to control the process?

f. How did you find this new process to fit in with your existing role?

6. Can you tell me how you think this method might influence the referral pathways already in place?
   a. For example, do you think this process will have an influence on the GP, pharmacy and secondary care services?
7. Would you recommend this service as an alternative to a GP referral?
   a. If no – why do you think the GP referral is better?
   b. What do you think we can do to make this service better?
8. If the results of this study suggest that the service is feasible and acceptable to the patients and health care practitioners we would look to run a community awareness campaign advising patients to visit the pharmacy if they have lung cancer symptoms that concern them – what are your initial thoughts on that?
   a. Do you think an awareness campaign would have this effect?
   b. Do you think the community would respond positively to it?
   c. How and where do you think would be the best place to engage patients?
   d. If we could do one thing to get people to come and talk to you about their symptoms what do you think it would be?
   e. Are there any messages or information that we can tell them that you think will help get them through the door?
   f. At the moment, there has not been a community awareness campaign, do you think the pharmacy has the infrastructure to be able to cope if more patients who are eligible do start to come in?
   g. Do you think such a pathway would be sustainable for all those involved?
9. I know we have spoken about a lot today - so thank you for your time. Is there anything you would like to say or talk about that we haven't already covered?

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PLUS: Pharmacy referral for Lung cancer Symptoms

Interview schedule (Patients)

1. So, can you talk me through the symptoms you were having when you first decided to go and talk to someone?
    a. What was it about these symptoms that made you go and talk to someone?
    b. Had you experienced them before?
    c. How long did you have the symptoms before you went to talk to someone?
    d. Did anyone mention to you to go and talk to someone? Or did you just decide yourself?
    e. Did you talk to any of your family or friends about the symptoms?
    f. Some people think it's important go and see someone about their symptoms, and others don't, can you tell me about what you think?
2. Can you tell me why you decided to go to the pharmacy?
    a. Did you consider going anywhere else i.e. your GP?
    b. Did you speak to anyone else at all?
    c. Why do you think you chose to go to the pharmacy over the doctor?
    d. Do you go to the pharmacy a lot?
        i. Have you spoken to the pharmacist about any illnesses or symptoms of any kind at all?
3. How did you feel about talking to your pharmacist about your lung symptoms?
    a. If you can remember, and you are happy to tell me, can you tell me a little bit about what you spoke about?
    b. Can you remember the kind of questions your pharmacist asked you?
    c. Did your pharmacist give you any advice?
        i. Did you find this advice useful?
        ii. How did it feel to have your pharmacists to ask you questions about your lung health?
    d. What did the pharmacist say to you about your smoking?
        i. Did they give you any advice or refer you to any services that could help you?
        ii. Did they talk to about your symptoms and smoking?
        iii. How did you feel about them talk to you about this?
        iv. If we were to continue this service in future, how would your friends and family feel about the pharmacist talking to them about their smoking?
        v. Can you think of anyone else who might be more appropriate to talk to people about their smoking?
4. So your pharmacist referred you for a chest X-ray, how did you feel about that?
    a. Did the pharmacist explain to you why you were referred?
    b. How long did you wait for your chest X-ray?
    c. Was it easy for you to get to the hospital for your X-ray?

Holland-Hart D, *et al. BMJ Open Resp Res* 2021; 8:e000772. doi: 10.1136/bmjresp-2020-000772

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   d. Have you had the results?
   e. What did you think about getting your results over the phone/by letter?
5. Overall, how did you feel about your experience?
   a. Was there anything that made you feel unhappy or unsure at all?
   b. Is there anything that you think worked particularly well?
   c. Is there anything you think that we could improve or change to make it better for people in the future?
      i. Is there anything you think we could do to make people feel more supported during the process in the future?
   d. How do you feel about other people being referred like this through a pharmacy?
   e. What do you think your friends and family would think of using this service?
   f. How do you think people would feel about going to their pharmacist rather than their GP?
   g. Following your experience, would you suggest it to anyone else?
   h. Would you like to see this service continue?
   i. Do you think there is anything that would put people off this service?
   j. How can we make this service better?
6. If this service works well for people and the pharmacists we would like to develop a campaign in the future so people are more aware that they can go to their pharmacist and ask them about lung symptoms. Do you think this is a good idea?
   a. Do you have any ideas on how we might tell people about this service in the future?
   b. From your experience, do you think there is anything that will help persuade people to go and talk to their pharmacist?
   c. Are there any places where you think it is important for us to have information?
   d. What type of information do you pay attention to? (TV adverts, posters, radio adverts, leaflets, GP surgery, community centres)
   e. If we could do one thing to get more people to go and talk to their pharmacist what do you think it would be?
7. I know we have spoken about a lot today! So thank you for your time. Is there anything you would like to say or talk about that we haven't already covered?

