

Barriers, Facilitators, and Strategies to Recognise and Refer High-Risk Individuals with Lung Cancer ‘Alarm’ Signs and Symptoms:

A Study with Primary Healthcare Professionals in Ireland

March 2022

Report prepared for the National Cancer Control Programme¹

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¹ **Recommended citation:** Saab, M. M., O’Driscoll, M., Sahn, L. J., Leahy-Warren, P., Noonan, B., FitzGerald, S., Kilty, C., McCarthy, M., O’Malley, M., Lyons, N., & Hegarty, J. (2022). *Barriers, Facilitators, and Strategies to Recognise and Refer High-Risk Individuals with Lung Cancer ‘Alarm’ Signs and Symptoms: A Study with Primary Healthcare Professionals in Ireland - Report prepared for the National Cancer Control Programme.* Cork, Ireland.

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Abbreviations

A&E	Accident and Emergency Department
COPD	Chronic Obstructive Pulmonary Disease
CP	Community Pharmacist
CT	Computed Tomography
CI	Confidence Interval
CME	Continuing Medical Education
CPD	Continuous Professional Development
CRP	C-Reactive Protein
GMS	General Medical Services
GP	General Practitioner
HSE	Health Service Executive
HCP	Healthcare Professional
IRR	Incidence Rate Ratio
IQI	Inter Quartile Intervals
IOP	Irish Institute of Pharmacy
LDCT	Low-Dose Computed Tomography
LC	Lung Cancer
MAU	Medical Assessment Unit
NCCP	National Cancer Control Programme
NHS	National Health Service
NR	Not Reported
PICO	Population, Intervention, Comparison, Outcome
PICOST	Population, Intervention, Comparison, Outcome, Study design, Timeframe
PPV	Positive Predictive Value
PN	Practice Nurse
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
PR	Prevalence Ratio
PHN	Public Health Nurse
RCT	Randomised Controlled Trial
RALC	Rapid Access Lung Clinic
SRQR	Standards for Reporting Qualitative Research
UK	United Kingdom
USA	United States of America
UCC	University College Cork

Acknowledgements

The authors would like to thank Dr Heather E. Burns, Dr Una Kennedy, and Ms Áine Lyng at the National Cancer Control Programme without whom this study would not have been possible. A special thank you to all the Primary Healthcare Professionals who participated in this research as well as the Practice Nursing Professional Development Coordinators, the Director of Public Health Nursing Ms Anne Lynott, the National Lead for Public Health Nursing Ms Virginia Pye, and Dr Lloyd Philpott for spreading the word about this project and helping recruit study participants.

Executive Summary

Lung cancer (LC) is the leading cause of cancer incidence and mortality in men and women globally, with 2.1 million new cases and 1.8 million deaths in 2018 (Bray et al., 2018). It is estimated that the number of people diagnosed with LC and who die from it annually will increase to 3.63 and 3.01 million respectively by 2040 (World Health Organization International Agency for Research on Cancer, 2020). In Ireland, LC is the fourth most commonly diagnosed invasive cancer (excluding non-melanoma skin cancer) with around 1,500 men and 1,200 women diagnosed each year (2017-2019). LC continues to be the leading cause of cancer death in Ireland, with 1,030 men and 850 women dying from it annually (2016-2018) (National Cancer Registry Ireland, 2021). Annual numbers of LC cases in Ireland are projected to increase by 119% between 2015 and 2045 (National Cancer Registry Ireland, 2019).

Almost three quarters of LC cases in Ireland are diagnosed at stage III or IV, which reduces patients' eligibility for curative treatment and reduces survivorship (National Cancer Registry Ireland, 2018). Late diagnosis is associated with lack of knowledge of LC signs and symptoms in the public, limited access to Healthcare Professionals (HCPs), and delays in referral and diagnosis (National Institute for Health and Care Excellence, 2021a). Furthermore, the COVID-19 pandemic has played a detrimental role in early presentation and referral for cancer alarm signs and symptoms (Petrova et al., 2021; Quinn-Scoggins & Cannings-John, 2021). Timely patient help-seeking and subsequent HCP referral for LC alarm signs and symptoms are crucial for early diagnosis and improved survivorship.

There are approximately 30 million patient interactions with the Irish health service every year. Of those, 14 million are with general practice services, including general practitioners (GPs) and practice nurses (PNs) (Health Service Executive [HSE], 2021c). Community pharmacists (CPs) are among the most accessible primary HCPs, with over 1.6 million weekly interactions with the public (Irish Pharmacy Union, 2018). Public health nurses (PHNs) provide general nursing services at home to patients with a wide range of medical needs. PHNs have an important role in caring for patients undergoing cancer therapy at home (HSE, 2021b). While these interactions provide an opportunity for patients to consult with a HCP, the barriers that may exist for HCPs recognising and referring people with LC alarm signs and symptoms remain underexplored. A "push-pull" approach can help target the early detection of LC, whereby members of the public with symptoms indicative of LC are "pushed" to act on their symptoms and HCPs are encouraged to "pull" individuals with LC alarm signs and symptoms into relevant services.

The "push" element was explored in a recent study commissioned and funded by the HSE National Cancer Control Programme (NCCP), whereby we interviewed 46 at-risk individuals who had at least

one LC risk factor and lived in areas with high LC incidence about their help-seeking intentions in the event that they developed symptoms indicative of LC (Saab et al., 2020a; 2020b; 2021b). We found that, despite identifying the GP as the first point of contact for signs and symptoms of concern, some participants would not consult their GP in the event that they developed signs and symptoms of LC, mainly due to GPs' perceived negative attitudes towards smokers, cost of healthcare, waiting time for GP appointment, and previous bad experiences with the healthcare system. Other barriers included: symptom misappraisal, fear, denial, use of self-help measures and machoism and stoicism among men (Saab et al., 2020b; 2021b).

The current report presents the “pull” element of this project, whereby barriers to the recognition and referral of high-risk individuals with signs and symptoms indicative of LC are explored with Primary HCPs, namely GPs, CPs, PHNs, and Practice Nurses (PNs). Ultimately, findings from this report will inform the development of strategies to support primary HCPs to recognise and refer people with signs and symptoms of LC.

This project was conducted in two phases: (i) a systematic review of interventions aimed at helping Primary HCPs recognise and refer individuals with signs and symptoms indicative of LC along the appropriate healthcare pathway; and (ii) focus groups and individual interviews with GPs, CPs, PHNs, and PNs to explore barriers and facilitators to recognising the population at high risk of LC and referring individuals with signs and symptoms indicative of LC along the appropriate healthcare pathway. This study also explored strategies to engage Primary HCPs in education on early detection of LC.

Phase 1: Five studies were included in the systematic review. The majority (n=3) were non-randomised controlled trials (non-RCTs). Three different interventions were used, including: Combined public and HCP awareness campaigns; letters and continuing medical education (CME) meetings; and cancer fast-track programme.

The small number of studies included as well as heterogeneity in study designs, interventions, and outcomes limited our ability to draw definitive conclusions. However, findings from this review indicate that CME meetings for GPs can be instrumental in helping with early LC referral, diagnosis, and potentially improved survivorship (Guldbrandt et al., 2014; 2015). While fast-track programmes – also known as rapid access, two-week-wait, or “urgent” programmes/clinics two-week wait – can be effective in reducing the time from initial presentation to LC diagnosis, there is a risk that the use of fast-track programmes is reduced over time as seen in one study (Prades et al., 2011), hence the importance of continually educating Primary HCPs about LC detection and referral pathways. One approach to educating Primary HCPs is through awareness campaigns. While such campaigns have the potential to enhance LC referral and reduce diagnostic interval, they did not lead to a

significant increase in number of cases diagnosed (Athey et al., 2012; Emery et al., 2017). Outcomes such as LC stage at diagnosis, recurrence, and mortality were seldom measured in the reviewed studies, mainly due to short follow up times. When measured, statistical significance was not reached for these outcomes, hence the importance of conducting future studies that are powered, controlled, and have longer follow-up times.

Phase 2: A total of 36 Primary HCPs (10 CPs, 10 PHNs, 8 GPs, and 8 PNs) from 11 counties in Ireland participated in the qualitative study. Four major themes were created from the data (**Table 1**):

1. Primary HCPs' experiences and accounts of patient referral for LC
2. Patient help-seeking for signs and symptoms of concern
3. Facilitating early presentation and referral
4. Perspectives on previous LC awareness campaigns

Table 1. Barriers, facilitators, and strategies to recognise and refer high-risk individuals with lung cancer 'alarm' signs and symptoms

Themes	Sub-themes	Abbreviated codes	Sources
Primary Healthcare Professionals' experiences and accounts of patient referral for lung cancer	<i>Triggers for Primary HCPs to refer patients</i>	• Typical LC signs and symptoms (localised [e.g., cough] and non-localised [e.g., weight loss, lack of energy])	GP, CP, PHN, PN
		• Atypical or non-specific signs and symptoms (e.g., back pain, looking pale/unwell, and abnormal blood tests)	GP, PHN, PN
		• Fear caused by haemoptysis	GP, CP, PHN, PN
		• Smoking as a LC risk factor	GP, CP, PHN, PN
		• Recurrent prescriptions (e.g., cough medicine, steroids, and antibiotics)	GP, CP, PHN, PN
	<i>Primary HCPs' role in patient referral</i>	• Advising, encouraging, and reassuring patients	GP, CP, PHN, PN
		• Upholding and respecting patient autonomy	CP, PHN
		• Patient assessment	GP, PHN, PN
		• Recognising the seriousness of presentation	GP, PHN, PN
		• Being on high alert " <i>in the patient's home</i> "	PHN
	<i>Awareness and Use of Rapid Access Lung Clinics</i>	• Varied service knowledge and use	GP, PN, CP, PHN
		• Greater awareness and use of other rapid access cancer clinics	GP, PN, CP, PHN
		• Experiences of using the Rapid Access Clinic e-referral system	GP, PN
		• Ease of access to computed tomography (CT)	GP, PN
		• Hesitance to refer patients to Rapid Access Lung Clinics (e.g., fear of abusing the system and fear of mentioning LC when symptoms are not definitive)	GP, PN
	<i>Challenges faced by</i>	• Limited role and scope of practice	GP, CP, PHN

	<i>Primary HCPs during referral</i>	• Fear of scaring patients while emphasising the urgency of referral	GP, CP, PHN
		• Opportunistic referrals	PHN, PN
		• Pressures on HCPs and the healthcare system	GP, CP, PHN
		• Respiratory diseases not prioritised (e.g., Chronic Disease Management Programme and HCPs' continuous professional development)	GP, PHN, PN
		• HCP fatigue from repeated patient presentations	GP, CP, PHN
		• Late patient presentation and missed/delayed LC diagnosis	GP
	<i>Post LC diagnosis follow-up and continuity of care</i>	• Predominantly fatalistic accounts of patient outcomes	GP, PHN, PN
		• Providing care and support following LC diagnosis	GP, PHN
		• "The missing link": lack of integration/communication within the healthcare system and the resulting disruption in continuity of care	GP, CP, PHN, PN
		• Enhancing integration, communication, and continuity of care (e.g., interprofessional communication, strong relationship with GPs, and keeping records of consultations)	GP, CP, PHN, PN
Patient help-seeking for signs and symptoms of concern	<i>Perceived healthcare system-related barriers to help-seeking</i>	• High cost of a GP visit	GP, CP, PHN, PN
		• Waiting times to see a GP and time constraint	GP, CP, PHN, PN
		• Misdiagnosis, delayed diagnosis, and chest X-ray failure to detect LC	GP, PHN, PN
	<i>Perceived patient-related barriers to help-seeking</i>	• Embarrassment, guilt, and fear of judgement due to smoking history	GP, CP, PHN, PN
		• Emotional factors: cancer fear, denial, and anger	GP, CP, PHN, PN
		• Sociodemographic and geographic factors (e.g., educational level, drug use, homelessness, and being male and older)	GP, CP, PHN, PN
	<i>Perceived impact of the COVID-19 pandemic on patient help-seeking</i>	• Stigma relating to cough	CP, PN
		• Lack of in-person contact with HCPs	GP, CP, PN
		• COVID-19-related health issues prioritised	CP, PHN, PN
		• Fear of contracting or transmitting COVID-19 in healthcare settings	CP, PHN, PN
<i>Promoting help-seeking for symptoms of concern</i>	• Patient education	GP, PN	
	• Learning from COVID-19, accessibility of additional and free services for LC health checks/health screening and diagnosis	GP, CP, PHN, PN	
	• The positive role of family, GP, and community supports	GP, CP, PHN, PN	
Facilitating early presentation and referral	<i>Primary HCPs</i>	• Providing information on when to refer patients	GP
		• Delivering education by LC Specialists	PHN, PN
		• Delivering education and webinars by professional organisations	GP, CP, PHN
		• Creating a checklist or algorithm for the early detection of LC signs and symptoms	GP, PHN, PN
		• Embedding LC symptoms into pre-existing systems (e.g., Chronic Disease Management Programme)	GP, PHN, PN
		• Using patient stories to educate HCPs	CP, PHN
		• Adopting an interdisciplinary approach to education	CP

	<i>Patients</i>	<ul style="list-style-type: none"> • Focusing on LC prevention and early detection • Focusing on the cough rather than smoking • Using learnings from previous health campaigns (e.g., stroke, cervical, skin, and male cancers) • Offering free and accessible lung health check/ lung screening services 	PHN CP GP, CP, PHN, PN CP, PHN, PN
Perspectives on previous LC awareness campaigns	<i>Perspectives on previous patient-focussed campaigns (Be Clear on Cancer and Detect Cancer Early)</i>	• Risk of information overload in both campaigns	GP, CP, PHN, PN
		• Mixed views on the visuals of both campaigns	GP, CP, PHN, PN
		• The risks and benefits of using patient, doctor, and celebrity profiles in both campaigns	GP, CP, PHN, PN
		• The benefits of the catchy slogan and strapline of the “Detect Cancer Early” campaign	GP, CP, PHN, PN
		• Practicality and usability of leaflets for patients queried	GP, CP, PHN, PN
	<i>Perspectives on a HCP-focused infographic (Think Lung)</i>	• Mixed views on the information provided	GP, CP, PHN, PN
		• Easy to read	GP, CP, PHN, PN
• Information felt engineered to fit the acronyms		GP, CP, PHN, PN	
		• Queries around who was the target audience	GP, CP, PHN, PN

CP=Community Pharmacist; GP=General Practitioner; HCP=Healthcare Professional; LC=Lung Cancer; PHN=Public Health Nurse; PN=Practice Nurse.

The triggers for referral that participants described comprised respiratory symptoms, such as persistent or changing cough, and non-respiratory symptoms, such as back pain or looking pale and unwell. Some participants, particularly GPs and CPs, highlighted repeated prescriptions for antibiotics and steroids, or frequent requests for cough bottles, as red flags warranting consideration of Specialist referral. Haemoptysis was often described as a particular alarm symptom. Smoking was highlighted as a cause for concern, with some participants voicing surprise at the diagnosis of LC in non-smokers, patients with atypical/non-specific signs and symptoms, and individuals who are asymptomatic.

Overall, it was felt that Primary HCPs’ role was to advise, encourage and reassure patients, and assess them appropriately while upholding and respecting patient autonomy. Knowing the patient well and in some cases being able to see them in their own homes aided the referral process in most cases. GPs, who are the primary users of the Rapid Access Lung Clinics’ (RALCs) e-referral system, provided rich insights regarding RALCs. However, they seemed hesitant to refer patients to RALCs unless they were sure that signs and symptoms were consistent with LC. Moreover, it seemed that HCPs were more aware of other rapid access cancer clinics (e.g., prostate, breast, and pigmented lesion) compared to RALCs.

Challenges to referring a patient along the appropriate pathway related to Primary HCPs’ reluctance to mention a possible diagnosis of LC, fear of misdiagnosing (i.e., mentioning a possible LC diagnosis when the cause of the symptoms may be a benign condition), fear of scaring the patient in tandem with the reluctance of some patients to take the advice to seek further help offered on

board. Perceived pressure on the healthcare system by both patients and HCPs added to the complexity of the referral process. The opportunistic nature of some referrals, as opposed to referral through structured referral pathways, particularly for PHNs, was highlighted as challenging, as were the limitations of individual professions' scope of practice. For some, a lack of knowledge of referral systems (i.e., RALCs) proved problematic. Respiratory conditions in general, and LC in particular, were seen to not be prioritised at health system level, and fatigue among HCPs relating to repeat patient presentations was acknowledged as an issue.

Stories of patients who were diagnosed with LC following a referral were fatalistic in nature, with limited examples of positive outcomes. Most participants perceived their role to revolve around post-diagnosis care and support, with the notable exception of GPs who also acknowledged their key role in referral of patients with suspected LC from primary to secondary care. Participants expressed their frustration around siloed provision of care and the lack of integration/communication in the healthcare system, impacting continuity of care for patients with suspected LC. The importance of developing new referral checklists and algorithms and/or embedding these in pre-existing systems (e.g., Ireland's Chronic Disease Management Programme) was highlighted.

In terms of help-seeking, the cost of a GP visit, long waiting times to access primary care, and the potential for misdiagnosis and/or delayed LC diagnosis were perceived to deter patients from seeking medical help for LC signs and symptoms. Moreover, all Primary HCP groups identified patient embarrassment, guilt, and fear of judgement due to smoking history, cancer fear, denial, anger, and geographic and sociodemographic factors (e.g., being male, older, and living in rural areas) as key barriers to patient help-seeking.

The COVID-19 pandemic was discussed at length as it presented unique challenges for the early diagnosis of LC, including stigma relating to cough, lack of in-person contact with HCPs, the pausing and reconfiguration of some services, prioritisation of COVID-19-related care, and fear of contracting or transmitting COVID-19 while accessing healthcare settings.

Participants discussed what they thought would be effective strategies to educate patients about LC. The importance of prevention and early detection was iterated and the importance of focusing on the symptom (e.g., cough) rather than the underlying behaviour (e.g., smoking) was emphasised. It was also felt that patient support networks and relationships (e.g., family, GPs, and community supports) were important in the help-seeking process. HCPs also mentioned that learnings from previous health awareness campaigns (e.g., the "F.A.ST." stroke awareness campaign) can be used to inform future LC awareness campaigns. The need for free and accessible health screening services for people at risk of LC – similar to the pilot "lung health checks" offered to target populations in the United Kingdom (UK) – was discussed. Of note, a roadmap for cancer screening

in Europe has been published by Science Advice for Policy by European Academic (2022). This roadmap is still under discussion with European health authorities as part of the recently released European Beating Cancer Plan (van Meerbeeck & Franck, 2021).

Participants were provided with posters and leaflets from two National Health Service (NHS) patient-focussed LC awareness campaigns in England (<https://www.nhs.uk/be-clear-on-cancer/symptoms/lung-cancer>) and Scotland (<https://getcheckedearly.org/lung-cancer>). They were also shown a two-page HCP-focussed infographic titled “Think Lung” developed by the NCCP (Kennedy et al., 2021; HSE, 2021b). While the English campaign was perceived as informative and factual, the Scottish campaign was favoured by most participants due to the colours used, the use of a celebrity (i.e., Sir Alex Ferguson), and the positive slogan “Don’t Get Scared Get Checked.” As for the “Think Lung” infographic, PHNs and PNs believed that the infographic was helpful and usable, while CPs and GPs were critical of the infographic and discussed how the information felt engineered to fit the acronyms used (i.e., LUNG and CANCER). They recommended several ways to improve this infographic.

In summary, this report provides a description of barriers and facilitators to recognising the population at increased risk of LC and referring individuals with signs and symptoms indicative of LC along the appropriate healthcare pathway. This report also explores strategies to engage Primary HCPs in initiatives on early detection of LC. Greater awareness of RALCs and a system that ensures integration and continuity of care between the various health disciplines are needed. Using new referral checklists and algorithms and/or embedding these in pre-existing systems such as Ireland’s GP Chronic Disease Management Programme can help ensure standardised and timely referral. Learnings from previous public health awareness campaigns (e.g., the “F.A.ST.” stroke awareness campaign) can be used to raise the public profile of LC. Free and accessible targeted health screening services can help detect LC early among asymptomatic individuals. The use of family, GP, and community supports and relationships can help engage hard-to-reach at-risk populations. Adopting a non-judgemental approach towards smokers and focusing on the symptom (e.g., cough) rather than the behaviour (i.e., smoking) would enable patients to better engage with Primary HCPs. Finally, findings from this report indicate that “one size does not fit all” when it comes to supporting HCPs in detecting LC early. Therefore, interventions targeting Primary HCPs should be tailored to meet the needs and scope of practice of each Primary HCP group.

1. Introduction

1.1 Background

Lung cancer (LC) is the leading cause of cancer incidence and mortality in men and women globally, with 2.1 million new cases (11.6% of total cancer cases) and 1.8 million deaths (18.4% of total cancer deaths) in the year 2018 alone (Bray et al., 2018). It is estimated that, by the year 2040, the number of people diagnosed with LC and who die from LC annually will increase to 3.63 and 3.01 million respectively (World Health Organization International Agency for Research on Cancer, 2020). More than half of LC cases (53%) are diagnosed among men and women aged 55 to 74 years (median age=70 years) (Torre et al., 2016). LC is typically diagnosed at advanced stages, with a five-year survival rate of 10% to 20% in most countries (Sung et al., 2021). The five-year relative survival rate for LC differs significantly by stage at diagnosis and histological subtype. For instance, in the United States of America (USA), data from the Surveillance, Epidemiology, and End Results Program indicate that the five-year relative survival rate for localised non-small cell LC between 2010 and 2016 was 63%. This decreased to 35% where there was regional spread and 7% for distant metastasis. As for small cell LC, the five-year relative survival rate was 27% for localised LC. This decreased to 16% where there was regional spread and 3% for distant metastasis (National Cancer Institute, 2020).

A persistent cough, a change in a pre-existing cough, and shortness of breath are well-recognised symptoms of early-stage LC (Chowienczyk et al., 2020). Haemoptysis remains the strongest symptom predictor of late-stage LC, yet it occurs in only a fifth of patients (Walter et al., 2015). Patients with LC can also be asymptomatic until systemic symptoms such as unexplained weight loss and fatigue occur, signalling advanced disease (American Cancer Society, 2019). Therefore, the symptom signature of LC is broad (Koo et al., 2018) in comparison to cancers that have a narrow symptom signature, such as breast (O'Mahony et al., 2013) and testicular (Saab et al., 2017) cancers which typically present with a painless lump (Koo et al., 2018). This may contribute to delays in presentation and diagnosis of LC (Holmberg et al., 2010).

Early patient help-seeking for signs and symptoms indicative of LC is crucial for early referral and diagnosis and improved survivorship. However, a Swedish study found that patients diagnosed with LC experience, on average, a six-month delay between symptom onset and initiation of treatment (Ellis & Vandermeer, 2011). This has detrimental effects on early diagnosis, quality of life, cost of healthcare, and patients' eligibility for curative treatment (Walter et al., 2015; World Health Organization, 2020b). In addition to lack of symptom awareness and symptom misappraisal, several healthcare-related barriers to help-seeking and early detection of LC exist, such as poor relationship

with Healthcare Professionals (HCPs) and lack of healthcare access (Cassim et al., 2019; Carter-Harris, 2015; Cunningham et al., 2019; Saab et al., 2020b). LC stigma also impacts negatively on patient help-seeking for LC alarm symptoms. Indeed, a survey of 93 symptomatic individuals in the USA found that higher levels of perceived LC stigma, blame, social isolation, and smoking were associated with a median waiting time of 41 days (range 0-366 days) prior to seeking medical help for symptoms of concern (Carter-Harris, 2015). Moreover, the impact of the COVID-19 pandemic on cancer help-seeking and timely diagnosis is considerable. Quinn-Scoggins and Cannings-John (2021) examined help-seeking behaviours for cancer symptoms during the COVID-19 pandemic among 7,543 adults in the UK and found that patients were afraid to waste the GP's time and to put strain on healthcare services. Almost half of participants who reported experiencing cancer symptoms did not contact their GP and had concerns about catching or transmitting COVID-19.

1.2 Lung cancer in Ireland

In Ireland, LC is the fourth most commonly diagnosed invasive cancer (excluding non-melanoma skin cancer) with around 1,500 men and 1,200 women diagnosed each year (2017-2019) (National Cancer Registry Ireland, 2021). Alarming, annual numbers of LC cases are projected to increase by 131% for males and 105% for females between 2015- 2045 in Ireland (increase by 119% for males and females combined) (National Cancer Registry Ireland, 2019). LC is the leading cause of cancer death in Ireland, with 1,030 men and 850 women dying from it annually (2016-2018) (National Cancer Registry Ireland, 2021). The median age group at diagnosis and death is 70-74 years. Five-year relative survival for LC in Ireland is 24% (National Cancer Registry Ireland, 2021). Three quarters of LC cases in Ireland are diagnosed at stage III or IV (National Cancer Registry Ireland, 2018). Receiving a later stage LC diagnosis is associated with poorer prognosis and survival. A late diagnosis of LC can result from numerous factors including lack of knowledge of LC signs and symptoms among patients and HCPs, limited access to HCPs, and delays in referral and diagnosis (National Institute for Health and Care Excellence, 2021a).

Patients interact with many primary HCPs, including GPs, CPs, PHNs, and PNs. HCPs in the primary care setting can refer or advise patients with LC signs and symptoms. There are approximately 30 million patient interactions with the Irish health service every year. Of those, 14 million are with GP services (HSE, 2021c). CPs are among the most accessible HCPs, with over 1.6 million contacts between patients and community pharmacies per week (Irish Pharmacy Union, 2018). PHNs provide general nursing services at home to patients with a wide range of medical needs. PHNs have an important role in caring for patients undergoing cancer therapy at home (HSE, 2021b). While this represents an opportunity for a patient to consult with a trained HCP in a

relatively informal environment, the barriers to identifying and referring patients with LC alarm signs and symptoms that may exist for HCPs have not been assessed.

In a recent study commissioned and funded by the NCCP, Saab et al. (2020a; 2020b; 2021b) interviewed 46 at-risk individuals from two areas in Ireland with high LC incidence rates about their help-seeking intentions for symptoms indicative of LC. Despite identifying the GP as the first point of contact for symptoms of concern, some participants reported no intention of visiting their GP in the event that they developed LC signs and symptoms. These participants listed GPs' perceived negative attitudes towards smokers, cost of healthcare, waiting time for GP appointment, and previous bad experiences with the healthcare system as key barriers to help-seeking. This highlights the need to explore, in greater depth, barriers to the recognition and referral of high-risk individuals with symptoms indicative of LC from the perspective of HCPs, with the aim of developing strategies to engage them in initiatives specifically focused on early detection of LC and the care pathways that are most appropriate for the patient.

There is also a need to explore Primary HCPs' awareness and use of Rapid Access Lung Clinics (RALCs). These clinics, located at the eight Designated Cancer Centres (situated in Dublin, Cork, Galway, Limerick, and Waterford), provide prompt diagnostic evaluation of patients with suspected LC (NCCP, 2012). The RALC referral process is primarily electronic via the Healthlink system. The majority of RALC referrals originate from GPs, but patients can also be referred from radiologists or other hospital-based physicians. RALCs provide access to a specialist team including a Lung Nurse to support navigation and understanding of the assessment and diagnosis process. RALCs aim to meet with patients within two weeks of receipt of referral (NCCP, 2017; 2020).

1.3 Aims

Recommendation 7 of Ireland's National Cancer Strategy 2017-2026 states that *"the NCCP and the HSE Health & Wellbeing Directorate, in partnership with the voluntary sector, will develop a rolling programme of targeted multi-media based public awareness and education campaigns, aimed at the early detection of specific cancers and with particular focus on at-risk populations"* (Department of Health, 2017; p.134). In line with this recommendation, the aim of this project was to:

1. Systematically review evidence from recent studies aimed at helping Primary HCPs recognise and refer high-risk individuals with signs and symptoms indicative of LC along the appropriate healthcare pathway
2. Explore barriers and facilitators to recognising the population at high risk of LC and referring individuals with signs and symptoms indicative of LC along the appropriate healthcare pathway
3. Explore strategies to engage Primary HCPs in education on early detection of LC

2. Recognising and Referring Patients with Symptoms Indicative of Lung Cancer: A Systematic Review of Interventions with Primary Healthcare Professionals

2.1 Introduction

Early medical help-seeking for symptoms indicative of LC is a key enabler of early diagnosis and improved survivorship. However, a Swedish study found that patients diagnosed with LC experience, on average, a six-month delay between symptom onset and initiation of treatment (Ellis & Vandermeer, 2011). This has detrimental effects on early diagnosis, quality of life, cost of healthcare, and patients' eligibility for curative treatment (Walter et al., 2015; World Health Organization, 2020b). Several healthcare-related barriers to help-seeking and early detection of LC exist, such as poor relationships with Primary HCPs and lack of healthcare access (Carter-Harris, 2015; Cassim et al., 2019; Cunningham et al., 2019; Koo et al., 2018; Saab et al., 2020b; 2021b).

Addressing these barriers can facilitate early detection of LC. This includes designing and testing targeted interventions to equip Primary HCPs with the tools to recognise and refer high-risk individuals who present with signs and symptoms suggestive of LC. This can potentially help detect LC early, with an associated reduction in treatment burden, and improved LC survivorship. The purpose of this systematic review was to identify and describe the effect of interventions aimed at helping Primary HCPs recognise and refer high-risk individuals with symptoms indicative of LC to the appropriate healthcare pathway. Specifically, this systematic review focused on the effect of interventions on:

1. Patient outcomes (e.g., LC detection, stage at diagnosis, LC treatments received, and LC mortality)
2. Primary HCP outcomes (e.g., knowledge and awareness of any aspect of LC)

2.2 Methods

This systematic review was guided by the Cochrane Handbook for Systematic Reviews of Interventions (Higgins et al., 2020) and reported using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) checklist (Page et al., 2021).

2.2.1 Eligibility criteria

The review eligibility criteria were predetermined according to the review aims using a modified version of the population, intervention, comparison, and outcomes (PICO) framework (Schardt et al.,

2007), to include “S” for Study design and “T” for Timeframe (PICOST). Studies considered for inclusion met the following criteria: **Population:** Any Primary HCPs. Studies were included only when patient outcomes were reported as a result of an intervention targeted towards Primary HCPs; **Intervention:** Any intervention, campaign, programme, trial, education, algorithm, decision tree/support, or guide targeted at helping Primary HCPs detect LC early among symptomatic patients and/or increase their awareness and/or knowledge of any aspect of LC; **Comparison:** Any comparison(s) (within or between group[s]) pre- and post-intervention; **Outcomes:** Reported on at least one of the review outcomes namely patient outcomes (e.g., LC detection among symptomatic patients, stage of LC at diagnosis, LC treatments received, and LC mortality) and/or Primary HCP outcomes (e.g., knowledge/awareness regarding any aspect of LC); **Study design:** Used any experimental study design; and **Timeframe:** Published between January 2011 and September 2021 in order to identify the most up-to-date evidence.

Studies were excluded if interventions were exclusively targeted at patients or HCPs in secondary care, did not incorporate a comparator, and/or used non-experimental designs. Studies focusing on LC screening among asymptomatic patients were also excluded. Moreover, we excluded qualitative studies, literature reviews, conference proceedings, dissertations, and theses. The full review eligibility criteria and search terms are presented in **Table 2**.

Table 2. Review eligibility criteria and search terms

PICOST framework	Inclusion criteria	Exclusion criteria	Search terms
Population	Primary Healthcare Professionals (HCPs) (or patients, only when patient outcomes were reported as a result of an intervention targeted towards Primary HCPs)	Patients (when patient outcomes were not reported as a result of an intervention targeted exclusively towards patients) Secondary care HCPs	(Lung* OR pulmo*) N3 (cancer* OR neoplas* OR malignan* OR tumo* OR symptom* OR sign*) “Health* profession*” OR “health care profession*” OR HCP* OR “health* work*” OR “health care work*” OR HCW* OR clinician* OR nurs* OR “public health nurs*” OR PHN* OR “community nurs*” OR “clinic nurs*” OR “practice nurs*” OR pharmac* OR chemist* OR doctor* OR physician* OR “general practitioner*” OR GP* OR consultant*

Intervention	Any intervention, campaign, programme, trial, education, algorithm, decision tree/support, or guide targeted at helping Primary HCPs detect lung cancer (LC) early among symptomatic patients and/or increase their awareness and/or knowledge of any aspect of LC	Studies without an intervention or where interventions were not pertinent to LC	Interven* OR program* OR campaign* OR trial* OR experiment* OR educat* OR algorithm* OR “decision* tree*” OR “decision* support*” OR guid*
Comparison	Any comparison(s) (within or between group[s]) pre-post the intervention	Studies without a comparator	Not specified
Outcomes	<i>Primary outcomes:</i> For symptomatic patients: Number of referrals for LC, number of consultations for LC, number of patients diagnosed with LC, and so on <i>Secondary outcomes:</i> Primary HCP outcomes such as awareness and/or knowledge of any aspect relating to LC	Outcomes relating to LC screening in asymptomatic patients, diseases other than LC, or where data relating to LC cannot be distinguished from other diseases/cancers	Refer* OR consult* OR recogni* OR counsel* OR advice OR advis* OR detect* OR find* OR triag* OR direct* OR manag* OR signpost* OR know* OR aware* OR understand*
Study design	Any experimental design (i.e., randomised controlled trials and non-randomised controlled trials)	Qualitative studies, cross-sectional surveys, editorials, opinion pieces, theses, dissertations, literature reviews, and conference abstracts	Not specified
Timeframe	Records published between January 2011 and September 2021	Records published before January 2011	Not applicable

HCP=HCP; LC=Lung Cancer.

2.2.2 Search strategy

Electronic databases MEDLINE, CINAHL, ERIC, and Academic Search Complete were searched on September 13, 2021. Truncation “*” was used to enable different forms of a keyword. Keywords were combined using Boolean operators “OR” and “AND” and the proximity indicator for EBSCO “N.”

The following keywords were searched based on title or abstract: (Interven* OR program* OR campaign* OR trial* OR experiment* OR educat* OR algorithm* OR “decision* tree*” OR “decision* support*” OR guid*) AND (Refer* OR consult* OR recogni* OR counsel* OR advice OR advis* OR detect* OR find* OR triag* OR direct* OR manag* OR signpost* OR know* OR aware* OR understand*) AND ((Lung* OR pulmo*) N3 (cancer* OR neoplas* OR malignan* OR tumo* OR symptom* OR sign*)) AND (“Health* profession*” OR “health care profession*” OR HCP* OR “health* work*” OR “health care work*” OR HCW* OR clinician* OR nurs* OR “public health nurs*” OR PHN* OR “community nurs*” OR “clinic nurs*” OR “practice nurs*” OR pharmac* OR chemist* OR doctor* OR physician* OR “general practitioner*” OR GP* OR consultant*). The search was limited to records published in English between January 2011 and September 2021.

2.2.3 Study selection

Records identified from the database search were transferred to Covidence, an online software used to produce systematic reviews, including Cochrane reviews (The Cochrane Collaboration, 2020). Titles and abstracts of records were first screened, and irrelevant records were excluded. The full text of potentially eligible records was then screened and reasons for excluding full-text records were logged. Title, abstract, and full-text screenings were conducted in pairs. For a screening decision to be made, each record had to be screened twice by two independent reviewers. Screening conflicts were resolved by a third independent reviewer.

2.2.4 Data extraction and synthesis

Data from the included studies were extracted using a standardised data extraction table (Saab et al., 2020a; 2021a) (**Appendix 1**). The following were extracted for each study: author(s); year; country; aim; design; theoretical underpinning; sample; setting; relevant outcomes; intervention; procedures; instruments; follow-up time(s); and relevant findings.

Data extraction was conducted by one reviewer. Each extracted study was cross-checked by the rest of the review team for accuracy. Inaccuracies were resolved by a third independent reviewer. A meta-analysis was not plausible due to heterogeneity in study design, interventions, outcomes, and outcome measures; instead, a narrative synthesis of study findings was conducted.

2.2.5 Quality appraisal and level of evidence assessment

The Mixed Methods Appraisal Tool was used to appraise the methodological quality of the included randomised controlled trials (RCTs) and non-randomised studies (Hong et al., 2018). Quality appraisal was conducted in terms of the appropriateness of recruitment, data collection, and data analysis to the research question. Each item was voted on a “yes,” “no,” and “cannot tell” basis. The

Scottish Intercollegiate Guidelines Network (2011) grading system was used to assess the level of evidence for each of the included studies. The eight levels of evidence range between 1++, 1+, 1-, 2++, 2+, 2-, 3, and 4. For instance, a score of 1++ corresponds to high quality meta-analyses, systematic reviews of RCTs, or RCTs with a very low risk of bias, whereas a score of 4 is assigned to expert opinions. Level of evidence assessment and quality appraisal were conducted by one reviewer and cross-checked for correctness by all review team members. Inaccuracies were resolved by a third independent reviewer.

2.3 Results

2.3.1 Study selection

Electronic database searching resulted in 5,829 records. Following deletion of duplicates, 3,556 records were screened based on title and abstract and 3,458 irrelevant records were excluded. The full texts of the remaining 98 records were obtained and screened, and 93 records were excluded mainly due to ineligible study design (n=54). Therefore, five studies were included in this systematic review. The full study identification, screening, and selection process is presented in **Figure 1**.

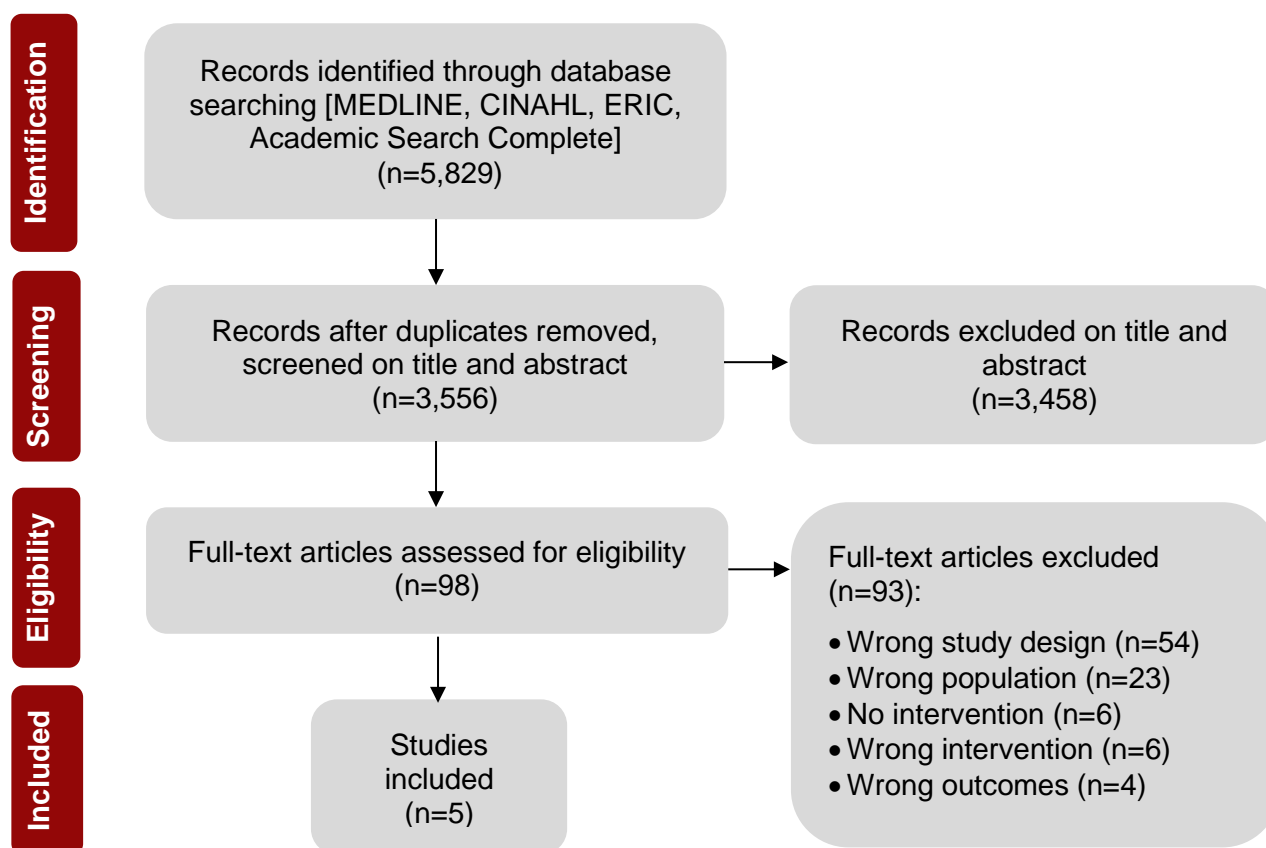


Figure 1. Study identification, screening, and selection process.

2.3.2 Study characteristics

The included studies were conducted in Denmark (n=2), England (n=1), Australia (n=1), and Spain (n=1). Two studies were RCTs and three were non-RCTs (see Table 3 below and Appendix 1). One of the included studies reported having a theoretical underpinning, namely the Model of Pathways to Treatment (Emery et al., 2017). Sample size ranged widely between 117 (Emery et al., 2017) and 56,020 (Prades et al., 2011) participants.

Three different interventions were used across the five studies, including: Combined public and GP LC awareness campaigns (Athey et al., 2012; Emery et al., 2017); letters on referral procedures and indications for CT and 1-hour small-group-based CME meetings on the state-of-the-art knowledge on LC early detection (Guldbrandt et al., 2014; 2015); and a cancer fast-track programme aimed to reduce the lag (time elapsed) between suspicion (in primary care), diagnosis, and treatment of cancer, by designing circuits that would foster the rapid coordination of the process circuit (Prades et al., 2011). Follow-up times varied widely from 3 months (Emery et al., 2017) to 19 months (Guldbrandt et al., 2014).