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Focus Group Topic Guide
Health Care Professionals

PLUS 2: Pharmacy referral for Lung Symptoms

Focus group aims

1. To explore views on how to engage the public in a community awareness campaign
2. To explore views on what materials/messages could be used in the community awareness campaign

Facilitator note

The facilitator should stress that:
The focus group is not a test, we are seeking opinions on how to engage the public in the pharmacist referral pathway and what materials we could use in the community to inform people of it. We are interested in all opinions, both positive and negative and want people to be as honest as possible. The facilitator should try and engage all participants equally (where appropriate) so all opinions can be heard.

Prologue

Thank you all for being here today, we really appreciate you taking the time to be part of this research. Before we start I need to give you some information about why we are doing this study and what you have to do.

Recently, as some of you are aware, we set up a pharmacy referral service for patients presenting with lung cancer symptoms. Patients are screened for eligibility and referred for an X-ray that takes place within two days. Now we have set the service up, we are going to develop a targeted community awareness campaign for the local community to encourage people to use the service. Today we would like to hear your opinions and ideas of how best to do this. We want to know what materials you think will be the most effective, where we should put them for people to notice them, what messages they could have on them to engage people.

This is not a test at all, and we want you to be as honest as possible with us. We want to hear what you think is good and bad, and what you think will and won't work for this community.

It is completely up to you if you take part today or not. Taking part is voluntary. If you decide you want to leave the focus group at any point, that is absolutely fine, just let me know. You can stop the focus group at any point and you don't need to give me a reason.

If you don't want to answer any of the questions that is fine, just let me know and we can move on to the next question. If you don't understand any of the questions, please let me know and I can find another way to phrase them.

If it's ok with you I will record the focus group on this audio-recorder and (insert name of researcher) may take some notes as we go along. After the focus group we recording will be transcribed. The transcription will be completely anonymous. We may use quotes from what

you have said today in research presentations and reports, but these will always be kept completely anonymous.

No one outside of the research team will know that you have taken part in the study. We ask that you do not repeat anything that people have talked about today to anyone outside of this group, especially if people talk about personal opinions or experiences. Please also try not to talk at the same time as someone else. This helps us to have the most accurate transcription possible.

I have planned a few questions and activities for us to structure the discussion around today; but if you have anything else you want to say or add at any point, please feel free to do so.

[Verbally go through consent form with participants. Ask participants to sign consent form if they agree to take part. Set-up audio-recorder].

Main Discussion
[Turn on the audio-recorder and ask all participants to introduce themselves]

Materials and Strategies

Open Discussion

- Asking participants what ideas they have
    - Prompt them as to why and how they think they might work
    - Ask participants if there were previously any health campaigns they can remember that worked well – what can they remember, why do they think they remember them, what did they include?

[Note down participant ideas to add to examples to discuss and ranking exercise]

- Provide participants with the following ideas in-turn (and examples where appropriate)

    1. Pharmacy inserts to be included with medication collection bags
    2. Campaign stands to be held at public events and locations in the local area (such as rugby matches and shopping centres)
    3. Prescription add-ons to be given to patients when collecting their prescription slips from GPs in the local area
    4. Posters and leaflets
    5. Campaign materials such as pens, mugs, magnets and bags
    6. Bus notices
    7. Social media campaigns

    - Prompts to ask with each example -

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- What do you think the community would like/dislike about this idea?
- Do you think they would notice it?
- How do you think they would feel if they saw something like this?
- How do think they would feel about receiving information like this?

- Ask participants to rank the ideas from what they think will be the most to least effective for people in their community.
    - Prompts to ask during and after the ranking exercise -
        - Why have you placed this one at the top?
            - Why do you think it will be better than the others?
            - Do you think compared to the others it will have the most impact?
        - Why have you placed this one at the bottom?
            - Why do you think this one will not be as good as the others?
            - Do you think compared to the others it will have the least impact?
        - So the ones in the middle, can you tell me why you don't think these will be as good?
        - Does anyone disagree with this order, it's okay if you do, I would just like to know what order you would put them in and why?