Table 3. Study characteristics (n=5)

Country	Denmark (n=2) England (n=1) Australia (n=1) Spain (n=1)
Research design	Randomised controlled trial (n=2) Pre-post (n=1) Cohort (n=1) Mixed method (n=1)
Theoretical underpinning	Model of Pathways to Treatment (n=1) None/not reported (n=4)
Sample size (min-max)	117-56,020
Settings	Sixty general practices and department of radiology in Denmark (n=2) Six communities with high LC risk (smoking and social deprivation) served by 11 GP surgeries in England (n=1) Small and medium sized towns in three regions and the GP surgeries that serve them in Australia (n=1) Catalonian Health Service (private and publicly owned health facilities) in Spain (n=1)
Intervention	Combined public and HCP awareness campaigns (n=2) Letters and continuing medical education meetings (n=2) Cancer Fast-Track programme (n=1)
Relevant outcomes*	LC diagnosis (n=3) Stage at diagnosis (n=3) Diagnostic interval (n=2) Diagnostic workup (n=2)

	Compliance with referral guidelines (n=1) LC detection rate (n=1) Patient referral from GPs (n=1)
Follow-up time (min-max)**	3-19 months

*Studies often reported on more than one outcome. n corresponds to the number of times an outcome was measured.

**n=1 study did not report on length of follow-up.

HCP=Healthcare Professional; LC=Lung Cancer.

2.3.3 Quality appraisal and level of evidence assessment

All the included non-RCTs (n=3) used appropriate data collection methods, outcome measures, intervention administration, and had clear research questions. Moreover, all non-RCTs had complete outcome data. Only one non-RCT reported that participants were representative of the target population (Guldbrant et al., 2014), and none reported whether confounders were accounted for in the study design. As for RCTs (n=2), both had clear research aims, performed randomisation appropriately, collected data in line with the research aims, had groups that are comparable at baseline, and reported on participant adherence to the assigned intervention. However, the outcome assessor was not blinded in the study by Guldbrant et al. (2015) (**Appendix 2**).

As for level of evidence assessment, three studies scored 2+ on the Scottish Intercollegiate Guidelines Network (2011) level of evidence criteria, indicating well-conducted non-RCTs with a low risk of confounding or bias and a moderate probability that the relationship is causal (Prades et al., 2011; Athey et al., 2012; Guldbrandt et al., 2014). Both RCTs scored 1+ indicating well-conducted RCTs with a low risk of bias (Guldbrandt et al., 2015; Emery et al., 2017).

2.3.4 Study 1: Mixed method community based social marketing intervention

A mixed method community based social marketing intervention using a “push-pull” approach led to non-statistically significant increase in the number of chest X-rays and LC diagnoses.

Athey et al. (2012) conducted a pre-post telephone survey to evaluate the effectiveness of a mixed method community based social marketing

intervention on chest x-ray rates, LC diagnosis, and stage at diagnosis in England. A total of 1,601 members of the public were recruited from six priority communities (i.e., communities with high LC risk, high rates of smoking, and high levels of social deprivation) served by 11 GP surgeries (intervention group) and five communities served by nine GP surgeries (control group).

The social marketing intervention used a push-pull approach. The “push” element was in the form of a public awareness campaign designed by creative, media, and public relations agencies; face-to-face events; and conversations that focused on raising awareness of the importance of seeking medical advice and requesting a chest X-ray for a cough lasting more than three weeks. The “pull”

element involved training Primary HCPs for the initiative by sharing insights, training, and capacity management in GP surgeries. Primary HCPs were reminded of National Institute for Health and Care Excellence chest X-ray referral criteria. Community pharmacists were encouraged to promote campaign materials to patients buying over-the counter cough medications. GP practices were visited by the researchers and training was delivered prior to the public campaign.

Retrospective chest-X-ray data from the Radiology Information System were obtained. The numbers of X-rays requested by GP practices over the six weeks before and after the intervention were recorded. These were compared with the GP X-ray request rates. Data were compared between 12 months before the campaign and 12 months after the campaign. It was found that, compared to six weeks before the campaign and during the campaign, chest X-ray referrals increased by 289 (22%). A total of 169 more X-rays were obtained (19% increase) in the control group and 120 more X-rays were obtained (27% increase) in the intervention group. Twelve months after the campaign, there was a continued increase in chest X-rays requested in the intervention group (extra 567 chest X-rays [20% increase]) as compared to 32 fewer X-rays (2% fall) in the control group.

The community based social marketing intervention **did not significantly impact on the stage of LC at diagnosis.**

Overall, there was a statistically significant increase in the number of chest X-rays over time between the intervention group and the control group (Incidence Rate Ratio [IRR]=1.22, 95%Confidence Interval [CI] 1.12-1.33, p=0.001). In addition, compared with 12 months before the campaign, LC diagnoses increased by 27% in the intervention group and fell by 10% in the control group after the campaign. However, this was not statistically significant (IRR=1.42; 95%CI 0.83-2.44; p=0.199). Moreover, there was no statistically significant stage shift at three months, six months, or one year following the campaign.

2.3.5 Study 2: Community-based symptom awareness and general practice-based educational intervention

Emery et al. (2017) conducted a 2x2 factorial cluster randomised controlled trial (RCT) to measure the effect of community-based symptom awareness and general practice-based educational interventions on the time to diagnosis (i.e., total diagnostic interval) in 1,358 rural patients presenting with breast, prostate, colorectal or LC in Australia. Trial Area A (i.e., small and medium sized towns in three Australian regions and the GP surgeries that serve them) served as the intervention group and Area B (i.e., two regions in Australia) served as the control group.

The intervention had two elements. A community intervention which used the modified “Find Cancer Early” UK-based campaign tailored for rural Australians. As for the GP intervention, it involved the use of a GP education resource card with symptom risk assessment charts and local cancer referral

pathways created and implemented through multiple academic visits, to promote earlier recognition and investigation of suspicious symptoms by GPs and clarifying cancer diagnostic pathways.

Within both trial areas, General Practices were randomised to the GP intervention or control. The SYMPTOM questionnaire and a GP record audit tool were used to calculate the total diagnostic interval. In the SYMPTOM questionnaire, participants answered items specific to LC to capture details of symptoms, their date of onset, and time taken to seek help. The GP record audit tool captured information on the date, type, and duration of symptoms within the last 12 months and referral information.

A study using a community-based symptom awareness and general practice-based educational interventions found no statistically significant differences in the total diagnostic interval for LC (i.e., the time between symptomatic presentation and diagnosis).

Emery et al. (2017) found no statistically significant differences in the total diagnostic interval at the community or GP levels, or by factorial design for any tumour groups (i.e., breast, prostate, colorectal, and LC). In terms of LC, for members of the public, the median

total diagnostic interval was 114.5 days for the intervention group and 114 days for the control group (Mean Difference=0.06, 95%CI 0.39-0.5, p=0.79). In terms of GP participants, the median total diagnostic interval was 115 days for the intervention group and 125 days for the control group (Mean Difference=0.02, 95%CI 0.56-0.60, p=0.45).

2.3.6 Study 3: Direct access to chest low dose computed tomography in general practice

Guldbrandt et al. (2015) conducted a cluster RCT to measure the effect of direct access to LDCT from general practice in early LC detection on time to diagnosis (i.e., diagnostic interval) and stage at diagnosis in Denmark. A total of 266 GPs (n=133 in the intervention group and 133 in the control group) were recruited from General Practices and Department of Radiology in a University Hospital.

Six times within a three-month period, GPs in the intervention group were informed by letter about the intervention. Letters included information concerning the referral procedures and indications for CT. GPs were also invited to sit in one-hour small-group-based Continuing Medical Education (CME) meetings to increase their awareness of LC. GPs received information about CTs, how to use them, and how to interpret the reports. If nodules (4-10 mm) could not be categorised as benign, GPs referred patients to a follow-up programme (3, 6, or 12 months after the first scan) as decided by the chest physicians. If the CT revealed suspicion of LC, GPs referred patients (fast-track) to standard diagnostics.

The Danish Lung Cancer Registry and the Danish National Patient Registry were used to identify LC cases. The Danish Deprivation Index was used to gather information about deprivation level in

the different GP clinics' population. Data on patient comorbidity were obtained from a GP Questionnaire and data on identified LC patients' socio-economic position were collected from Statistics Denmark 3, 6, or 12 months after the first scan (according to the size and the characteristics of the nodules).

A study testing the effect of direct access to chest LDCT in general practice found no statistically significant difference in primary care and diagnostic intervals for GPs who had direct access to LDCT in comparison to GPs who had no access.

Guldbrandt et al. (2015) found no statistically significant difference in primary care interval between patients in the intervention group (Median=14 days, inter quartile intervals [IQI]=4-53) and patients in the control group (Median=18 days, IQI=5-69, prevalence ratio [PR]=0.99, 95%CI 0.65-1.54, p=0.455). Moreover, there was no statistically significant difference in diagnostic interval between patients in the intervention group (Median=44 days, IQI=17-83) and patients in the control group (Median=36 days, IQI=17-112, PR=0.8, 95%CI 0.5-1.27, p=0.299).

The primary care interval and the diagnostic interval in the intervention group were statistically significantly shorter if the GP participated in CME

Primary care interval and the diagnostic interval were statistically significantly shorter if the GP participated in CME.

(primary care interval Median=9 days [with CME] versus 37 days [without CME], p=0.048; diagnostic interval Median=23 days [with CME] versus 66 days [without CME], p=0.008). Guldbrandt et al. (2015) also found non-statistically significant higher risk of having a long diagnostic interval for patients in the control group (Risk Difference=13.5%, 95%CI -11-37.9%, p=0.280) as well as a non-statistically significant difference in risk for having a long primary care interval (Risk Difference=1.1%, 95%CI 23.9 to 26.1%, p=0.929).

There was no statistically significant difference in stage of LC at diagnosis.

In terms of stage at diagnosis, there was no statistically significant difference in stage of LC at diagnosis between the control group and the intervention group for all patients (p=0.586 for advanced [stage IV] LC and p=0.595 for localised [stage IA-IIIa] LC). In addition, there was no statistically significant difference in stage of LC at diagnosis between the control group and intervention group for patients whose GP was involved in the diagnosis (p=0.47 for advanced [stage IV] LC and p=0.658 for localised [stage IA-IIIa] LC).

2.3.7 Study 4: Technological upgrade in GP referral and direct access to chest low dose computed tomography

Guldbrandt et al. (2014) described the usage and outcome of a technological upgrade in a GP update format and implementing direct access to chest LDCT from general practice for patients with respiratory symptom in Denmark. Using a cohort study nested in an RCT (**the RCT is Study 3**

above), Guldbrandt et al. (2014) recruited 133 GPs from General Practices and Department of Radiology in a University Hospital. Of those, 64 participated in CME and 69 did not participate in CME.

Outcomes measured included: the amount of diagnostic workup needed, cancer incidence, use of fast-track referral option for suspected LC, and stage of LC at diagnosis. Of note, in this fast-track programme, GPs can refer patients with “reasonable suspicion” of LC to a fast-track evaluation, a maximum of 72 hours waiting time. This programme offers direct access to chest CT from general practice for patients with respiratory symptoms in Denmark since 2008 (Guldbrandt et al., 2014).

Six times within a three-month period, GPs were informed by letter about this intervention. Letters to GPs included information concerning the referral procedures and indications for the CT to let GPs substitute the radiograph with chest LDCT when

A study comparing participation in CME to non-participation found that **referral rate to direct CTs was significantly higher among GPs working in a clinic with one or more CME-participating GPs.**

ruling out LC. GPs were invited to sit in one of eight one-hour small-group-based CME meetings on the state-of-the-art knowledge on LC early detection. Algorithms for positive predictive values (PPV) (i.e., proportion of LC) in primary care were used. GPs received information about CT, how to use them, and how to interpret the reports. GPs in the control group did not participate in CME.

Referral rate to the LC fast-track programme was not significantly higher for CME-participating GPs.

Data were obtained from GP referral notes on symptoms, known diseases, and smoking history. The Danish Lung Cancer Registry was used for information

on subsequent LC diagnosis and the Danish Deprivation Index was used for information on deprivation rates in different GP clinics. The Health Service Registry was used to gather information about GP list size and age/gender distribution of patients listed with the GP. Indirect sex-age standardisation was used to compare referral rates between CME-attending GPs and non-attending GPs.

It was found that 91 (68.4%) GPs used direct CTs. The referral rate to direct CTs was significantly higher (61%, 95%CI 54-66%) among GPs working in

The ratio of patients truly diagnosed as positive to all those who had positive test results as a result of referral to a fast-track (2 weeks) LC pathway was significantly higher for CME-participating GPs.

a clinic with one or more CME-participating GPs. A total of 335 patients were referred to LC fast-track. Of those, 33 (10%) had confirmed LC diagnosis. Of those, 8 (23.5%) had early-stage LC and 26 (76.5%) had advanced LC. The referral rate to the LC fast-track programme was 0.13 (95%CI 0.09 to 0.19) for CME-participating GPs in comparison to 0.14 (95%CI 0.09-0.20) for non-participating GPs, which was not statistically significant ($p=0.503$). The PPV for LC diagnosis (i.e.,

the ratio of patients truly diagnosed as positive to all those who had positive test results) as a result of referral to a fast-track LC pathway was 13.3% (95%CI 8.7 to 19.1%) for CME-participating GPs and 6.1% (95%CI 3-11%) for non-participating GPs (2.2 higher PPV). This was found to be statistically significant ($p=0.027$).

2.3.8 Study 5: Cancer Fast-track Programme

Prades et al. (2011) conducted a mixed-methods study of a Cancer Fast-track Programme (CFP) aimed to reduce the time between well-founded suspicion of breast, colorectal and LC in primary care, and the start of treatment in secondary care in Spain. A total of 56,020 member of the public recruited from the Catalonian Health Service (private and publicly owned health facilities) were included in the CFP programme which was launched in 2005 for cancers registering the highest incidence and mortality rates. Its aim is to reduce the lag (time elapsed) between suspicion (primary care), diagnosis, and treatment of cancer, by designing circuits that would foster the rapid coordination of the process circuit (30 days between well-founded suspicion of cancer in primary care and the start of initial treatment). Healthcare authorities issued organisational recommendations for effective implementation of these circuits such as clinician responsible for disease, definition of maximum waiting times for diagnosis, study without hospitalisation where possible or coordination mechanisms in the event of referral to another hospital.

A study of Cancer Fast-track programme found that, between 2006 and 2009, there was a **decrease in: (i) the proportion of overall LCs diagnosed via the programme, (ii) the proportion of LC patients referred by a GP, and (iii) LC detection.**

Quantitative analysis of the CFP was performed using data generated by the hospitals based on seven FastTrack monitoring indicators for the period 2006-2009, namely: the “number of patients included in the CFP; cancer patients

diagnosed through the CFP route; patients referred from GPs; compliance with referral guidelines; cancer detection rate; mean time between detection of suspected cancer and start of treatment; and distribution of the wait among different categories (‘over 30 days’, ‘30 to 45 days’ and ‘over 45 days’)” (Prades et al., 2011, p. 754).

Data from this study were reported using proportions rather than absolute numbers. Prades et al. (2011) reported an increase in

Time to treatment increased over time (from 2006 to 2009) following the implementation of the Cancer Fast-Track programme.

compliance with referral guidelines from 70.8% in 2006 (95%CI 69.1-72.1) to 82.3% in 2009 (95%CI 81.1-83.5) yet a decrease in: (i) the proportion of overall LCs diagnosed via the CFP (cancer detection rate) from 2006 (60.2 [95%CI 59.8-63.4]) to 2009 (53.2 [95%CI 51.5-54.9]); (ii) the proportion of LC patients referred by a GP from 2006 (60.6 [95%CI 59-62.3]) to 2009 (41.4 [95%CI

39.7-42.9]); and (iii) LC detection from 49.9 (95%CI 48.2 to 51.6) in 2006 to 39.7 (95%CI 38.1-41.2) in 2009. It was found that the mean time from detection of suspected LC in symptomatic patients in primary care to start of initial treatment increased from 30.8 days (2006) to 36.7 days (2009). In addition, there was an increase in the proportion of LC patients waiting over 45 days from the time of detection of suspected cancer to start of initial treatment (13.6% in 2006 vs 22.6% in 2009) and an increase in the proportion of LC cases waiting between 30-45 days (23.7% in 2006 to 26.1% in 2009). In their interpretation of this variable trend, Prades et al. (2011) acknowledged that this trend was “somewhat distant from the 30-day target, something that is, in part, attributable to the

Compliance with the programme’s referral guidelines increased significantly between 2006 and 2009.

complexity of the treatment process, in as much as this includes thoracic surgery concentrated at tertiary hospitals.” (p. 756).

2.4 Discussion

This systematic review identified and described the effect of interventions aimed at helping Primary HCPs recognise and refer high-risk individuals with symptoms indicative of LC to the appropriate healthcare pathway. Findings indicate that time is of the essence when it comes to early detection and management of LC (Prades et al., 2011; Guldbrandt et al., 2015; Emery et al., 2017). In a scoping review of 33 studies, Malalasekera et al. (2018) compared time intervals in LC care against

Primary HCP- and system-related barriers to early diagnosis include: low index of suspicion; delays in obtaining access to diagnostic tests; multiple specialist consultations; lack of rapid assessment; and delay to surgical resection and radiotherapy.

timeframe benchmarks and explored barriers to timely care. It was found that, although most patients with LC see a specialist within an acceptable timeframe following initial referral. (e.g., two weeks), treatment commencement is

often delayed by 56 days from first clinical presentation in primary care. This was attributed to disease and patient-related factors such as lack of clinical symptoms (i.e., asymptomatic disease or failure to recognise signs/symptoms) and low educational level or socioeconomic status. These factors are well documented in the wider

Lack of clinical symptoms and low educational level or socioeconomic status are common patient-related barriers to early LC diagnosis.

A scoping review found that time from LC symptom onset to treatment remains relatively long.

literature (Willén et al., 2019; Saab et al., 2021b). Malalasekera et al.’s (2018) scoping review also identified several Primary HCP- and system-related barriers to

early referral, diagnosis, and commencement of treatment including low index of suspicion, delays in obtaining access to diagnostic tests, multiple specialist consultations, lack of rapid assessment, and delay to surgical resection and radiotherapy. Two of the studies included in our review attempted to address these barriers (Guldbrandt et al., 2015; Emery et al., 2017).

Interventions that were not successful in reducing the time from symptom onset to workup and LC diagnosis include a community and GP targeted breast, prostate, colorectal, and LC awareness campaign (Emery et al., 2017) as well as information for GPs on LDCT for symptomatic patients (Guldbrandt et al., 2015). Participation in CME, however, was associated with shorter primary care and diagnostic intervals (Guldbrandt et al., 2015), higher referral rates to LC fast-track, and higher PPV (i.e., proportion of LCs diagnosed) (Guldbrandt et al., 2014).

Over 85% of patients subsequently diagnosed with cancer initiated their diagnostic pathway in primary care (Hansen et al., 2011). However, cancer

Over 85% of patients subsequently diagnosed with cancer initiate their diagnostic pathway in primary care.

detection and referral in general practice is challenging mainly because symptoms of some cancers, such as LC, tend to be vague, develop over time, and mimic symptoms of underlying conditions such as chronic obstructive pulmonary disease (COPD) (Møller et al., 2015). In order to support GPs' decision to refer patients with cancer warning signs and symptoms, Toftegaard et al. (2016) developed and implemented CME meetings in Denmark focused on cancer detection in primary

CME meetings on cancer detection in primary care are associated with improved knowledge of cancer diagnosis among GPs and increased numbers of urgent referrals.

care. An evaluation of this initiative found that CME meetings significantly improved knowledge of cancer diagnosis among GPs and increased the number of urgent referrals (Toftegaard et al., 2017), which is often associated with better cancer survival (Tørring et al.,

2013; Møller et al., 2015). However, in our review, regardless of the effect of interventions on promoting early referral and diagnosis, it was found that information and CME sessions on LDCT (Guldbrandt et al., 2015) and a combined public and HCP cancer awareness campaign (Athey et al., 2012), did not lead to statistically significant differences in stage of LC at diagnosis. Moreover, despite a significant increase in chest X-rays following Athey et al.'s (2012) cancer awareness campaign, there was no statistically significant increase in the absolute number of patients diagnosed with LC as a result of this campaign. Therefore, larger scale studies with more statistical power and prospective RCTs with longer follow-up are recommended (Athey et al., 2012; Guldbrandt et al., 2015).

Larger scale studies with more statistical power and prospective RCTs with longer follow-up are recommended to diagnose LC, detect LC stage shift, and measure LC recurrence and mortality.

The benefits of fast-track cancer programmes are well documented in the international literature.

The benefits of fast-track cancer programmes, also known as rapid access, two-week-wait, or "urgent" programmes/clinics are well documented in the international literature and with various cancer types (Stapley et al., 2012; Howell et al., 2013; Din et al., 2015; Zhou et al., 2018). However, fast-track referral criteria are typically based on the presence

of 'alarm' cancer signs and symptoms and/or relevant radiological findings (Din et al., 2015). Moreover, a large proportion of patients with cancer continue to be diagnosed late, which is associated with poorer survival (Elliss-Brookes et al., 2012; Abel et al., 2015). A review of fast-track referrals of 669,220 patients with 35 different cancers between 2006 and 2010 in the UK found significantly large variations in the odds of fast-track referral by cancer type (Zhou et al., 2018). For instance, patients with testicular and breast cancers were most likely to have been diagnosed after a fast-track referral. In contrast, patients with brain cancer and Leukaemias were least likely to have been diagnosed after a fast-track referral. As for LC, Zhou et al. (2018) found a slow increase in odds of age-specific fast-track referral until late middle age (55-64 years) with subsequent decrease in fast-track referral in older ages (65-74 years). This is concerning since the median age of LC at diagnosis is 70 years (Torre et al., 2016).

Cancers with a wide symptom signature are less likely to be diagnosed following fast-track referral.

Only one study reported on a Primary HCP outcome namely compliance with LC referral guidelines following implementation of a cancer fast-track programme (Prades et al., 2011). Findings from this study are promising with a significant increase in GP compliance with cancer fast-track referral guidelines reported.

2.5 Strengths and limitations

Rigorous methods were used in conducting and reporting this systematic review. All records were screened and selected by blinded reviewers. Data extraction, methodological quality, and level of evidence assessment were conducted and cross-checked by several expert reviewers. Moreover, to the best of the authors' knowledge, no recent reviews in this area have been published between January 2011 and September 2021.

A few limitations are worthy of note. Study selection bias could have occurred, since only studies that answered the review questions were included, the search did not include records from the grey literature, and the review was limited to studies published within a 10-year timeframe. In addition, a meta-analysis was not possible due to heterogeneity in study design, interventions, outcomes, and outcome measures.

2.6 Conclusion

Findings from this review and the wider literature indicate that CME meetings for Primary HCPs can be instrumental in helping with early LC referral, diagnosis, and potentially improved survivorship. Cancer fast-track programmes can help improve patient outcomes. However, as seen in Prades et al. (2011), there is a risk that the use of fast-track programmes is reduced over time, hence the

importance of continually educating HCPs about LC detection and referral pathways. LC awareness campaigns targeted at HCPs can potentially enhance LC referral and reduce the diagnostic interval. However, in our current review, cancer awareness campaigns did not lead to significant improvements in patient outcomes (Athey et al., 2012; Emery et al., 2017). Outcomes such as LC stage shift and mortality rates as a result of early primary care referral were seldom measured in the reviewed studies. When measured, statistical significance was not reached, hence the importance of conducting future studies that are powered, controlled, and have longer follow-up times.

3. Recognising and Referring High-Risk Individuals with Lung Cancer ‘Alarm’ Symptoms: A Qualitative Study with Primary Healthcare Professionals

3.1 Introduction

In a recent study commissioned and funded by the NCCP, Saab et al. (2020a; 2020b; 2021b) interviewed 46 individuals who had at least one LC risk factor and lived in two areas in Ireland with high LC incidence about their help-seeking intentions for symptoms indicative of LC. Despite identifying the GP as the first point of contact for symptoms of concern, a number of participants had no intention of visiting the GP if they developed signs and symptoms. These participants listed GPs’ perceived negative attitudes towards smokers, cost of healthcare, waiting time for GP appointment, and previous bad experiences with the healthcare system as key barriers to help-seeking. Pharmacies were identified as “one stop shops” for participants to buy lozenges and cough bottles without necessarily seeking further medical help for symptoms of concern.

Our previous findings with at-risk individuals highlight the need to explore, in greater depth, barriers to the recognition and referral of high-risk individuals with symptoms indicative of LC from the perspective of Primary HCPs, with the aim to develop strategies to engage HCPs in initiatives specifically focused on early detection of LC and the care pathways that are most appropriate for high-risk individuals. This aligns with recommendation 7 of Ireland’s National Cancer Strategy 2017-2026 which states that *“the NCCP and the HSE Health & Wellbeing Directorate, in partnership with the voluntary sector, will develop a rolling programme of targeted multi-media based public awareness and education campaigns, aimed at the early detection of specific cancers and with particular focus on at-risk populations”* (Department of Health, 2017; p.134). Therefore, the aims of this qualitative study were to explore:

1. Barriers and facilitators to recognising the population at high risk of LC and referring individuals with signs and symptoms indicative of LC along the appropriate healthcare pathway
2. Strategies to engage Primary HCPs in initiatives on early detection of LC

3.2 Methods

This qualitative descriptive study explored the phenomenon of interest in its natural state rather than adhering to prior views or theories (Guba & Lincoln, 1994). Qualitative description is suitable to answer questions such as: “What are the concerns of people about an event? What are people’s responses toward an event? What factors facilitate and hinder recovery from an event?”

(Sandelowski, 2000; p.337). This study is reported using the 21-item Standards for Reporting Qualitative Research (SRQR) checklist (O'Brien et al., 2014).

3.2.1 Participants and settings

Convenience and snowball sampling strategies were used to recruit Primary HCPs including GPs, PHNs, PNs, and CPs in Ireland. Practice Nursing Professional Development Coordinators, the Director of Public Health Nursing, the National Lead for Public Health Nursing in Ireland, and the Department of General Practice at University College Cork (UCC) were contacted by e-mail and asked to circulate the study materials to PNs, PHNs, and GPs nationally. These included the study invitation letter, poster, and Google Forms link where participants can register their interest in participating by providing their contact details. CPs were invited to participate during an NCCP symposium titled "The Importance of Pharmacists in Early Detection of Lung Cancer," as well as by e-mail and text to colleagues.

3.2.2 Ethical considerations and data protection

Ethical approval to conduct the study was granted by the Social Research Ethics Committee at UCC (Log 2020-197). Participation in the study was voluntary and participants were given the freedom to refuse to participate or withdraw from the study. They were assured that refusal or withdrawal would not have any negative repercussions.

All data were anonymised at transcription and stored on an encrypted and password protected computer accessible only to the research team using the UCC-supplied OneDrive for Business. There were no hard copies in this study. Audio-recorded interviews were permanently deleted immediately following transcription. Participants' contact details were transferred to a password protected Microsoft Excel sheet stored on an encrypted and password protected computer. Participants' contact details, sociodemographic data, and transcripts were not linked in any way. As per UCC's Code of Research Conduct, anonymised data will be stored for 10 years.

3.2.3 Data collection

Participants were provided with an electronic information sheet about the study and signed an electronic informed consent form. Prior to the interviews, participants completed a brief sociodemographic questionnaire electronically with questions on age; gender; highest level of education; years of experience since primary qualification; current role; time in current professional role; county of work; and place of work (**Appendix 3**).

In accordance with Public Health and Government guidance relating to the COVID-19 pandemic at the time of the study, all interviews were conducted virtually using videoconferencing and were

audio-recorded. Participants were invited to participate either in focus groups or in individual interviews. While the preference was for focus groups, HCPs typically have busy schedules and/or might not feel comfortable discussing their views in front of their colleagues. These individuals were given the option to participate in individual interviews. Of note, the combination of focus groups and individual interviews, also known as qualitative interview method triangulation, helps enhance data richness, depth of inquiry, and trustworthiness in qualitative research (Lambert & Loisel, 2008).

A bespoke semi-structured interview guide explored three key areas, namely: (i) Primary HCPs' experiences of previous referrals for symptoms indicative of LC; (ii) perceived barriers and facilitators to patient help-seeking for LC; and (iii) recommendations for interventions to help HCPs recognise and refer high-risk individuals with symptoms indicative of LC. The interview guide was tailored for each of the four participant groups (**Appendices 4A-4D**).

Data were collected between February and April 2021. Individual interviews were facilitated by one researcher and the majority of focus groups were facilitated by two researchers who had extensive expertise in conducting qualitative interviews. In total, 2 focus groups were conducted with 10 CPs, 1 individual interview and 3 focus groups were conducted with 10 PHNs, 2 focus groups were conducted with 8 PNs, and 4 individual interviews and 1 focus group were conducted with 8 GPs (**Table 4**). Focus groups lasted between 56 and 86 minutes (72 minutes on average) and individual interviews lasted between 25 and 55 minutes (36 minutes on average). Following data collection, each participant was given a €20 gift voucher as a token of appreciation for her/his/their time.

Table 4. Number and duration of individual interviews and focus groups per participant group

Participant groups	Number of participants	Number of individual interviews	Number of focus groups	Number of participants in focus groups	Interview duration in minutes
General Practitioners	8	4	1	4	212
Public Health Nurses	10	1	3	2, 2, 5	253
Community Pharmacists	10	0	2	5, 5	167
Practice Nurses	8	0	2	2, 6	148
Total	36	5	8	31	780

3.2.4 Data analysis

Audio-recorded reflexive memos were kept by the researchers immediately after each interview. This iterative process helped the researchers identify the key themes and information gleaned from

the interviews and specify areas that need to be addressed and explored further in subsequent interviews.

Focus groups, individual interviews, and reflexive memos were transcribed verbatim by professional transcription services. Data analysis was iterative and began immediately after the first interview, such that, analysis of early interviews informed the content of subsequent interviews. Data were analysed using thematic analysis (Braun & Clarke, 2006). Transcripts were read and re-read to gain understanding of the data. Participant excerpts were then extracted and summarised into codes. A coding sheet was created by the first author with codes in one column and associated participant excerpts in a second adjacent column (Saab et al., 2020a; 2020b; 2021b). Data from each participant group were coded separately. Data source triangulation was then performed. This involved collating codes from the participant groups and exploring convergence, complementarity, and dissonance between the results (Carter et al., 2014). All codes were cross-checked for accuracy by the research team. Similar codes were collapsed and refined. Sub-themes linking the various codes were generated and cross-checked against participants' excerpts. A thematic map was then created to clarify the relationship between the codes and sub-themes. Similar sub-themes were then grouped into themes.

3.2.5 Trustworthiness

Credibility was enhanced by selecting a heterogeneous sample and using participants' own words to present the data (Elo et al., 2014). Dependability was established by having the research team cross-check the coding process and agree on the analysis. Confirmability and reflexivity were addressed through maintaining a constant dialogue among the researchers as well as using audio-recorded reflexive memos of the research process (Graneheim & Lundman, 2004). Transferability was enhanced by thickly describing the data collection process (Graneheim & Lundman, 2004). Finally, authenticity was optimised by using icebreakers to establish a trusting relationship with the participants and get them to openly discuss their views and experiences (Holloway & Galvin, 2016).

3.3 Results

3.3.1 Participant characteristics

A total of 36 HCPs participated in the study (10 CPs, 10 PHNs, 8 GPs, and 8 PNs). The majority were female (n=29, 80.5%) and held either a bachelor's (n=11, 30.6%) or master's degree (n=11, 30.6%). On average, participants had 21.67 years of experience (± 10.53) and spent 12.3 years (± 8.8) in their current role. Half of the participants (n=18, 50%) worked in county Cork. The remaining participants worked in 10 other counties. More than half of the participants (n=22, 61.1%) reported working in urban areas. The full participant characteristics are presented in **Table 5**.

Table 5. Participant characteristics (n=36)

Characteristic		n (%)
Age (years)	21–30 years	5 (13.9)
	31–40 years	5 (13.9)
	41–50 years	13 (36.1)
	51–60 years	11 (30.6)
	>60 years	2 (5.6)
Gender	Female	29 (80.5)
	Male	7 (19.5)
Highest Level of Education	Diploma	1 (2.8)
	Higher/postgraduate diploma	6 (8.3)
	Bachelor's degree	11 (30.6)
	Master's degree	11 (30.6)
	PhD/Doctorate	3 (8.3)
	Other	4 (11.1)
Years of experience since primary qualification	Range: 1-36 Mean: 21.67 (\pm 10.53)	
Current role	Community Pharmacist	10 (27.8)
	Public Health Nurse	10 (27.8)
	Practice Nurse	8 (22)
	General Practitioner (<i>Qualified</i>)	7 (19.4)
	General Practitioner (<i>Trainee</i>)	1 (0.3)
Time in current professional role (years)	Range: 1-26 Mean: 12.3 (\pm 8.8)	
County of work	Cork	18 (50)
	Mayo	5 (13.9)
	Dublin	4 (11.1)
	Waterford	2 (5.6)
	Donegal	1 (2.8)
	Galway	1 (2.8)
	Kerry	1 (2.8)
	Limerick	1 (2.8)
	Louth	1 (2.8)
	Tipperary	1 (2.8)
	Wexford	1 (2.8)
Place of work	Urban	22 (61.1)
	Rural	14 (38.9)

The following four themes were created from the data: (1) Primary HCPs' experiences and accounts of patient referral for LC; (2) patient help-seeking for signs and symptoms of concern; (3) facilitating early presentation and referral; and (4) perspectives on previous LC awareness campaigns. Themes, sub-themes and abbreviated codes are presented in **Table 6**.

Table 6. Barriers, facilitators, and strategies to recognise and refer high-risk individuals with lung cancer ‘alarm’ signs and symptoms

Themes	Sub-themes	Abbreviated codes	Sources
Primary Healthcare Professionals’ experiences and accounts of patient referral for lung cancer	<i>Triggers for Primary HCPs to refer patients</i>	• Typical LC signs and symptoms (localised [e.g., cough] and non-localised [e.g., weight loss, lack of energy])	GP, CP, PHN, PN
		• Atypical or non-specific signs and symptoms (e.g., back pain, looking pale/unwell, and abnormal blood tests)	GP, PHN, PN
		• Fear caused by haemoptysis	GP, CP, PHN, PN
		• Smoking as a LC risk factor	GP, CP, PHN, PN
		• Recurrent prescriptions (e.g., cough medicine, steroids, and antibiotics)	GP, CP, PHN, PN
	<i>Primary HCPs’ role in patient referral</i>	• Advising, encouraging, and reassuring patients	GP, CP, PHN, PN
		• Upholding and respecting patient autonomy	CP, PHN
		• Patient assessment	GP, PHN, PN
		• Recognising the seriousness of presentation	GP, PHN, PN
		• Being on high alert “in the patient’s home”	PHN
		• “Knowing” the patient and the relationship of trust: a double-edged sword	GP, CP, PHN, PN
	<i>Awareness and Use of Rapid Access Lung Clinics</i>	• Varied service knowledge and use	GP, PN, CP, PHN
		• Greater awareness and use of other rapid access cancer clinics	GP, PN, CP, PHN
		• Experiences of using the Rapid Access Clinic e-referral system	GP, PN
		• Ease of access to computed tomography (CT)	GP, PN
		• Hesitance to refer patients to Rapid Access Lung Clinics (e.g., fear of abusing the system and fear of mentioning LC when symptoms are not definitive)	GP, PN
	<i>Challenges faced by Primary HCPs during referral</i>	• Limited role and scope of practice	GP, CP, PHN
		• Fear of scaring patients while emphasising the urgency of referral	GP, CP, PHN
		• Opportunistic referrals	PHN, PN
		• Pressures on HCPs and the healthcare system	GP, CP, PHN
		• Respiratory diseases not prioritised (e.g., Chronic Disease Management Programme and HCPs’ continuous professional development)	GP, PHN, PN
		• HCP fatigue from repeated patient presentations	GP, CP, PHN
		• Late patient presentation and missed/delayed LC diagnosis	GP
<i>Post LC diagnosis follow-up and continuity of care</i>	• Predominantly fatalistic accounts of patient outcomes	GP, PHN, PN	
	• Providing care and support following LC diagnosis	GP, PHN	
	• “The missing link”: lack of integration/communication within the healthcare system and the resulting disruption in continuity of care	GP, CP, PHN, PN	
	• Enhancing integration, communication, and continuity of care (e.g., interprofessional communication, strong relationship with GPs, and keeping records of consultations)	GP, CP, PHN, PN	

Patient help-seeking for signs and symptoms of concern	<i>Perceived healthcare system-related barriers to help-seeking</i>	• High cost of a GP visit	GP, CP, PHN, PN		
		• Waiting times to see a GP and time constraint	GP, CP, PHN, PN		
		• Misdiagnosis, delayed diagnosis, and chest X-ray failure to detect LC	GP, PHN, PN		
	<i>Perceived patient-related barriers to help-seeking</i>	• Embarrassment, guilt, and fear of judgement due to smoking history	GP, CP, PHN, PN		
		• Emotional factors: cancer fear, denial, and anger	GP, CP, PHN, PN		
		• Sociodemographic and geographic factors (e.g., educational level, drug use, homelessness, and being male and older)	GP, CP, PHN, PN		
	<i>Perceived impact of the COVID-19 pandemic on patient help-seeking</i>	• Stigma relating to cough	CP, PN		
		• Lack of in-person contact with HCPs	GP, CP, PN		
		• COVID-19-related health issues prioritised	CP, PHN, PN		
		• Fear of contracting or transmitting COVID-19 in healthcare settings	CP, PHN, PN		
	<i>Promoting help-seeking for symptoms of concern</i>	• Patient education	GP, PN		
		• Learning from COVID-19, accessibility of additional and free services for LC health checks/health screening and diagnosis	GP, CP, PHN, PN		
		• The positive role of family, GP, and community supports	GP, CP, PHN, PN		
	Facilitating early presentation and referral	<i>Primary HCPs</i>	• Providing information on when to refer patients	GP	
			• Delivering education by LC Specialists	PHN, PN	
• Delivering education and webinars by professional organisations			GP, CP, PHN		
• Creating a checklist or algorithm for the early detection of LC signs and symptoms			GP, PHN, PN		
• Embedding LC symptoms into pre-existing systems (e.g., Chronic Disease Management Programme)			GP, PHN, PN		
• Using patient stories to educate HCPs			CP, PHN		
• Adopting an interdisciplinary approach to education			CP		
<i>Patients</i>		• Focusing on LC prevention and early detection	PHN		
		• Focusing on the cough rather than smoking	CP		
		• Using learnings from previous health campaigns (e.g., stroke, cervical, skin, and male cancers)	GP, CP, PHN, PN		
		• Offering free and accessible lung health check/ lung screening services	CP, PHN, PN		
		Perspectives on previous LC awareness campaigns	<i>Perspectives on previous patient-focussed campaigns (Be Clear on Cancer and Detect Cancer Early)</i>	• Risk of information overload in both campaigns	GP, CP, PHN, PN
				• Mixed views on the visuals of both campaigns	GP, CP, PHN, PN
				• The risks and benefits of using patient, doctor, and celebrity profiles in both campaigns	GP, CP, PHN, PN
• The benefits of the catchy slogan and strapline of the “Detect Cancer Early” campaign	GP, CP, PHN, PN				
• Practicality and usability of leaflets for patients queried	GP, CP, PHN, PN				
<i>Perspectives on a HCP-focused infographic (Think Lung)</i>	• Mixed views on the information provided		GP, CP, PHN, PN		
	• Easy to read		GP, CP, PHN, PN		
		• Information felt engineered to fit the acronyms	GP, CP, PHN, PN		
		• Queries around who was the target audience	GP, CP, PHN, PN		

CP=Community Pharmacist; GP=General Practitioner; HCP=Healthcare Professional; LC=Lung Cancer; PHN=Public Health Nurse; PN=Practice Nurse.

3.3.2 Theme 1: Primary Healthcare Professionals' experiences and accounts of patient referral for lung cancer

Participants were first asked to remember a time that they referred a patient whom they suspected might have had LC to Specialist services. As a result, they discussed various triggers for referral, their role in patient referral, their experiences with RALCs, challenges to referral, and follow-up and continuity of care following LC diagnosis.

3.3.2.1 Triggers for Primary Healthcare Professionals to refer patients

The triggers that participants described comprised of respiratory symptoms, such as persistent or changing cough as well as non-respiratory symptoms such as back pain or

Cough, weight loss, lack of energy, back pain, looking pale/unwell, abnormal blood tests, haemoptysis, smoking history, and recurrent prescriptions triggered patient referrals.

looking pale and unwell. Some participants highlighted repeated prescriptions for antibiotics and steroids, or frequent requests for cough bottles as red flags warranting referral to a GP or for chest X-ray/secondary care. Haemoptysis was often described as a particular “alarm” symptom, while smoking was highlighted as a cause for concern, with some participants voicing surprise at the diagnosis of LC in non-smokers.

Typical lung cancer signs and symptoms

All participants spoke about typical LC signs and symptoms. Persistent cough, a new cough, or a change in an existing cough were all mentioned as examples of warning signs that raised concern:

“A few months ago, I referred a person and the reason for referral was a continuous cough, very, very bad cough. It wasn’t treated by anything over the counter, and it had persisted for a few months...” (CP1).

Weight loss was flagged as another typical sign of cancer, and as something that would warrant immediate referral:

“When someone presents and their clothes are loose, you know, that’s always an alarm bell. Either it’s like a neglect or they’ve lost weight. And especially if you’re doing a wound, a leg ulcer, you see how loose their pants are” (PHN3).