- Provide participants with examples of posters that could be used for our campaign, or those have been used in previous similar campaigns. Explain that now we are interested in what they say, and how they say it, rather than what they look like. Show participants the examples one at a time.
    - Prompts to ask with each example –
        - Do you think people will understand what it is trying to tell them?
        - Are there any aspects that you think they will find difficult to understand?
        - Could any changes be made to make it easier for people to understand it?
        - Do you think this example would make people think about their symptoms?
        - Do you think it would motivate people to go to the pharmacist?
        - Do you think the community would find any of this information off-putting?
        - Do you think people would believe the information provided?
        - Do you think people will feel in control of their health after seeing the information?

- Explain to participants that now we would like to talk about where the materials could be placed around the community. Explain that we want as many people as possible to see them. Ask participants where they think they could go.

  - Prompts to ask to aide group discussion –
    - Where do you think we could put them so that the most people would see them?
    - Are there any places that everyone tends to go?
    - Are there any community hubs, shops, coffee shops, hairdressers/barbers that people use a lot locally?
    - How do you think we could make information stand out in these places?
    - If we could put the information in one place, where do you think it will have the most impact?

<u>The role of a campaign to promote the PLUS service and strategic development</u>

Thank you for sharing your thoughts on the campaign with us. We would now like to gain your opinions on how the campaign could increase workload on services and how we could develop the campaign to maximise impact of the campaign but to limit the burden on you/the health service.

- What impact do you think this campaign will have on local health services?
- How can we support local health services to reduce the potential burden on them?
- Can you think of any ways that we can design the campaign so that we limit potential burden on local health services?

End

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Focus Group Topic Guide
Public – Current & Former-smokers
DRAFT Version 1.0 31.10.2018

PLUS 2: Pharmacy referral for Lung Symptoms

Focus group aims

1. To explore views on how to engage the public in a community awareness campaign
2. To explore views on what materials/messages could be used in the community awareness campaign

Facilitator note

The facilitator should stress that:
The focus group is not a test, we are seeking participants' opinions on how to engage the public in a campaign to encourage people to go to their pharmacist with lung cancer symptoms. We are interested in all opinions, both positive and negative and want people to be as honest as possible. The facilitator should try to engage all participants equally (where appropriate) so all opinions can be heard.

Prologue

Thank you all so much for being here today, we really appreciate your help with this work. Before we start, I need to give you some information about why we are doing this study and what you have to do.

Recently we set up a service for people to talk to their pharmacist about their lung health. When they talk to their pharmacist, if people have possible symptoms and are high risk of lung cancer, their pharmacist can refer them for a chest X-ray at the hospital within two days. We hope that by doing this more people will be diagnosed sooner as they will not have to wait to try and get a doctor's appointment.

At the moment this service exists but not many people know about it. Now we would like to develop a community campaign to raise peoples' awareness of the service and encourage people to use it. This is where we need your help. We want to know what materials we should use (such as posters and leaflets) that will be the most effective, where we should put them for people to notice them, and other ways that we could engage people. We want the message to get to as many people as possible.

This is not a test at all; and we want you to be honest with us. We want to hear what you think is good and bad, and what you think will and won't work.

It is completely up to you if you take part today or not. Taking part is voluntary. If you decide you don't want to take part anymore, that is absolutely fine, just let me know. You can leave the focus group at any point and you don't need to give me a reason.

If you don't want to answer any of the questions that is fine, just let me know and we can move on to the next question. If you don't understand any of the questions, please let me know and I can find another way to phrase them.

If it's ok with you I will record the focus group on this audio-recorder. All this does is record your voices, and (insert name of researcher) may take some notes as we go along. After the focus group we will type up what you we have all said to help us with our work. Nothing that can identify you, such as your name, will be used when we write it up. We may use quotes from what you have said today in research reports, but these will always be anonymous – people will not know who said it.

No one outside of the research team will know that you have taken part in the study. We ask that you do not repeat anything that people have talked about today to anyone outside of this group, especially if people talk about personal opinions or experiences. Please also try not to talk at the same time as someone else. This is so the person typing up the focus group can hear what everyone says.

I have planned a few activities for us, and a few questions to open up the discussion, but if you have anything else you want to say or add at any point, please feel free to do so.

[Verbally go through consent form with participants. Ask participants to sign consent form if they agree to take part. Set-up audio-recorder].