Reduced energy levels and reduced mobility were also picked up on in terms of typical presenting symptoms. One PHN gave an anecdotal example of gauging this change in the person through a practical comparison:

“I said, [name of patient], are you able to manage to walk from the car to the pitch anymore?’ And he said, ‘Do you know, I’m not. I often bring the car up close to the pitch and I sit in the car and watch the match now.’ And I said, [name of patient], I think that that’s not you. That’s not you, sure it’s not?’ And he said to me, ‘Yes, I know, I know it’s not and I’m not great” (PHN1).

Atypical or non-specific signs and symptoms

All participants, apart from CPs, spoke about non-specific signs and symptoms of LC, such as “back pain” (PN2), “clubbing” (GP4), or abnormal blood tests:

“He [patient] presented with vague symptoms first of all...the only trigger really looking back on it now was his CRP [C-reactive protein] was quite raised. Ferritin levels were up. So, we were kind of wondering ‘what’s going on?’ Bloods, white cell count, everything else was perfectly normal. He was sent for chest X-ray, that was absolutely fine. And then the pain in the back really got progressively worse and we sent him off for an MRI and basically he had lung cancer with bone mets...” (PN2).

Some participants were surprised that LC can be asymptomatic from a respiratory perspective or can present atypically.

challenging:

It was noted that because not all patients present with typical and/or lung-related symptoms, it can make diagnosis and early detection more

“My husband didn’t have a cough. That was the most extraordinary thing about it. It was quite an opportunistic diagnosis really. He was in hospital for something else, so quite an unusual presentation” (PN1).

GPs also offered insights into patients who have no respiratory symptoms, and the challenge of deciphering and acting on vague or non-existent respiratory symptoms:

“Another guy that I had diagnosed him last year too presented with brain mets and had no respiratory symptoms at all and even retrospectively when they biopsied, no, did they biopsy? I can’t remember, but they found the mets and went looking for a primary [cancer] and found the lung primary at that point. But he, even looking back, was asymptomatic” (GP5).

Fear caused by haemoptysis

The fear that haemoptysis creates for patients was highlighted by most participants who offered insights into how patients perceive blood with one PHN stating that “anything to do with blood is red, literally” (PHN3):

“I think blood frightens people...If you look at something on television, if an actor has a tissue in their hand and they cough and there’s blood on it, it’s like DUH! DUH!. You’re a goner now. That’s it. You’ve perforated something in your chest. You’re finished. And that sticks in people’s head” (PN2).

Haemoptysis was also recognised by most HCPs as a “red-flag” for referral. Therefore, any mention of haemoptysis prompted clear instruction to the patient to seek further investigations:

“I told him [patient] that certainly that [haemoptysis] wouldn’t be something normal, that he would need to get that investigated. That wouldn’t be a normal symptom that somebody should have” (PHN2).

Smoking as a lung cancer risk factor

Smoking and its effects were mentioned by all HCP groups as triggers for suspicion of LC, with “a lower threshold for referring” (GP2) particularly as part of a bigger picture with symptoms and co-existing risk factors:

“He [patient] was a male in his fifties, someone who had been smoking for many years, presenting with a non-resolving cough and some weight loss...from my point of view as a GP, lots of red flags there” (GP1).

Another GP flagged smoking linked with shortness of breath as suspicious:

“She [patient] was a lady in her seventies, and she had progressive shortness of breath and she was a very heavy smoker. So, on that basis, that’s why I was suspicious and yes, she did have lung cancer” (GP5).

PNs voiced surprise at the fact that non-smokers too could present with LC:

“But it was only since my husband was diagnosed that I discovered that 15% of lung cancers are non-smokers, so that was quite a revelation to me!” (PN1).

In keeping with smoking, CPs described how important it is to be able to discern the seriousness against a background of pre-existing symptoms, particularly in smokers:

“I would always say to somebody I know smokes: ‘Is it your regular cough now or is it a different cough?’ And when they tell me it’s a different cough, I always say, ‘Well, ok. We’ll pretend as if you’re not a smoker now and this is just a different cough, so let’s deal with the cough and we have to get this different cough better.’ To take the smoking out of the equation for them and just treat it as like this is something different” (CP1).

Recurrent prescriptions

CPs in particular were cognisant of the presentation of patients for recurring cough medicine or repeat prescriptions for antibiotics or steroids. As the providers of these medications, CPs could see the patterns and had to have potentially difficult conversations with patients as a result:

“Persistent or a recurrent level of antibiotic and steroid prescribing in an attempt to cure a cough that wasn’t going away...you say to the patient ‘you’ve been in so many bottles of cough. The cough is still persisting. It’s not been taken away.’ It’s kind of a difficult conversation...it’s very difficult to manage because if I said no, they could just walk across the road! [to another pharmacy]” (CP1).

GPs also reflected on their care of patients and described instances where coughs were persistent and not improving with repeated treatment:

“Looking back, we had treated her [patient with LC] over the phone with steroids and antibiotics on a few occasions...” (GP4).

3.3.2.2 Primary Healthcare Professionals’ role in patient referral

Overall, it was felt that HCPs advise, encourage, and reassure patients, and assess them appropriately, guided by the remit and scope of their respective professions. This was a common finding among participants who were not trained diagnosticians. GPs, on the other hand, discussed their role in sending patients for further diagnostics. Moreover, an integral element of HCPs’ role was upholding and respecting patient autonomy. Knowing the patient well and in some cases being able to see them in their own homes aided the referral process in most cases.

Primary HCPs play a key role in **reassuring, advising, and encouraging patients to seek help while upholding and respecting patient autonomy.**

Advising, encouraging, and reassuring patients

CPs described doing their best to reassure patients, and to get them to make an appointment with their GP as the next step:

“You find that some patients are glad of the permission to go and...bother their GP. So, they’re glad of somebody agreeing that maybe it’s going on a little bit too long and that their GP would welcome seeing them” (CP2).

This experience was in contrast to that described by a fellow CP from another focus group:

“If it’s someone who doesn’t go to the GP a lot, I just find it really difficult to convince them to go. You’re saying ‘you should really get this checked out, no matter what it is,’ and you can tell they’re not going to go” (CP1).

PHNs reported having a similar role to play in persuading patients and their carers to get further help:

“And I said [to the patient], ‘Will you do me a favour? Will you go down to your doctor and let him know this and see what he thinks?’ Now, he said he would, so like I would generally contact the GP myself, but I’d always get his permission obviously. But he promised me he would do that, and he did...” (PHN1).

PNs mentioned *“allaying fears”* (PN1) and referring to the GP but said very little in terms of the scope of their own practice in this regard.

Upholding and respecting patient autonomy

CPs and PHNs emphasised the importance of upholding and respecting patient autonomy while prompting service users to seek referral for symptoms of concern:

“When they [patients] come to us, we’re not there to lecture them. They are adults. We’re there to give them advice. The trust that we have with them and the advice, it has to come as a natural, they are not like children” (CP1).

“It’s how you communicate and it’s how you make somebody feel...that’s about just respecting clients and that’s very much so on an individual basis with a GP, with a public health nurse...we get public health nurses that go around pointing fingers and I will admit when I was self-righteous and knew everything when I started off, I did the same myself, but I soon realised that this isn’t a good way to do things” (PHN4).

Patient assessment

This was described in terms of organisation of tests and workups. For instance, GPs and PNs talked about arranging X-rays, measuring lung function with spirometry, and taking weight and blood tests. PHNs, on the other hand, spoke more about the importance of having a holistic view of the patient and *“not just look at the hole [ulcer] in the leg”* (PHN3) but to assess their health from a wider perspective to see the *“whole patient”* (PHN3):

“Most of our detection and referral comes down to a holistic overview of patients when we’re doing an assessment...as public health nurses, health promotion is always key, so we ask a lot of

questions...health promotion is very much opportunistic as opposed to planned and that's where we pick up on just the patient's story" (PHN3).

In contrast, CPs did not speak about patient assessment as part of their role in the process of LC detection.

Recognising the seriousness of presentation

The importance of being able to recognise the seriousness of the patient's presentation emerged across all HCP groups:

"He [patient] had this cough that's kind of getting a little bit worse. Is there something sinister going on here?" (PN1).

PHNs offered various examples of where they recognised the seriousness of the presentation and consequentially referred the patient to their GP:

"I was saying it in discussion [with the GP], I was concerned about his [patient] smoking and his colour and I was thinking like could three courses of antibiotics have made no difference? He could do with a chest X-ray...and the doctor said: 'you know, that's a good idea. I'll send him for an X-ray'" (PHN3).

For GPs, their role also involved being able to communicate the seriousness of the presentation to the patient, something which other HCP groups did not feel was in their remit:

"I basically had to tell her [patient] that it looked like it was lung cancer, and it was. And she was just distraught. She was hysterical here. We as GPs, we're actually pretty good at kicking for touch on this and we tend not to bring that option in" (GP5).

Being on high alert "in the patient's home"

This was a feature exclusive to PHNs, as they frequently visit patients in their homes. This was believed to give them a unique insight into not just the health of the patient, but also of their family and carers:

"When we go into someone's house as a public health nurse for whatever reason, your eyes are always on alert, high alert for not just the problem that you've encountering at that moment in time, but the surrounding people in the home, be it a carer or whatever" (PHN1).

“I think definitely that relationship is a big thing with the GP, but I think there tends to be a closer relationship with the public health nurse. We’re in their [patients] homes where they’re more likely to tell us something” (PHN4).

“Knowing” the patient and the relationship of trust: a double-edged sword

Knowing the patient and a trusting relationship were key features of the Public Health Nurse’s role. The benefits of “knowing” the patient as part of the referral process were presented strongly across most if not all interviews and focus groups. Knowing the patient often allowed for dialogue, openness, and candidness:

“I know this man. His daughter is somebody I know. There’s family connections. Once he said to me: ‘What are you worried about?’, I said: ‘What are YOU worried about?’ Probably not the way I’d have it with everybody else, but I think the key to this is knowing your customer well and them knowing you well” (CP1).

Similarly, for PHNs, knowing the patient was vital as it allowed PHNs to easily discern changes in a patient’s appearance and functional status:

“When I went back after Christmas, I remember opening the door and going in and I thought mother of god, this woman looks terrible!” (PHN1).

All HCPs talked about the importance of trust between patients and HCPs, especially in times of vulnerability:

“You’re actually very vulnerable, so you feel it’s lovely to have a relationship with your nurse and your doctor and you feel safe. And you have a good relationship with them and that’s in all aspects of the type of patients that come in...” (PN2).

CPs echoed those sentiments:

“That’s trust as well though...if you’re going to have a dialogue and discussion with somebody about your health, you want to be able to trust them and I think trust is earned and it doesn’t come by... You’re not going to have that conversation with somebody you’ve met for the first time” (CP1).

Conversely, participants considered the counterargument, where knowing the patient and trust can act as barriers to prompt early referral:

“A patient can get an appointment within a day or two to see a doctor, but they might decide to hang around to see the doctor that they know well. And if they’re waiting around to see a doctor they know well, there may be a delay in getting to see them” (GP3).

3.3.2.3 Awareness and Use of Rapid Access Lung Clinics

GPs in particular, whose role is to utilise the referral system, provided rich insights into the RALC system in terms of service knowledge and use, access to RALCs, efficiency of the referral system, and benefits of CT scans. Interestingly, however, GPs seemed hesitant to refer patients to RALCs unless they felt very certain that symptoms were consistent with LC. Moreover, GPs reported referring patients to other rapid access clinics (e.g., prostate, breast, and pigmented lesion) more than RALCs. Similarly, other HCPs stated being more aware of other rapid access clinics rather than RALCs.

GPs are the primary users of the RALCs e-referral system. However, they seemed to have greater awareness and use of other rapid access cancer clinics.

Varied service knowledge and use

Knowledge and use of RALCs seemed to go hand in hand. Some PHNs had some awareness of RALCs due to knowing colleagues who worked there:

“I actually worked with a girl who was one of the CNSs [Clinical Nurse Specialists] I’ve contacted her once or twice just to follow up on people maybe...I mean it seems to work very well. It is Rapid Access. They’re [patients] in and they meet their consultant, their nurse...they get their scans...”
(PHN4).

In contrast, PNs and GPs were mostly aware of RALCs, due to their direct dealings with them:

“Suspicious signs and symptoms, I would use the electronic referral pathway” (GP1).

“Oh, I have heard of them, yes. I think that’s unit something...I think that’s now kind of where we would [refer patients], which is very good, very thorough, I have to say” (PN1).

However, it seemed like RALCs were infrequently used:

“I use the RALC only two to three times a year, not very frequently” (GP3).

In keeping with the infrequent use of RALCs, there was a reflective moment for one GP where they considered previous patients whom they had not referred to RALCs and now wondered if this would have been an appropriate pathway:

“Looking backwards, we had treated her [patient] over the phone with steroids and antibiotics on a few occasions, but hindsight is 20/20 vision, you know. There are probably 40 people who we’d do the same thing with who don’t turn out to have cancer for every one that does. So, I don’t think we

can be too harsh on ourselves, but I think it's an admirable aim to try and diagnose it earlier, but that diagnosing it earlier involves investigating multiple people who don't have it" (GP4).

GPs also described reserving RALC use to those with advanced symptoms or an almost certain diagnosis of LC:

"...if I'm particularly concerned that it's lung cancer, I would use it. So, if a patient had haemoptysis and if that haemoptysis was associated, well, virtually always with haemoptysis, if it's a middle-aged or older person, I would use it" (GP3).

"...those people I've referred to the Rapid Access Lung Clinic have pretty much had proven lung cancer" (GP4).

Greater awareness and use of other rapid access cancer clinics

RALCs seemed underused with most participants, including GPs, having greater knowledge of other rapid access clinics rather than RALCs. **Some GPs reported using RALCs only when they were certain of a LC diagnosis.**

CPs seemed to have the least knowledge of RALCs and only some knowledge of other rapid access clinics based on personal rather than professional experience:

"I have experience of helping or going with my sister to the Rapid Access Bowel Clinic [urgent referral to endoscopy/gastroenterology/colorectal OPD] and I suppose like obviously she still had to be referred by her GP, but instead of being referred to a consultant for I suppose a consultation where then you were referred for tests at a later stage...so yes, I haven't come across the lung one at all, I'm afraid" (CP2).

Similarly, some PHNs believed that *"profiles of other conditions [rather than LC] are high."* As a result, they had some awareness of other types of rapid access clinics:

"I have to say I haven't been aware of a Rapid Access Lung referral pathway. I would know of the Rapid Access for the likes of prostate cancer...Likewise the Rapid Access Breast Clinic...but certainly I wasn't aware of a Rapid Access Lung" (PHN1).

Likewise, despite being aware of RALCs, PNs and GPs reported greater awareness and use of other rapid access clinics (e.g., prostate, skin, and breast):

"The Rapid Access Prostate Clinic and say Pigmented Lesion are more...they're just more in my mind...I don't know if the Rapid Access [Lung] Clinic has guidance like that [referral prompt checklist]" (GP4).

“I’ve certainly used the breast one a lot more often and the skin one. Yes, not the lung one actually, no” (GP5).

“We kind of under-utilise it [RALCs], I actually think we do, to be honest, but like when we do access it, it works extremely well. It really does, no more than the Rapid Access, the prostate clinic and all that” (PN2).

Experiences of using the Rapid Access Clinic e-referral system

GPs, with responsibility for referral, offered salient knowledge of how to access RALCs. The majority were well informed regarding location and the electronic referral process. However, there were concerns highlighted relating to *“individual RALC procedures”* (GP2), and IT challenges, *“didn’t know that RALC is on the e-referral system”* (GP4), *“RALC link to HSE website is broken”* (GP5), systems incompatibility (private and public), and the scanning of test results:

Except for minor IT challenges, **the RALCs e-referral system seemed to work well.**

“Difficult to get scans over to RALC and loaded onto system – must be brought manually...private scans are not compatible with the NIMIS imaging system” (GP5).

Furthermore, there was evident frustration when GPs spoke of their experience with uncertainty in diagnosis: *“didn’t know there was a checklist in terms of symptoms”* (GP4). Some concern was expressed with the acceptance criteria of RALCs where *“referral criteria are too narrow...and a sense that the RALC is not built for uncertainty”* (GP5). As such, other patient presentations, such as a breast lump, were considered easier to refer:

“Breast clinic referral is easy because there has to be a lump” (GP5).

Overall, RALCs were considered by GP and PN participants to be efficient and timely from initial referral to ongoing care where a diagnosis of LC has been confirmed:

“It’s seamless really. There’s a dedicated online referral that you use, and you know, and that gets fast-tracked really” (GP2).

“RALCs are one of the best developments between primary and secondary interfaces” (GP3).

A sense of RALC team competence emerged with perceived confidence in procedures and response to referrals, with an ability to bypass obstacles (e.g., COVID-19 restrictions, waiting lists, and access to tests):

“Once you have diagnosis, things always move fast...team very experienced, and a colleague feels confident in them” (GP5).

“... RALC is brilliant because you bypass all these kinds of barriers” (PN2).

Nonetheless, there was some uncertainty concerning timeframes from referral to assessment:

“Prostate clinic is seen within three to four weeks, but not sure with the lung cancer one. The UK has a two-week criterion, need to create that culture” (GP4).

“I think sometimes even when they say Rapid Access, but they’re still waiting. They’re still waiting a long time to be seen” (PN1).

Ease of access to computed tomography

Ease of access to timely CT scans through RALCs was perceived as a major benefit.

Ease of access to CT scans enhances the patient journey and facilitates earlier diagnosis of LC. Whilst acknowledging that cost and patient reluctance may be an issue or barrier for some patients, *“took a year to persuade patient to go for a scan” (GP5)*, CT scans were recognised as beneficial and superior to X-rays in diagnosing LC:

“X-rays cannot be fully relied upon, further tests like CT and PET scan are required” (GP3).

“Symptoms...need a CT scan” (GP2).

At times, the need for CT scans prompted GPs to consider RALC referral, particularly in the absence of direct access to CT. GPs can now obtain CT scans directly for General Medical Services (GMS) patients:

“Before being able to get scans they would refer to rapid referral with suspected lung cancer and be told they need a CT scan” (GP5).

Whilst ease of CT scan referral for GPs was applauded, there was acknowledgement that increased referrals may be burdensome on the system:

“Doing CTs more often means doing CTs on people who don’t have lung cancer” (GP4).

Hesitance to refer patients to Rapid Access Lung Clinics

Whilst experiences with RALCs were mostly encouraging, a degree of hesitance to refer patients to RALC was evident, stemming from both patient and professional concerns. Patient-level challenges involved patient

Hesitance to refer patients to RALCs and the resulting underuse of these clinics were apparent among GPs.

GPs worried about using the term “lung cancer” with patients, especially where a diagnosis has not been confirmed.

preference, *“may want to stay with their own Consultant”* (GP2), but more often there was a worry as to how patients would respond and cope with terminology the term *“lung cancer,”* especially where a diagnosis has not been confirmed:

“My patient was called to the cancer clinic and I had to clarify that they don’t have cancer but need to investigate” (GP5).

“Communications from the RALC is from the “lung [cancer] clinic” although the patient may not have cancer diagnosis” (GP1).

GPs also described how patients require reassurance and *“a lot of talking down”* (GP5) when discussing onward referral and on receipt of correspondence from RALC where cancer is clearly documented as a possible diagnosis:

“Patient is not aware that it’s a lung cancer clinic...inform patient that you’re referring them to hospital because something has shown up” (GP2).

“Patient didn’t have lung cancer, but a lot of reassurance had to happen to patient and family members on the phone to the doctor” (GP5).

What I find difficult sometimes in terms of making that referral is that the clinic is called the lung cancer clinic” (GP1).

Additional challenges included exposing patients to unnecessary investigations and associated radiation:

“Weighing up putting somebody through a full dose CT scan if symptoms were vague and no concerning history” (GP5).

Despite the generally positive experiences that GPs described in relation to the RALCs, both GPs and PNs also mentioned how they would be reluctant to use it unless they felt it was highly warranted, as they did not want to overwhelm or *“abuse the system”* (GP3):

“...They’ve had a mass on the chest X-ray and symptoms, you know, there was a high level of concern there” (GP4).

“When the patient comes in and their symptoms are quite bad or they’ve left it go and that they’re quite concerned, it would be when they’re really concerned that they [GPs] send them then to the Rapid Access. I think if they’re unsure or, I suppose they’re weighing it up, it would just be a normal e-referral then that they’re sending for to be seen” (PN1).

3.3.2.4 Challenges faced by Primary Healthcare Professionals during referral

Key challenges that Primary HCPs face during patient referral were:

- **Limited role and scope of practice**
- **Fear of scaring patients and using the word “cancer”**
- **Opportunistic referrals**
- **Pressures on the healthcare system**
- **Respiratory diseases not prioritised**
- **HCP fatigue from repeated patient presentations**
- **Late patient presentation and missed/delayed LC diagnosis**

Participants explored many challenges during the process of referring the patient, including reluctance to diagnose and fear of misdiagnosing, not wanting to scare the patient, in tandem with the reluctance of some patients to take on board the advice that they need to see their GP. Perceived pressure on the healthcare system made the referral process more

complex. The opportunistic nature of the referral in some cases was highlighted as challenging, as was the limitations of individual professions’ scope of practice. Some HCPs felt that a lack of knowledge about the Specialist referral systems was problematic. Respiratory conditions in general were seen to not be prioritised at health system level, and a fatigue relating to repeat presentations was acknowledged.