Main Discussion
[Turn on the audio-recorder and ask all participants to introduce themselves]

Materials and Strategies

Open Discussion

- Asking participants what ideas they have to encourage people to go to their pharmacist to talk about lung symptoms i.e. 'To start, can anyone think of ideas for a potential campaign'?
    - Prompt them as to why and how they think those ideas might work
    - Ask participants if there any health campaigns they can remember – what can they remember, why do they think they remember them, what did they include?
        - What was good/bad about those campaigns?

[Note down participant ideas to add to examples to discuss and ranking exercise]

- Provide participants with the following ideas in-turn (and examples where appropriate)

    1. Pharmacy inserts to be included with medication collection bags (this could be information on a slip added to the white bag that your pharmacist gives you your medication in)
    2. Campaign stands to be held at public events and locations in the local area (such as rugby matches and shopping centres)
    3. Prescription add-ons to be given to patients when collecting their prescription slips from GPs in the local area
    4. Posters and leaflets
    5. Campaign materials such as pens, mugs, magnets and bags
    6. Bus notices
    7. Social media campaigns

    - Prompts to ask with each example -
        - What do you like/dislike about this idea?
        - To what extent do you think you would notice it?
        - Do you think people in your community would notice it/pay attention?
            - Why yes/no?
        - How would you feel if you saw this?
        - How does it make you feel about receiving information like this?

- Ask participants to rank the ideas from what they think will be the most to least effective for people in their community.

    - Prompts to ask during and after the ranking exercise -
        - Why have you placed this one at the top?
            - Why do you think it will be better than the others?
            - Do you think compared to the others it will have the most impact?
        - Why have you placed this one at the bottom?
            - Why do you think this one will not be as good as the others?
            - Do you think compared to the others it will have the least impact?
        - So the ones in the middle, can you tell me why you don't think these will be as good?
        - Does anyone disagree with this order, it's okay if you do, I would just like to know what order you would put them in and why?

- Provide participants with examples of posters that could be used for our campaign, or those have been used in previous similar campaigns. Explain that now we are interested in what they say, and how they say it, rather than what they look like. Show participants the examples one at a time.

    - Prompts to ask with each example –
        - What do you it is trying to tell you?
        - Are there any aspects that you find difficult to understand?
        - Could any changes be made to make it easier to understand?
        - Do you think other people in your community will understand it?
        - Do you think this example would make people think about their symptoms?

- Do you think it would motivate them to go to the pharmacist?
- Do you find any of this information off-putting?
- Do you think others would find any of this information off-putting?
- Do you think people would believe the information provided?
- Do you think people will feel in control of their health after seeing the information?

- Explain to participants that now we would like to talk about where the materials could be placed around the community. Explain that we want as many people as possible to see them. Ask participants where they think they could go.
    - Prompts to ask to aide group discussion –
        - Where do you think we could put them so that the most people would see them?
        - Are there any places that everyone tends to go?
        - Are there any community hubs, shops, coffee shops, hairdressers/barbers that people use a lot locally?
        - Do these places often have information around?
        - How do you think we could make information stand out there?
        - If we could put the information in one place, where do you think it will have the most impact?

<u>Acceptability of smoking cessation advice</u>

Thank you for sharing your thoughts on the service with us. We have one last point to discuss with you today. We would like to know what you would think about being offered smoking cessation advice by your pharmacist if you were talking to them about your lung health? Smoking cessation are different things that can be done to help people stop smoking.

- Do you think it is acceptable for your pharmacist to discuss this with you?
- Is this something that would put you off the service? Or suggesting someone else to go?
- If it was appropriate to bring it up, what do you think is the best way to do it?

Table 1

Consolidated criteria for reporting qualitative studies (COREQ): 32-item checklist

No	Item	Guide questions/description
Domain 1: Research team and reflexivity		
Personal Characteristics		
1.	Interviewer/facilitator	Which author/s conducted the interview or focus group? **Dr Daniella Holland-Hart** **Dr Grace McCutchan** **Dr Harriet Quinn-Scoggins** **Dr Lucy Hill**
2.	Credentials	What were the researcher's credentials? *E.g. PhD, MD* **PhD**
3.	Occupation	What was their occupation at the time of the study? **(DHH, GM, HQS) Research Associate, Cardiff University** **(LH) Research Assistant, Hywel Dda University Health Board**
4.	Gender	Was the researcher male or female? **Female**
5.	Experience and training	What experience or training did the researcher have? **All researchers have extensive expertise in doing interviews and facilitating focus groups. They all hold an updated GCP certificate and hold PhD's.**
Relationship with participants		