Limited role and scope of practice

Some participants, particularly CPs and PHNs, believed that they had a limited role in referral due to their scope of practice and/or the nature of their role. As a result, they voiced fears of discussing the possibility of a cancer diagnosis with a patient, even when the signs and symptoms were clearly associated with LC:

“I think it’s a huge leap to say to somebody, ‘I think you have cancer.’ I think that would be exceptionally wrong to do that. All I would do would be, dancing around how long somebody has had the cough and that really is standard practice that if it’s been going on longer than three weeks, that we’d always recommend an X-ray and that’s something their GP could talk to them about” (CP2).

“I don't think I'm skilled as a diagnostician and I'm certainly not a radiologist, so I'm not going to start to use terminology like that [cancer]” (CP1).

For some CPs, the challenge of being a locum in a community pharmacy and not necessarily knowing the patient was highlighted as a challenge to discussing symptoms of concern:

Community-based HCPs such as PHNs and CPs had unique challenges to referral.

“I'm a locum pharmacist... So I might be working in a pharmacy this coming Saturday and I may not be working in that same pharmacy for another month or six weeks or never again possibly. So, I would be at a disadvantage in unfortunately being able to follow up with those patients” (CP2).

Some PHNs did not want to *“start talking about lung cancer when not sure”* (PHN4), while others expressed a lack of exposure to LC and limited knowledge as a result. These concerns were less pronounced among GPs, whose role is to refer, as well as PNs who worked closely with GPs. However, GPs still felt limited in what they could tell patients without Specialist investigations:

“It was only when it was clear in the letter to me that the prognosis was good really that I could discuss that in detail because of course, initially, as a GP, you don't always have enough information that you can offer reassurance. You can offer broad generalisms about saying “well, look, you didn't have it [LC] too long.” You presented reasonably early. You're otherwise healthy. But one can't offer unqualified hope and positivity without some scientific backup really” (GP3).

Fear of scaring patients while emphasising the urgency of referral

Community-based HCPs feared mentioning the possibility of a cancer diagnosis in case this was not the cause of signs/symptoms patients and refrained from using the word “cancer” while emphasising the urgency of seeing a GP.

Some HCPs expressed fear of mentioning the possibility of a cancer diagnosis in case this was not the cause of signs and symptoms. They also wished to avoid causing fear to patients by mentioning a

possible cancer diagnosis. This presented most strongly for CPs and PHNs, who have a role in prompting patients to see their GP. They spoke about the difficulty of getting patients to see their GP since patients were either unwilling to seek help or unaware of the seriousness of their symptoms:

“It's difficult to strike a balance between suggesting to somebody they need to see their GP for what they might consider a minor condition. You don't want to alarm them, but at the same time, they need to be seen” (CP2).

“I didn’t assume or give the impression to him [patient] that it was something very drastically worrying because there was no need to worry at that stage for him, even though I had my own suspicions. So, at that time, I just said to him that look, it is something abnormal as such and it would need further investigation” (PHN2).

Some PHNs contacted the GP on the patient’s behalf, with the patients’ permission:

“I encouraged him [patient] to ring the GP, but later on that week when I was due to go back to him again to do a leg dressing, he hadn’t contacted the GP at that time and with his consent then, he allowed me to ring the GP on his behalf” (PHN2).

Opportunistic referrals

This presented most strongly for PHNs. Symptoms of LC were more likely to be noted incidentally when the patient was being seen by the PHN for something else:

“You wouldn’t come across it [LC] too much, unless they’re kind of discussing other things because I suppose they might present to the GP more than us with it [LC]” (PHN4).

“I remember there was one gentleman. I was going to him to do a leg dressing and subsequently he was telling me that with recent time, he was having pain in his lung and then the most alarming feature certainly was coughing up blood” (PHN2).

Pressures on Healthcare Professionals and the healthcare system

Almost all Primary HCP groups identified the various pressures on the healthcare system in general and HCPs in particular as key challenges to timely referral. These related to understaffing, lack of resources in some hospitals, busy GP practices, high workload, and limited time. Of note, this theme was very strong among GPs who described pressures such as *“lack of GPs”* (GP1) and *“the busy nature of the GP setting”* (GP4) as key challenges to timely referral. The stretched system was highlighted in the following excerpt:

“There were positive findings on the chest X-ray in that there was consolidation, wasn’t really resolving, but the hospital system’s under such strain that they couldn’t organise an inpatient. It was mooted as an outpatient” (GP4).

PHNs also described the stretch in resources, the personal effect this has on stress levels, and ultimately on the patient experience. Healthcare system pressure also emerged briefly from conversations with CPs around staffing issues and time constraints:

“But again, if you’re busy, you’re stressed out, you’ve a huge client load, you’re far less likely to make every contact count” (PHN4).

“I’m too busy and I’ve too much else to do...that’s just unfortunate like with staffing. Sometimes you don’t have the time to devote for a 10-minute chat” (CP2).

Respiratory diseases not prioritised

Participants believed that respiratory diseases were not prioritised in the Chronic Disease Management Programme.

All participants, except for CPs, mentioned that there was a tendency towards focusing on other chronic diseases or cancers, with

respiratory symptoms and/or LC not being prioritised:

“We know cervical screening and BreastCheck inside out and back to front, not because I’m female, but it’s on every media coverage. I suppose mostly because of the whole scandals around it, but I don’t know, what do you ever see about lung cancer?” (PHN3).

Others echoed this sentiment, referring to Ireland’s Chronic Disease Management Programme. One PN referred to the omission of LC both, in the Chronic Disease Management Programme and in their available continuous professional development (CPD) education. Of note, COPD is included in the Chronic Disease Management Programme:

“With our chronic disease management programme, we had a diabetes cycle of care up and running and it seemed to take priority over every other chronic disease at the time. But now it seems to have moved onto cardiovascular disease. In fact, even in terms of courses, I’m at the moment doing a cardiovascular disease management course through [name of organisation], but there isn’t an equivalent [course] for respiratory, not at the moment anyway” (PN1).

“So we’ll say diabetes. Now, diabetes is fairly high profile. Or any other chronic conditions. The reason we know so much about the chronic conditions is because of their profile. Like diabetes, cardiac disease, all the neuro, motor neurone, they’re all high profile and when the profile of a condition is raised, then there’s a lot of in-service for nurses and it generates a lot of interest” (PHN3).

Healthcare Professional fatigue from repeated patient presentations

There was a sense that repeated presentation of respiratory patients could cause fatigue amongst HCPs:

“I remember kind of COPD more in the A&E [accident and emergency department], like you know. You’d have the same fellow in the ambulance. And the oxygen and you’ll be: ‘Oh, you’re John’. Sorry, I’m coming back to you, do you know that way nearly. Ah, give up the smoking already, will you? [Laughter]” (PHN4).

“I think that we probably, because we’ve got a bit sort of jaded about people not listening to us, underestimate how much they probably do listen to us, you know, and that we should be doing more of it, you know [giving advice]” (GP5).

Late patient presentation and missed/delayed lung cancer diagnosis

GPs also spoke about late diagnosis, and the challenge of catching symptoms early. Enhanced availability of CT scans has helped, but there is still a delay for many patients in presenting and in getting a diagnosis, which can affect their outcomes:

Late presentations often led to **palliative care rather than specialist LC**

“I think he [patient] was very worried about it and I think my impression was that he’d been worried about it for quite a while and certainly my impression was that one of the reasons he came in to me was that he was coming under pressure from his partner who had noticed weight loss and noticed the cough wasn’t going away” (GP1).

Another GP reflected on the patterns of late diagnosis, and his/her/their own personal experience of “missing” the diagnosis:

“Most of our palliative patients are lung cancer patients. I’m not sure why that is. But we’ve had a few cases, they’ve nearly always been late diagnoses...I mean I’ve missed one recently. Saw a chap who has COPD, but had a whole host of other medical ailments, losing weight, dysphagia, sent towards the surgeons. They said it was because he was on morphine for pain and he’d lost three stone in weight. Then he developed hoarseness, so he went to ENT [ear, nose and throat Specialist] so he sought different services, and, in the end, he ended up getting admitted acutely to hospital and having a CT. So probably a five-month delay between him presenting with symptoms consistent with cancer and him having a test done. I hold up my hand. I wasn’t thinking along the terms lung cancer. I thought it was more GI or upper GI symptoms. But I suppose the system failed him in a way” (GP4).

3.3.2.5 Post lung cancer diagnosis follow-up and continuity of care

Patient stories with LC were often **fatalistic**.

Participants were asked to recall stories of patients who got diagnosed with LC following a referral. Interestingly, most of these stories were

fatalistic in nature, with some limited examples of positive outcomes. In terms of follow-up care, most study participants perceived their role to revolve around post-diagnosis care and support. They expressed, however, their frustration around the lack of communication within the healthcare system and the resulting disruption in continuity of care for patients referred for suspected LC, and a desire to enhance it.

Predominantly fatalistic accounts of patient outcomes

The vast majority of examples of LC from HCPs were fatalistic and described patients with poor prognosis or quick deterioration. It was felt that outcomes did not inspire confidence in HCPs or patients regarding LC:

“She was palliative because it was such a late stage, and she chose not to have any chemotherapy and I visited her in the home and that’s where we diagnosed the brain mets in fact at that point”
(GP5).

“He had lung cancer and with bone mets in the spine. Following diagnosis, he only lasted about six weeks” (PN2).

“I think from start to finish, it was five weeks and he died with lung cancer” (PHN1).

Amongst the stories of poor prognosis and outcomes, there were also some accounts of patients who did well or fully recovered from LC:

“He did have lung cancer and he had surgery and he was treated successfully. His wound healed. He did really well” (PHN3).

Similarly, GPs had anecdotes of an uplifting nature, albeit limited:

“I had a guy who’s in homeless services and he’d a real phobia about cancer because he watched his mother die when he was 13...he started losing weight and at that time, I had access to the scans and it actually took me a year to get him to go for the scan, by which time he had lost a colossal amount of weight. He had a lung cancer. He was suitable for surgery...he refused chemo and radiation and he’s still alive two years later” (GP5).

Providing care and support following lung cancer diagnosis

Post-diagnosis care and support emerged strongly for PHNs:

“We would be the support group there to do all the extra bit of work in their home...you become a huge part of the family network and the go-to person for the family...for the most part, when

somebody has a diagnosis of lung cancer, they invariably think the worst and you're there to try and support them through that journey" (PHN1).

GPs spoke about the consultation process, and how a lot of their time investment in the patient is actually "post-surgery" or "post-investigation" and involves managing both the physical and the psychological impact of LC and its treatment:

Participants had an important role to play (e.g., symptom management) following referral and LC diagnosis.

"I think after they've [patients] received the diagnosis, after they come back to you for that initial chat and they may be anxious, they may be depressed, they may be stressed, they may have lots of questions...and in fact this gentleman, I've probably seen him six times because he had post-surgical neuralgia. He had chest wall pain, so I've started him on anti-neuralgic treatment. He got very worried. So often, most of the time, investment is post-surgery or post-investigation" (GP3).

"The missing link": lack of communication/integration within the healthcare system and the resulting disruption in continuity of care

Participants expressed their frustration regarding the lack of communication within the healthcare system and the resulting disruption in continuity of care for patients referred for suspected LC.

The lack of continuity of care stemmed from lack of an integrated healthcare system, lack of communication between the different HCPs, and lack of

awareness of the roles of some HCPs involved in the referral system. For instance, CPs noted a lack of formal communication systems between GPs and CPs, affecting their ability to follow up on patient outcomes following advice to consult the GP. Having advised the patient to see the GP, CPs often heard no more, and had to follow up with the patient directly, or ask the patient to let them know the outcome of referral:

"I do try and encourage my patients to always come back and tell me the end of the story because, without a universal health record, we don't ever find out the end of the story" (CP2).

CPs also spoke about not always feeling part of an integrated system:

"It's always kind of been an us against them kind of attitude [GPs versus CPs], unfortunately. Sometimes it can feel like that, but again, I think that's because of the nature of the communication because you don't see that person or you don't know their story, you've never met them. So maybe like being a bit more familiar with each other and with how that person works" (CP2).

PHNs reported similar experiences of chasing the results, or only finding out from the patient later regarding the outcome of the referral, although some did have good relationships with GPs:

“You’re only picking up really from the client because he comes home after all these tests and sure he only has a small amount of information really and we don’t get any official knowledge or information or feedback from the hospital. So, it’s through us contacting his GP to really get the full picture of what is actually happening at the time because obviously we were to call to do his leg dressings, but outside of that, we didn’t really know what the plan was for this gentleman” (PHN2).

GPs themselves were not immune to the lack of communication and continuity, and had their own experience of the “*missing links*,” waiting for feedback from Specialists and not knowing under whose care the patient was, with lag times between components of the system:

“I don’t always know when they’re going to be seen and sometimes what happens is patients go and it might be even a month or so before I get any sort of letter back to say what’s happened, you know” (GP1).

PNs highlighted a lack of awareness of the Advanced Nurse Practitioners’ (ANP) role in some circumstances:

“I think the awareness of ANP in the GPs I’ve come across is very slim and there’s a kind of old school approach on a nurse prescriber and I just think that’s the lack of knowing the role” (PN1).

Enhancing integration, communication, and continuity of care

In order to address the lack of communication and the resulting disruption in continuity of care, PHNs, PNs, and GPs spoke about the importance of a good referral system, and how it makes the whole process “*seamless*” (GP2) if it runs as intended, allowing HCPs to bypass barriers that would otherwise slow down the process:

“A lot of conditions have been found in our practice because we’ve got a good system” (PN1).

“They seem to have a very good system in [name of hospital], which is the main hospital in [name of area] that deals with it. So there doesn’t seem to be a referral problem at all. It seems to be pretty rapid” (PHN1).

Participants also spoke about the importance of communication between the different disciplines, and the impact this has on the quality of patient care. However, this was often based on personal and professional relationships and initiatives rather than standardised systems:

“You can ring them [Clinical Nurse Specialists] up, tell them your story. They will fast-track people. They’re really good to fast-track and that seems to work very well and they’re very good to communicate back with us then if there’s any issues” (PHN3).

“I would have worked with GPs where you’d be on to them regular. You could almost pick up their phone. You’d have their mobile phone. I referred in whoever. How is she?” (PHN4).

CPs also highlighted steps that they take as a profession to improve the continuity of care for their patients:

“If you have a consultation or if you have anything at all unusual about somebody’s prescription, we’d just try and get into the habit of making a comment, in the notes section so that if you’re off or a locum is following it up, there’s a clear history, just to have a record and accountability” (CP2).

3.3.3 Theme 2: Patient help-seeking for signs and symptoms of concern

Participants were asked to discuss factors that they perceive would delay or prevent patients from seeking medical help for symptoms indicative of LC. They identified several healthcare-related and patient-related factors. The negative impact that COVID-19 had on LC referral and diagnosis also featured strongly. Participants made a few recommendations to help promote patient help-seeking for symptoms of concern.

Several healthcare-related factors, patient-related factors, and the COVID-19 pandemic served as perceived challenges to patient help-seeking for symptoms of concern.

3.3.3.1 Perceived healthcare system-related barriers to help-seeking

The cost of a GP visit, long waiting times, and misdiagnosis and/or delayed LC diagnosis were identified as healthcare-related barriers to help-seeking for symptoms of LC.

High cost of a General Practitioner visit

There was a clear divide between GP visit for medical card holders and those who must pay for a GP visit. For instance, as the HCPs who often see the patient first, CPs found referring those who have GP visit or medical cards much easier:

“Where I’m working, we have a huge volume of patients with medical cards and I’d find that they’re much more ready. They want to talk to you. They want to show you everything and they’re nearly asking you, ‘Should I go to the GP? I think I’ll call the doctor.’ And they might ask you, could they call the doctor for like a blood blister on their finger and you’d say no, you’re fine. You caught your finger in the door last night. But they want to go to the doctor. It’s a different environment or it’s a different ethos” (CP2).

While the cost of a GP visit was acknowledged as a challenge to help-seeking, some patients are medical card and GP visit card holders and hence have free GP care access.

The perception of cost of GP visit was also seen as a barrier by the other HCP groups, with PNs surmising “you can get anything

done if you pay for it" (PN1). PHNs noted that they personally could appreciate the cost issue when it came to seeing a GP (PHN4) but as HCPs, their service is for medical card holders and so they do not see patients who need to pay for the GP (PHN3). GPs, however, had mixed views regarding the cost of GP visit as a barrier, with some referring to the fact that many patients with suspected LC are eligible for the GMS scheme, so cost should not present a barrier to care for this cohort. Others queried whether cost would really *"come into play"* (GP2) if serious symptoms were present.

Waiting times to see a GP and time constraint

All HCP groups mentioned long waiting times for GP appointments and other services as a potential barrier to help-seeking, but again some GP participants wondered whether this was a valid reason, saying that they *"don't buy into the waiting times argument"* (GP2).

CPs noted how people who are working find it harder to get to a GP for this reason:

"I have people as well who are working. So, you're telling them you need to go to the GP...and they're like, 'When am I supposed to go? I can't take time off work to go'" (CP1).

PNs touched on waiting times in A&E and for consultants, as well as personal experiences of waiting to see a GP:

"I'm suffering myself. I'm trying to find a GP. Just for myself with a GP and I've asked over 15 practices around...and nothing (PN1)".

Misdiagnosis, delayed diagnosis, and chest X-ray failure to detect lung cancer

There was a strong awareness among participants of missed diagnoses that can happen with X-rays as opposed to CTs:

The limitations of chest X-rays and the resulting missed LC diagnosis were discussed.

"He [patient] was sent to the hospital for a series of X-rays, which really didn't show anything at all. Now, he was a smoker, a lifelong smoker. He was then referred for a CT and they picked it [LC] up" (PN1).

GPs offered examples of symptoms being misappraised for example, three-stone weight loss being attributed to *"morphine use"* (GP4) rather than cancer, and reflected on the potential impact of poor access to diagnostics:

"Over-reliance on chest X-rays is a problem. I think we're all busy and I think when you step back from it and look and go oh yes, well, they've presented now seven times in a year. Maybe we

should just do a CT chest. I wonder if things will change with the better access now via the HSE to radiology” (GP4).

PHNs gave examples of where GPs not listening to the family’s concerns led to delayed diagnosis:

“They [family] had great faith in their GP and they were very happy with him generally, but they just felt that he was not acting on the fact that she was deteriorating so quick, on how they would like it to proceed. And they felt they had to circumvent him” (PHN1).

3.3.3.2 Perceived patient-related barriers to help-seeking

Emotional factors like cancer fear and guilt due to smoking were identified as potential key help-seeking deterrents.

All HCP groups identified the following as perceived patient-related barriers to help-seeking: embarrassment, guilt, and fear of judgement due to smoking history; cancer fear, denial, and anger due to a potential LC diagnosis; and certain geographic and sociodemographic factors. In addition, CPs and PHNs felt that being male and older were also a potential barrier to patients reaching out.

Embarrassment, guilt, and fear of judgement due to smoking history

The stigma associated with smoking and the choice to smoke was discussed among all participating HCP groups. It was felt that patients are of the opinion that they have brought the symptoms on themselves. According to current study participants, patients also anticipate judgement from their HCPs therefore, they choose not to present for symptoms of concern:

“I think the huge one is that they’re nearly invariably smokers and so they blame themselves for their symptoms always and they’re like yes, I’ve a cough, but of course I have a cough because I’m a smoker and so they explain away their own symptoms and have this whole sort of guilt thing about having the symptoms in the first place because they’re so aware of the link between their smoking and their symptoms. So, I think they just have the smoker’s cough. I won’t bother the doctor because it’s my own fault” (GP5).

PNs spoke about how patients “recoil” when asked whether they smoke (PN2), and are embarrassed that they do, despite the obvious health risks (PN1):

“If people are smokers, they feel that perhaps I brought this on myself and I’ve nobody to blame but myself. So, bury their head in the sand” (PN1).

CPs acknowledged that many fellow CPs are indeed prone to lecturing patients about smoking risks, but should try to remember that “*smoking is a choice*” (CP1):

“There are some pharmacists who will do the same lecture every time someone comes in and all you do is lose a customer. You can try and you can nudge and you can encourage, but you can’t do the full nine yards every single time. At the end of the day, they’re an adult and if they choose to smoke, they choose to smoke” (CP1).

PHNs were equally aware of the barriers that embarrassment and fear of judgment for smoking create for patients, and how *“treating them like children”* was detrimental to the process of early detection (PHN3) as guilt adds to the delay in diagnosis:

“It [smoking history] certainly leads to a delay. It’s one of the harder ones. When you get to talk to them [patients] to get rid of the guilt and get them to move forward a little bit with treatment, they do feel that it’s self-inflicted and there is an element of guilt. Guilt in terms of them having the cancer, guilt in terms of the effect it’s having on their families and guilt in terms of they could have avoided having to get involved in the health services” (PHN1).

Emotional factors: cancer fear, denial, and anger

One of the biggest perceived barriers to presentation was patients’ *“fear of dying”* (PHN1), an approach of *“burying their heads in the sand”* (PN1) and *“not wanting to upset family”* (GP1) when it came to a cancer diagnosis. Fear of the “C” word or “cancer” and a fatalistic attitude of *“what happens, happens”* (CP2) fuels this also. GPs also spoke about how patients had a fear that their symptoms could be cancer, and that their death would therefore be *“quick and painful”* (GP1).

Fear of the “C” word (cancer) was perceived as a barrier to patient help-seeking.

Sociodemographic and geographic factors

Homelessness, drug use, living in rural areas, and being older and male were identified as key barriers to help-seeking. All HCP groups agreed that sociodemographic and geographic factors play a role in help-seeking behaviour. Examples offered included rural versus urban settings, with PNs noting that patients in rural areas had to travel for services, and often had less well-established transport links:

“For anyone in a rural area, for anyone here they would have to go to [name of area] for the nearest Rapid Access Clinic, which is a distance” (PN1).

Conversely, it was felt that patients in rural areas were more willing to go to their GP:

“Generally, in rural areas, they’re quite good for going to the GP. I think it’s because they know us as well and they don’t mind” (PN2).

While PHNs also acknowledged the issue of accessibility, they countered that by saying that regardless of accessibility, patients would not attend if other factors were at play, such as fear or cost:

“If you were in rural Ireland, if there was no transport, feasibility of getting to a practitioner...even within the city, where proximity is not an issue, they still do not seek out the methods also of going to a health professional to get the help” (PHN2).

Some GPs spoke about the economic deprivation that they experience in their practices, and the “inverse care law”. Patients from these areas are more likely to have multiple co-morbidities at a younger age. These patients have less education and are less likely to engage with healthcare services:

“We work in an area of disadvantage and so we specialise in a category of people called the ‘unworried unwell’ who don’t come down, who don’t seek help, who are very slow to go to appointments and very reluctant, don’t have the head space or the organisational life because they’ve so much going on to cope with those possibilities. So, they’re very slow to come forward. And so, the ability to get the scan directly is very, very important because they’re very bad at keeping appointments in the hospital” (GP5).

It was also highlighted that many patients coping with the challenges of socioeconomic deprivation do not have the capacity to process a cancer diagnosis:

“Our patients are very busy. Their heads and their lives are very full just running around sorting stuff out...they literally haven’t got the bandwidth for contemplating something major like that. So, in contrast to maybe better-off areas where you get the worried well coming in with every little symptom, our patients, they just don’t want to think about it, so they just act like it’s not happening...then it’s up to us to pick it up, and to do that, we need the time” (GP5).

Age and gender also played a role whereby both, CPs and PHNs saw a reluctance in older men to seek help in general for their health:

“It’s always the wife who rings up, isn’t it? [laughter] to the public health nurse centre...especially with the older male, you tend to get a bit of that. So that’s something I would have experienced, not specifically with lung cancer, but in general and also in the research” (PHN4).

CPs echoed the observation that “women tend to push men to investigate” (CP1) and also offered the opinion that men want to “appear strong” (CP2), and will go to great lengths to say that they’re ok:

“So, with males, even males in my own family, very much so ‘I’m not sick, there’s nothing wrong with me’ to the point and I have examples of males who were adamant there was nothing wrong with them with a bowel rupture. So, there was a lot wrong with them” (CP1).

Pharmacies were perceived as ‘female’ environments, **hence deterring men from seeking help from a CP.**

Interestingly, the pharmacy environment was noted as a potential barrier for men seeking help, as pharmacies were typically perceived as female rather

than male environments:

“If you think of a typical pharmacy, not being stereotypical, but they might be generally perceived as being more female places rather than male places. The male part of the pharmacy might be stuck in a corner, and it might have [name of cream] and dare I say, condoms, a few sanitary products. You might have one shelf if you’re lucky and then the rest of the pharmacy is maybe cosmetics. So maybe older people, older men, for example, they may be coming in to get their prescription, something over the counter, maybe the odd thing in that men’s section and that would be it. They wouldn’t necessarily have any other reason to linger in a pharmacy, to browse, and maybe, there’s not those opportunities to pluck up the courage to have that conversation maybe with their pharmacy or pharmacist. But maybe they just find pharmacies more female rather than male spaces” (CP2).

3.3.3.3 Perceived impact of the COVID-19 pandemic on patient help-seeking

The COVID-19 pandemic presented unique challenges in relation to detection and diagnosis of LC including stigma relating to cough, lack of in-person contacts with HCPs, the pausing and reallocating of services, prioritisation of COVID-19-related issues, and a fear of contracting or transmitting COVID-19 while accessing healthcare.

The COVID-19 pandemic presented unique challenges to patient help-seeking and subsequent referral including:

- Stigma relating to cough
- Lack of in-person contact with HCPs
- COVID-19-related health issues prioritised
- Fear of contracting or transmitting COVID-19 in healthcare settings

Stigma relating to cough

Because of cough being such a high alert symptom of COVID-19, those who were experiencing a new cough were thought by CPs and PNs to be reluctant to present with it. For example, a CP described it as an embarrassment for patients:

“That’s a huge thing at the moment that I’m recognising. If someone comes in with a cough that’s totally unrelated to COVID, they nearly feel embarrassed. So, I think in this instance, that might be a barrier to presentation as well for people on a practical level” (CP2).

A PN mentioned the fear that “everything” in terms of respiratory symptoms could be linked to COVID, thus creating a barrier of fear:

“They were kind of very much afraid that, you know, that everything kind of was COVID” (PN2).

Lack of in-person contact with Healthcare Professionals

Telephone consultations, while beneficial during the pandemic, could lead to missed cancer diagnoses.

This barrier was cited by the CPs on several occasions, due to their role in the electronic dispensing process. On occasion, medications were being prescribed without the patient being physically seen by either the GP or the CP due to the pandemic, and the patients in question were often people with health issues who were cocooning:

“I think definitely the pandemic has had an impact on it as well because I’ve so many patients who are just getting antibiotic prescriptions emailed in and it’s the patients who aren’t going to the GP because they’re supposed to be cocooning and they’re not even getting seen. So, they’re not even having their chest listened to and they’re having antibiotic prescriptions sent over and I’m not even seeing them because there’s a family member coming in to pick it up. So, I think that’s a real barrier” (CP1).

Lack of in-person contact was also recognised as a significant barrier by GPs and PNs. One GP recounted a time that only by chance a physical appointment with a patient revealed significant weight loss that would have otherwise gone unmentioned, and therefore unnoticed:

“The pandemic has been a big problem because I was dealing with somebody on the phone, and I just took the notion of getting them in because I know him to be a tricky customer and he had lost 10 kilos. He never mentioned that [over the phone]” (GP5).

PNs saw the confusion that patients experienced regarding what services are still available to them and when they can access these services. The communication around this was found to be lacking until recently in the media:

Patients were unsure regarding the services available to them during the COVID-19 pandemic.

“I just think that they felt that GPs weren’t accessible anymore in this last year. I don’t think communication probably was that good generally...I noticed recently there’s been a bit of media coverage about if you have X or Y or Z, don’t leave it. Go to your GP. But I think even to be fair...I

was going like can you come in? Can you not come in? Are you taking patients? And like this was me, I'm a nurse" (PN2).

Conversely, some GPs did recognise the extra accessibility that remote consultations have brought to clinical practice, and their potential long- term benefits:

"I think something that has helped more recently is telemedicine and telephone. I mean we're, in the last year, expedited by COVID, we're doing a lot more phone consultations, we're doing video consultations and I think people are accessing their GP in ways other than face-to-face" (GP3).

COVID-19-related health issues prioritised

PNs were witness to the fact that services were paused or reconfigured, resources were redeployed, and other health issues prioritised. They described the "MAU [Medical Assessment Unit] being closed for more than a year" (PN1), and the confusion when clinics were cancelled:

"When COVID started, nobody knew where we were and what was happening. Clinics were being cancelled. Patients were ringing us going: 'This clinic has been cancelled. What do I do now? Where do I go? I need advice on my inhalers.' Everybody was stuck. I think we're still a bit stuck" (PN1).

Patients themselves perceived COVID-19-related issues to be more important than other health queries. As a result, they were slower to contact their GP about their general health concerns:

"I think that that definitely was a fear that there were more important things out there than seeing them with their ongoing cough or their ongoing pains and aches" (PN2).

Fear of contracting or transmitting COVID-19 in healthcare settings

Patients were believed to fear contracting or transmitting COVID-19 in healthcare settings.

All participants were aware of the fear that patients had of contracting COVID-19, and the resulting avoidance of accessing healthcare services (e.g., GP surgeries, hospitals, and pharmacies). PHNs gave examples of patients delaying care for so long, in other areas of health, that they needed to go "straight to A&E," or situations ending in myocardial infarction or even death (PHN1). They were acutely aware of the fear people experienced:

"Because of the COVID scares in hospital infections, people have definitely put off accessing treatment for any symptoms. It's not just specific to lung cancer and talking amongst ourselves in the practice, I'm in a primary care centre, we would definitely associate three or four sudden deaths in the past six months, that was really missed care because of COVID where they've put off

accessing care and it turned out that other things happened, whether it was an MI [myocardial infarction] or whatever. I would think also from a lung cancer point of view, that people would be putting off having to seek any kind of medical care in the fear that they would have to be admitted to hospital” (PHN1).

Similarly, CPs discussed that some patients were afraid to go to the pharmacy with a cough because they were concerned that people may think they had COVID-19 and could transmit it:

“Maybe it’s only applicable in COVID, but the fact that some people are still afraid to go to a pharmacy, especially people presenting with coughs in a pharmacy, even having someone beside them at the counter kind of hear that they have a cough might kind of feel ‘oh no, everyone thinks I have COVID” (CP2).

3.3.3.4 Promoting help-seeking for symptoms of concern

Participants felt that in order to promote help-seeking for LC symptoms, patient education about LC was vital. It was also felt that services for lung health checks/health screening and diagnosis should be accessible, and that patient support networks and relationships were important factors in the help-seeking process.

Recommendations for early help-seeking:

- Patient education
- Positive role of family, GP, and community supports
- Availability of free and accessible lung health check/ health screening services

Patient education

Educating patients about LC signs, symptoms, benefits of early presentation, and services available to them was perceived to promote early help-seeking.

GPs and PNs highlighted the importance of educating patients about LC and the services available to them. They spoke about how health education tends to be heard the loudest by the “worried well” (GP5), and this should be considered in the design of any such education, keeping the message clear and concise. Symptoms to watch for were flagged as something that patients lacked knowledge in, particularly when it comes to differentiating between symptoms of COPD and other suspicious symptoms:

“It probably would be a good thing that when patients attend clinics for COPD...with COPD, we don’t highlight ‘if this ever happens to you, you should always go to your surgery if you have this type of pain” (PN2).

It was advised that the role of the GP, and the process of further investigation should be communicated to the public in order to facilitate early and prompt presentation:

“They [patients] may not be fully aware that GPs have a vital access to lung cancer treatment, and I think maybe emphasising that, they probably see lung cancer as being more a hospital-based thing and not seeing the GP as the gateway to that secondary care” (GP2).

Education around prognosis was also advised, including the potential for positive outcomes with early diagnosis:

“I think many years ago, people regarded lung cancer as a terminal diagnosis, whereas of course if we catch it early enough, it doesn’t have to be and in fact the prognosis can be good if we catch it early enough” (GP3).

Learning from COVID-19, accessibility of additional and free services for LC health checks/health screening and diagnosis

It was suggested that the approach to COVID-19 testing has come with lots of learnings, and a model upon which to base other health initiatives:

“The COVID-19 consultation actually, the initial query lung cancer consultation, it’s a brief intervention. It’s almost a screening consultation...a triage consultation because you can tell almost over the phone whether this person needs to be seen or further intervention or further referral are needed. So, it is something that could be funded as a brief intervention. It could even be a phone intervention” (GP1).

A lung health check for smokers was suggested (GP5), as well as universal access to CT scans:

“There was a category of patients not covered there and that’s people who don’t have health insurance or don’t have a medical card. So, that would be the people just above the threshold for a medical card in an area like mine who wouldn’t have health insurance” (GP5).

Similarly, free GP care was suggested by PHN4, while access to free-of-charge Lung CT scans for all and more lung function tests were suggested by PN1.

The positive role of family, GP, and community supports

The role of the patient’s family in help-seeking was evident, with GPs describing how some patients in their

Participants discussed the **positive role that family, GP, and community supports play in promoting early help-seeking for symptoms of concern.**

care had been pressurised to present due to concerns from family members:

“I think he [patient] was very worried about it and I think my impression was that he’d been worried about it for quite a while and certainly my impression was that one of the reasons he came in to me

was that he was coming under pressure from his partner who had noticed weight loss and noticed the cough wasn't going away" (GP1).

PHNs too described how patients would be more likely to “*follow through*” with the referral process if family support was present (PHN4), and how the lack of such support was a barrier to help-seeking. They expanded this concept of family support and relationships to include the importance of patient relationships with their HCPs:

“I think relationship is fundamental, whether that's the relationship with the GP, the relationship with the public health nurse, the relationship within families” (PHN4).

PNs added to the importance of support for patients, particularly those who live alone, by acknowledging the crucial role of home help and “Meals on Wheels” personnel who may have unique insights into the patient's health, and an important role in noting when their health was deteriorating:

“The home helps are quite good. You've a lot of people living alone in our area and the only one that they see or may be in contact with that they'd confide in. The family obviously would be in contact, but they maybe God knows where. They're not on the ground. And I find home helps are brilliant. They would ring up and they're saying that they are a little bit concerned seemingly...even people that actually deliver the meals on wheels. That sounds probably a little bit mad, but like that's the only port of contact for a lot of these people living on their own. But they seem to be on the ball, they're on the alert a lot...their role is nearly underestimated as well at times” (PN2).

3.3.4 Theme 3: Facilitating early presentation and referral

Participants believed that early presentation and referral for symptoms indicative of LC can be achieved through Primary HCP and patient education.

3.3.4.1 Primary Healthcare Professionals

Recommendations to facilitate early referral by Primary HCPs:

- Specialist services
- Educational resources from professional bodies
- Creation of a new checklist or algorithm, and/or integration of LC-specific modules into pre-existing systems such as the Chronic Disease Management Programme

Participants felt that appropriate education for HCPs would enable and promote earlier presentation and referral. It was suggested that this could take the form of educational events run by Specialists, educational resources from professional bodies, the creation of a new checklist or algorithm, and/or integration of LC-specific modules into pre-existing systems

such as the Chronic Disease Management Programme. Some HCPs also highlighted the impact of using patient stories and adopting an interdisciplinary approach to educate HCPs.

Providing information on when to refer patients

GPs in particular were concerned about knowing and being confident about when to refer, and what cut-off point, or specific indications would warrant the use of a CT versus an X-ray. It was felt that currently, GPs only refer “*when it’s obvious that it’s cancer*” but lower thresholds of investigation are needed (GP4). When patients present with complex histories and borderline symptoms, there is a “knowledge gap” and clarity is needed in terms of education:

GPs wanted information on when to refer and when to use a chest CT as opposed to an X-ray.

“That’s the big knowledge gap, I think, for me as a GP is not understanding, if they [patients] haven’t lost weight and they don’t have haemoptysis and they’re just coughing all the time or it’s been going on for months, but they’ve had a bad chest for the last five years. When do you decide this is a problem here?” (GP5).

Education around motivational interviewing for patients, to help boost smoking cessation was also discussed (GP5), as was a request for reminders of the referral pathways and how to access them (GP3). GPs, who often carry the responsibility of referring patients, felt that they should be able to retrospectively look back and learn and grow from previous mistakes, and in doing so, “*open the communication*” around misdiagnosis, and remove the “*blame culture*” attached to it:

“I think the information has got to be open. If someone presents with a very advanced lung cancer, were there any points in the step? Were there any points in the history where we could have actually have diagnosed this earlier? be that GP, be that, as you said, pharmacist, not that the pharmacists should be diagnosing them, but if someone has 10 cough bottles in six months, as you pointed out, they escalate it to us. We’ve got to do something with it. If we’re concerned, we escalate it to the hospital and so on and so forth” (GP4).

Delivering education by lung cancer Specialists

Education by specialists and professional organisations was recommended with some participants emphasising the importance of **interdisciplinary education.**

PNs advised that “*nurse education should precede patient education*” (PN1) and suggested having visits from Specialists. For instance, some PNs gave the example of a

COPD Specialist who gave prompts and acronyms like B for Breathlessness and C for Coughing:

“When it gets very dense with information, you’re definitely [not going to remember]. I mean A, B, C, D and things that are linked with those sort of things that are the easiest things to remember. Even I

can remember a rep [Respiratory Specialist] coming in and she was talking about different, in COPD, different managements and talking about B for breathless and C for coughing” (PN2).

Similarly, PHNs spoke about the effectiveness of face-to-face training in the past, and the need for specialised rather than generalist approaches going forward (PHN2). They also suggested using

Using HSELand for courses on the signs and symptoms of LC and embedding those into existing nursing courses were recommended.

HSELand for courses on the signs and symptoms of LC as well as embedding this topic into existing Public Health Nursing courses (PHN3). It was advised that any education should be continuous to keep the information at the forefront of the mind:

“We do network meetings and often have a speaker. Maybe that might be an idea. So, it seems to be in person or live...and then it brings it [LC] to your forefront...it should be continuously updated then” (PHN4).

A challenge to education, however, is the lack of funding for CPD for some primary HCPs:

“I think funding is an issue for practice nurses as well to do these courses because we’re not employed by the HSE. We’re employed privately, so if you want to do a course, you’ve got to pay for it yourself, more often than not. So that’s a deterrent straight away for practice nurses who want to go on and do these things because it doesn’t increase your pay” (PN1).

Delivering education and webinars by professional organisations

GPs suggested using their network’s (i.e., Irish College of GPs) weekly webinars to reach large numbers of GPs, potentially in conjunction with the use of email communications:

“I don’t know if they’ve [Irish College of GPs] done anything about Rapid Access cancer pathways. Maybe they have. So, I think it’s through our professional body and it’s through the HSE communication, both in terms of email and in terms of letters. I would have thought that’s the main way” (GP3).

Similarly, CPs identified their group webinar on LC as being an appropriate educational means, with a recent webinar being the first type of education that CPs had received on RALCs:

“I’ve been working for years as a pharmacist and the first time I knew about the Rapid Access, I don’t know why, it was on the lecture that’s been held by the IOP [Irish Institute of Pharmacy]. So, I don’t think this information has been like communicated like for the pharmacist or like I never knew about it until I was in that IOP webinar” (CP1).

PHNs also identified e-mail as a suitable approach (PHN3) but noted that it would need to be structured and catchy to gain attention and would have to overcome the “e-mail fatigue” experienced by many (PHN4).

Creating a checklist or algorithm for the early detection of lung cancer signs and symptoms

GPs, PNs, and PHNs all suggested the creation of a checklist or algorithm for the detection of LC symptoms:

Participants recommended **creating checklists and algorithms for the detection of LC** with some suggesting **imbedding those into Ireland’s Chronic Disease Management Programme.**

“In the UK, you just get this checklist and you work through the checklist. I don’t know if the Rapid Access Clinic has guidance like that. I presume in terms of haemoptysis, weight loss, hoarseness maybe” (GP4).

GPs also liked the idea of a “flowchart” to work through (GP5), or the use of “software to create a LC portfolio” (GP1). Similarly, PNs felt that an algorithm would help flag the appropriate patients for referral, and should look like something that would easily spring to mind:

“Something simple, something springs to mind, it’s definitely something marketing needs to be used so that it’s got a visual impact and it’s got, an audio impact, but it’s actually easy to use” (PN2).

PHNs also called for an algorithm (PHN1) and/or a checklist with red flags for referral, similar to other interventions:

“I would look on what we would have for a lot of other interventions where we have an algorithm...if we had two particular symptoms, three particular symptoms, whatever. A yes/no, do you go that pathway? Is that warranting a Rapid Access? Is that warranting a wait and see? A monitoring, whatever? I think that would be beneficial. We have lots of algorithms for various different interventions, both for children and adult care, like the DESMOND programme for diabetes, there’s lots of focusing in on chronic disease, so why not focus on lung cancer and to be cascaded down to the likes of ourselves?” (PHN1).

Participants warned **against using too many checklists for the detection of LC** which would potentially lead to **HCP disengagement.**

in engagement among HCPs.

However, there was a warning against too many checklists, which can end up leading to a “rolling of the eyes” (PHN4) and a reduction

Embedding lung cancer symptoms into pre-existing systems

As an alternative to creating a new checklist or referral process, many participants suggested embedding the checklist into an existing system, namely the Chronic Disease Management Programme which is currently being rolled out for several chronic diseases:

“We’ve got this chronic disease module thing that has just come in really in the last year, and it applies to certain illnesses, including COPD. So, I would recommend integrating some kind of screening or X-ray recommendation into the Chronic Disease Management module because every GP in the country fills that in twice a year. And so, if there was something that we could be doing on that, if you fill in something’s wrong, they’ll say well, have you referred to? the diabetes one says have you spoken to them [patients] about their diet? Well, if not, what are you going to do? So, you could integrate [LC]. That would be by far the best way to get it” (GP5).