No	Item	Guide questions/description
6.	Relationship established	Was a relationship established prior to study commencement? **No relationship but the researchers used their research experience and training to introduce the research study and mitigate the asymmetry of information between the different parties.**
7.	Participant knowledge of the interviewer	What did the participants know about the researcher? e.*g. personal goals, reasons for doing the research* **Reasons for doing the research**
8.	Interviewer characteristics	What characteristics were reported about the interviewer/facilitator? e.g. *Bias, assumptions, reasons and interests in the research topic* **None reported**
Domain 2: study design		
Theoretical framework		
9.	Methodological orientation and Theory	What methodological orientation was stated to underpin the study? *e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis* **Thematic analysis was used. The conceptual thematic framework used in the study is described in the methodology section.**
Participant selection		
10.	Sampling	How were participants selected? *e.g. purposive, convenience, consecutive, snowball* **The sample were self-selecting for focus groups but fulfilled set criteria. Patients interviewed were self-selected and clinicians were self-selecting after initial**

No	Item	Guide questions/description
		invites were sent out from the research team.
11.	Method of approach	How were participants approached? e*.g. face-to-face, telephone, mail, email* **Face to face and via telephone.**
12.	Sample size	How many participants were in the study? **30**
13.	Non-participation	How many people refused to participate or dropped out? Reasons? **Ten patients initially consented to the qualitative element; of these, three patients subsequently declined to participate, two were not contactable and four were interviewed. Two patients stated a lack of time for declining interview participation and another stated that as a non-smoker they had been incorrectly referred.**
Setting		
14.	Setting of data collection	Where was the data collected? e*.g. home, clinic, workplace* **At home or over the telephone.**
15.	Presence of non-participants	Was anyone else present besides the participants and researchers? **A partner was present in some interviews**
16.	Description of sample	What are the important characteristics of the sample? *e.g. demographic data, date* **Geographical area related to socio-economic background. Gender**
Data collection		
17.	Interview guide	Were questions, prompts, guides provided by the authors? Was it pilot tested? **Interview schedules included prompts and were tested by the qualitative research team (HQS, DHH, GM, KB).**

No	Item	Guide questions/description
		Patient representatives also tested the topic guides' questions.
18.	Repeat interviews	Were repeat interviews carried out? If yes, how many? **No repeat interviews**
19.	Audio/visual recording	Did the research use audio or visual recording to collect the data? **All interviews were audio recorded**
20.	Field notes	Were field notes made during and/or after the interview or focus group? **Field notes were made during the focus groups**
21.	Duration	What was the duration of the interviews or focus group? **51-62 minutes focus groups** **23-45 minutes interviews**
22.	Data saturation	Was data saturation discussed? **Yes, this was discussed within the team to ensure that there were no further main themes to be explored.**
23.	Transcripts returned	Were transcripts returned to participants for comment and/or correction? **No, this was not done**
Domain 3: analysis and findings		
Data analysis		
24.	Number of data coders	How many data coders coded the data? **3 data coders (DHH), (GM) and (KB)**
25.	Description of the coding tree	Did authors provide a description of the coding tree? **Coding tree is available**
26.	Derivation of themes	Were themes identified in advance or derived from the data?

No	Item	Guide questions/description
		Derived from the data itself
27.	Software	What software, if applicable, was used to manage the data? **NVivo 11**
28.	Participant checking	Did participants provide feedback on the findings? **All participants were sent the main findings but no feedback was provided.**
Reporting		
29.	Quotations presented	Were participant quotations presented to illustrate the themes / findings? Was each quotation identified? e.*g. participant number* **All main themes were illustrated by quotes. Each quotation was followed by a code denoting whether it was a patient or healthcare professional interview or focus group. This code is explained in the text.**
30.	Data and findings consistent	Was there consistency between the data presented and the findings? **All main themes were illustrated by quotes, supplementary materials provide further evidence of these points and consistency.**
31.	Clarity of major themes	Were major themes clearly presented in the findings? **Major themes formed the basis of the presentation of the qualitative analysis, reflecting the purpose of the overall study (acceptability and feasibility of the cancer pathway, campaign promotion) and derived from the data itself on responses.**
32.	Clarity of minor themes	Is there a description of diverse cases or discussion of minor themes? **Sub themes and diverse cases are also discussed throughout the text.**