PNs who also have experience of using the Chronic Disease Management Programme suggested utilising it further:

“With the chronic disease management, you would have questions that would probably trigger you to delve further. At the moment, lung cancer isn’t included. Cancer isn’t. They’re kind of missing from it. It’s something that’s in progress. But you could certainly add a few boxes to those chronic disease management things that might trigger nurses to look further and then check the algorithm and go, ‘Oh, you know, this is ticking boxes. We need to move this along further” (PN1).

Socrates was another example of an existing system that could be used to assist in the early diagnosis of LC:

“But there’s also...I mean each practice would have kind of a programme. I would work with Socrates, so there’d be an awful lot of information on that [LC]” (PN1).

Using patient stories to educate Primary Healthcare Professionals

PHNs who had previously described their holistic approach to patient care, called for the use of patient stories to help educate HCPs about LC signs, symptoms, referral pathways, and outcomes:

“I would think if you heard a patient’s story and saying I had a cough. I went to the doctor. He gave me an antibiotic. I thought I was ok. Six months later or three months later, and their story...I think the patient journey is always interesting for nurses” (PHN3).

Similarly, CPs believed that real patient stories and seeing evidence of the benefit that early intervention could have in the LC prognosis might encourage them to refer more:

“Some more kind of not like testimonials or case studies or whatever, but just where early intervention proved really important because if you have a cough or other symptoms, lots of these symptoms could be indicators of lots of different disease states. So, if you were to see the effects that early intervention had and you could put a face to certain cases, it would maybe encourage you to refer more, that you would be more conscious that it could have a really beneficial impact on somebody” (CP2).

Adopting an interdisciplinary approach to education

CPs were the only group to suggest an interdisciplinary approach to HCP education on LC. They based this suggestion on historical approaches to CPD that were informative and successful in educating CPs about specific diseases:

“I’m 30 years qualified, so when I started working, there was interdisciplinary lectures...a consultant in the hospital would give a lecture say on lung cancer and pharmacists and doctors would be added together. And it was a great way of everybody being on the same page and everybody knowing, but it has completely stopped. We never ever get any intervention like that now anymore...but it was always very good because everybody heard the same information and this is the person who is leading it in the area, so we all knew what was the way to go. And yes, you might get two in the year, but they were very useful. Very useful” (CP1).

CPs also suggested bringing this interdisciplinary approach through to their subsequent engagements with patients via an *“interdisciplinary campaign that is visible”* (CP2).

3.3.4.2 Patients

Recommendations for patient education emphasised the importance of **using a health promotion approach and addressing the symptom (e.g., cough) rather than the behaviour attached to it (e.g., smoking).**

Participants discussed what they believed would be effective strategies to educate patients about LC. The importance of prevention and early detection was iterated and the importance of focusing on the symptom (e.g., cough) rather than the behaviour (i.e., smoking) was emphasised. Participants also mentioned that learnings from previous successful health awareness campaigns can be used to inform future LC awareness campaigns and that free and accessible lung health check/ health screening services were needed to raise the public profile of LC similar to other chronic diseases.

Focusing on lung cancer prevention and early detection

PHNs who play a key role in health promotion, believed that a strong focus on prevention and early detection – through educating patients about signs and symptoms of cancer – was required :

“I think a screening and looking at those patients that are at risk and educating them at primary care level to what to look out for, if they are to get sick, that you need to see a GP. You’re not sick now, but if you are to develop these symptoms, this is what you should do” (PHN1).

“I think that people are more aware of the symptoms of oesophageal cancer, of early detection...people don’t know the symptoms or early signs of lung cancer. As we said, the blood and the pain is usually associated with the late onset, or the late symptoms” (PHN3).

PNs highlighted how the general population should also know about RALCs, in the hopes that they would be more likely to request access to RALCs if needed:

“The Rapid Access Clinic, I think more information about that for patients to know, not just doctors...for people, just ordinary people to know, if you have something wrong with your lungs, you don’t always have to go through the normal channels, that there is this [RALC]” (PN2).

Focusing on the cough rather than smoking

CPs were of the view that the focus of any education should steer away from the traditional smoking campaign approach and focus instead on symptoms like cough:

“In Ireland, a lot of the advertisements you see on television about cancer, a lot of them are about smoking and stop smoking. ‘Daddy, that’s the last cigarette you said you’d have.’ And it’s not necessarily that says ‘don’t be afraid. Get checked out.’ And maybe if it was not so pointed, maybe more people would go, ‘Oh, well, do you know what? I have had a cough for three weeks. I don’t smoke. Maybe I should go to the doctor.’ Rather than saying, ‘Oh, well, I’m smoking, so I deserve to have that cough for three weeks’” (CP1).

Using learnings from previous health campaigns

All HCP groups advised using learnings from previous campaigns, with the F.A.S.T. campaign for stroke being the most cited, particularly the importance of urgent help-seeking. GPs felt that because of this campaign, people were more familiar with the early signs and lifesaving treatments of stroke:

Examples from previous campaigns (e.g., F.A.S.T.) which highlight the importance of urgent and timely help-seeking were given to guide the design of future LC awareness campaigns.

“I think the whole kind of stroke care with that kind of F.A.S.T. thing where they advise people and the community in general about the symptoms of a stroke and that it’s an urgent issue...you need to call the ambulance. That’s been quite effective I think in the past 10 years. So, we’ve seen things go from, ‘Oh, I think my mum’s had a stroke. Her face is drooping. She’s a little bit confused and has

slurred speech. What should I do?’ To finding out afterwards that a patient had a stroke and they’ve been in hospital already because their relatives knew to call the ambulance immediately...in some cases, obviously, this can be a life-saving treatment and so I think that was a very effective campaign. And it’s not ‘Call your GP.’ It’s ‘Call an ambulance’” (GP2).

PHNs talked about how breast cancer (PHN4) and cervical cancer (PHN3) are high on the agenda due to media coverage, and oesophageal cancer has excellent awareness due to the lollipop day. “Make every contact count” was another initiative that came up more than once (PHN2) (PHN4). The importance of marketing and message targeting was emphasised by PNs who advised that it is all about getting somebody to read the information, using “*whatever picture it takes*” (PN1).

Offering free and accessible lung health check/ lung screening services

CPs, PHNs, and PNs all suggested free and accessible lung health check/ lung screening services. Some participants gave examples of how similar interventions have worked in other contexts:

“What we did when we started it is we sent out a message to all of our patients in that category and we offered them a free screening service, FREE in big letters because people like to get things for free” (PN1).

Targeting patients in their own social/work spheres was perceived as an effective means to engage them in lung health check/ lung screening services.

PHNs gave a similar example of a free health check/ screening campaign targeting older male farmers which took place in the farmers’ “*own environment in the mart*”:

“We would at least once a year, sometimes twice a year, have gone to a mart where all the farmers were. We would open up a clinic in the public services building and all the people that worked in offices were free to come and have a free health screen. Now, we did have administration support and there’d be maybe four of us as public health nurses and a dietician. And they went round to each of the tables, and we’d do blood sugars, blood pressures, all of that. And then if anything was untoward, we would refer back into the GP saying that they have been at the clinic and in fairness, some of the GPs were willing to see them if there weren’t medical cards, as a free referral in from ours because that was the only way. To get the farmers to go and see the GP is just a non-runner, but being in their own environment in the mart, they definitely took it on board and there was roughly a 10% referral from each of the clinics, which was quite a lot of people that otherwise wouldn’t have been picked up” (PHN1).

3.3.5 Theme 4: Perspectives on previous lung cancer awareness campaigns

Participants were provided with posters and leaflets from two NHS patient-focussed LC awareness campaigns in England (Be Clear on Cancer) and Scotland (Get Checked Early; <https://getcheckedearly.org/lung-cancer>). They were then given 10 minutes to read through each campaign. The English campaign “Be Clear on Cancer” features a doctor explaining what symptoms to look for and contains personal stories from LC survivors. The second campaign “Get Checked Early” features Sir Alex Ferguson, a Scottish former football manager and player who lost both parents to LC. This campaign had bullet points with key signs and symptoms of early LC and used the slogan “Don’t Get Scared Get Checked.” Participants were then shown a two-page HCP-focussed infographic titled “Think Lung” developed by the NCCP (Kennedy et al., 2021; HSE, 2021b). This infographic contains suggestions for engaging with a patient who is at risk for LC (acronym: LUNG) and who may have symptoms indicative of LC (acronym: CANCER) (**Figure 2**).



Think Lung

You can help. Assure someone their health matters and talk about any concerns they may have about symptoms that are not normal for them. Think L.U.N.G.

Listen to a person’s concerns. Symptoms that they ‘play down’ as small or unimportant may in fact be symptoms of lung cancer.

Understand that a person may feel ashamed that they smoke and may be too embarrassed to talk about breathing symptoms.

Note symptoms that are not normal for someone.

Give a person encouragement to re contact their GP if symptoms persist after a first GP visit. It’s important to validate health-seeking behaviour, especially in people at increased risk of cancer.



Detect Lung Cancer early

While anybody can develop lung cancer some people are more at risk. Signs of lung cancer can be spotted. Watch out for the person who is at increased risk and shows potential early signs.

Signs of lung cancer

Constant or changing cough, clubbing

Appetite loss/weight loss

New cough

Chest or shoulder pain

Easily breathless

Really tired, raised platelets

Who is at risk

Male and female. Older, aged 50+ years

Smoker, ex-smoker or exposed to smoke

Socio-economically deprived

Radiation exposure, for example living in area with high radon



Encourage someone to ring their GP if they are worried about any symptom which is unusual for them.

Figure 2. The NCCP’s “Think Lung” infographic.

3.3.5.1 Perspectives on previous patient-focussed campaigns

The information and insights offered by participants regarding both NHS campaigns covered: the information provided and associated risk of information overload; the use of visuals; the use of patient, doctor, and celebrity profiles; the effectiveness of catchy slogans and straplines; and queries around the practicality and usability of leaflets for patients.

Risk of information overload in both campaigns

The use of long leaflets was questioned due to the risk of information overload.

Participants liked the emphasis placed on the message that GPs “*want to see you*” (GP1) in the English “Be Clear on Cancer” campaign, as well as the outlining of important symptoms (GP2) and the positive emphasis that is placed on what can be done (CP1). It was felt that the importance of early detection was clearly presented (CP2). Some GPs, however, recommended including additional information on the red flags for LC in the English campaign and cough bottle use in the Scottish campaign (GP3).

The “Be Clear on Cancer” leaflet was considered too long by PNs and PHNs; particularly for patients who are “*not medically minded*” (PHN1) due to the risk of information “*overload*” (PN1) with the poster providing a better amount of information than the leaflet. Some PNs and PHNs also felt that patients would get scared reading it and would not want to present as a result (PHN1). This contrasted with their view of the Scottish campaign, which they felt also had too much text in the leaflet, but was “*less clinical*” (PHN3), contained less jargon (PN2) and was more “*positive and upbeat*” (PN1), and therefore more appropriate to target patients as it assures that “*lung cancer is not the death sentence that it used to be*” (PN2).

In general, HCPs seemed to prefer the Scottish campaign, describing it as “*less shouty*” (GP5), except for some CPs who felt that while all “*the important information*” (CP2) was being provided by the Scottish campaign, its delivery was not strong enough, and “*was lost*” (CP1). They felt that signposting to CPs as somebody to speak to with initial concerns was omitted however, and this was something that should be addressed (CP1).

Mixed views on the visuals of both campaigns

Some participants felt that the English “Be Clear on Cancer” campaign lacked imagery (CP2), although it was impactful as a poster campaign (CP2), as it was big and clear (PHN1). The leaflet could have been made more dramatic through the appropriate use of images or other visuals (GP3).

None of the campaigns identified CPs as HCPs that patients could speak to with initial concerns. CPs advised that this be addressed in future campaigns.

Some PHNs liked the “green colour” as it felt “calm” and was “legible,” while others commented that it was “not very vibrant” and the use of “brighter colours and pictures” would have been welcomed (PN1).

Some found that the doctors featured in the English “Be Clear on Cancer” campaign were “cross looking” (GP5), but CPs felt that they were “benign” and not scary (CP1). The Scottish campaign, on the other hand, was thought to “draw your attention...eye catching and identifiable” (GP4) and was slicker in its approach, looking almost like a magazine and not like other leaflets (PHN1). CPs, however, felt that the imagery of tea and toast in the leaflet was a reminder of hospital and did not find it appropriate (CP1).

The risks and benefits of using patient, doctor, and celebrity profiles in both campaigns

Putting a face to the campaign, particularly celebrities, was thought to spark interest among patients.

Some GPs felt that the use of doctors in the “Be Clear on Cancer” campaign was “sterile,” while others felt they were friendly, and one of them was a well-known TV doctor (GP1). The use of doctors and older white patients was felt to be a limitation for the “Be Clear on Cancer” campaign, and gender balance was needed in the doctor representation (PHN4). Some participants, however, favoured the attempt of the “Be Clear on Cancer” campaign to portray doctors as accessible and human and to use real and relatable patient stories (CP1).

It was felt that the use of Sir Alex Ferguson in the Scottish campaign was a worthwhile approach and would generate conversation (PHN4). He was recognised by most if not all participants and was seen as somebody who would draw people in, a friendly face, somebody “trustworthy” (GP4) and “relatable,” particularly for older men (CP2). PNs thought that knowing the person would make you more likely to read what the leaflet was about (PN1) and take on board its message. Some CPs, however, felt that using a celebrity ran the risk of the person not being recognised and could even potentially lessen the campaign’s credibility. Some PHNs also noted that the celebrity may not be liked by some and using them can be “divisive” (PHN1).

The benefits of the catchy slogan and strapline of the “Detect Cancer Early” campaign

There were mixed views about the campaign slogans and straplines. “Be Clear on Cancer” was thought to be “soft and gentle” by some (GP3), while others found it catchy and clear (PHN4).

The importance of catchy and positively worded straplines was iterated.

In the Scottish campaign, the use of the phrase “lung cancer doesn’t have to mean game over” was welcomed, as it implied that early detection could have a positive outcome (GP3) and a LC

diagnosis was not necessarily a death sentence (CP1); however, for some, the use of the “extra time” and “game over” terminology was thought to be a little “*fatalistic*” (GP1, PHN3), suggesting that “*you’ll still die quickly*” (PN1). In keeping with the Scottish campaign, the strapline “don’t get scared get checked” was described as “*snappy*” and “*very good*” by some (CP2, PN2), as it recognised how people may be feeling (PHN3). However, some participants did not like the use of the word “*scared*” (PHN1).

Practicality and usability of leaflets for patients queried

Participants warned against using long leaflets to avoid patient disengagement.

GPs felt that the “Be Clear on Cancer” leaflet was too long, and that patients would get “*bogged down*” in the detail of it, with “*those who read health literature probably already having the knowledge it provides*” (GP3).

CPs were divided, with some saying they “*would use the Be Clear on Cancer campaign*” to educate their patients (CP1), while others felt it was “*more targeted towards HCPs*” rather than patients (CP2). PHNs would be less likely to use “Be Clear on Cancer” than the Scottish campaign.

The practicality of leaflets was queried widely. Some participants referenced existing research that “*leaflets are useless*” (PHN4), while others described how leaflets do not get picked up and read by people (CP1). The length of leaflets was found to contribute to lack of engagement, with PNs suggesting that a one-page leaflet would be more user-friendly (PN1). The length of the “Be Clear on Cancer” leaflet was considered more problematic than the Scottish campaign (PN2). Counter viewpoints that leaflets are a good way to “*broach the possibility of cancer*” or “*facilitate a tough conversation*” (CP2) were also expressed.

Long leaflets, wallet/ pocket cards, and posters were perceived as impractical.

Participants recommended one-page leaflets and/or billboards to draw the public’s attention.

PHNs felt that while leaflets do not get used, posters get glanced at once and then forgotten, unless they potentially were used on billboards, that “*you could see while stopped in your car*” (PHN4). Wallet/pocket card versions were perceived as impractical and prone to getting lost, according to some participants in PHN1.

The positive elements, areas for improvement, and recommendations to improve the “Be Clear on Cancer” and “Get Checked Early” campaigns and summarised in **Tables 7 and 8** respectively.

Table 7. Perspectives and recommendations relating to the “Be Clear on Cancer” campaign

Positive aspects	• Positive message: “GP wants to see you”	GP
	• Outlining important symptoms	GP
	• Positive emphasis on what can be done/ early detection	CP
	• Impactful as poster campaign	CP
	• Big and clear	PHN
	• Calm colour (green) and legible	PHN
	• Doctors look benign, approachable, human, and not scary	CP
	• Use of well-known TV doctor	GP
	• Use of real relatable patient stories	CP
	• Soft, gentle, catchy, and clear slogan	GP, PHN
• Useful to educate patients	CP	
• “Leaflet broaches the possibility of cancer and facilitates a tough conversation”	CP	
Areas for improvement	• Very long leaflet running the risk of “information overload”	GP, PN, PHN
	• Leaflets are “useless and do not get picked up and read”	PHN, CP
	• Would potentially scare patients	PN, PHN
	• Signposting to CPs omitted	CP
	• Lacking in imagery and not vibrant	PN
	• Doctors in the campaign looked angry	GP
	• Use of doctors made the campaign sterile	GP
	• Posters get glanced at once and then forgotten	PHN
	• Only white patients and doctors featured	PHN
	• Targeted more towards HCPs	CP
• Wallet/ pocket card versions impractical/ get lost	PHN	
Recommendations	• Adding information on the red flags for LC	GP
	• Signposting to CPs as somebody to speak to	CP
	• Use of more obvious and dramatic visuals, colours, and images	GP, PN
	• Gender balance and inclusivity needed	PHN
	• One-page leaflet would be more user-friendly	PN
• Billboard campaign would draw the attention	PHN	

CP=Community Pharmacist; GP=General Practitioner; LC=Lung Cancer; PHN=Public Health Nurse; PN=Practice Nurse.

Table 8. Perspectives and recommendations relating to the “Get Checked Early” campaign

Positive aspects	<ul style="list-style-type: none"> • “Less clinical” PHN • “Less shouty” GP • “Positive and upbeat” PN • Positive messages: “lung cancer is not the death sentence that it used to be,” “lung cancer doesn’t have to mean game over” GP, PN • Snappy and positive slogan: “don’t get scared get checked” CP, PHN, PN • Important information provided CP • “Draws your attention...eye catching and identifiable” GP • Slicker and looks like a magazine unlike other leaflets PHN • Use of Sir Alex Ferguson: worthwhile, generates conversation, recognisable, friendly, trustworthy, relatable, inviting GP, CP, PHN, PN • Length of leaflet less problematic than “Be Clear on Cancer” PN • “Leaflet broaches the possibility of cancer and facilitates a tough conversation” CP
Areas for improvement	<ul style="list-style-type: none"> • Too much text in the leaflet PHN • Leaflets are “useless and do not get picked up and read” PHN, CP • Delivery not strong enough CP • Signposting to Pharmacists omitted CP • Imagery of tea and toast as reminder of hospitals CP • Using a celebrity runs the risk of the person not being recognised thus reducing campaign credibility CP • Celebrity may not be liked by some. Using them can be “divisive” PHN • Use of “extra time” and “game over” terminology perceived as “fatalistic” GP, PHN, PN
Recommendations	<ul style="list-style-type: none"> • Need for information on frequent cough medicine use GP • Signposting to Pharmacists as somebody to speak to CP • One-page leaflet would be more user-friendly PN • Billboard campaign would draw the attention PHN

CP=Community Pharmacist; GP=General Practitioner; LC=Lung Cancer; PHN=Public Health Nurse; PN=Practice Nurse.

3.3.5.2 Perspectives on a Healthcare Professional-focused infographic

Participants provided feedback around information provided, visuals used, the role of acronyms, and the usability and usefulness of the NCCP’s “Think Lung” infographic.

Mixed views on the information provided

In general, HCPs found the NCCP “Think Lung” infographic to have some “salient points” (GP2) such as “understanding the patient” (GP4) and trigger ideas of what to look out for (PN1). PHNs found the infographic

The “Think Lung” infographic was perceived as informative, yet some information felt engineered to fit the acronyms.

“simple, clear and non-threatening” and contained *“sufficient information”* (PHN1), including some facts that they were not previously aware of (PHN4). PNs *“really liked it,”* and PHNs felt that the infographic was well pitched for HCPs. As a result, they could see themselves using it (PHN3).

CPs, on the other hand, were critical of the infographic, deeming it to be *“generic and basic”* (CP2) and that it contained *“nothing there that [they] don’t already know”* (CP1). The relevance and accuracy of information such as *“raised platelets”* (GP1) and socioeconomic deprivation as a risk factor for LC (PN1) were queried. More specific information such as cough duration (GP5) and the risk of occupational hazards (PN2) were recommended for inclusion in future iterations of the infographic.

Easy to read

Only GPs and PHNs commented on the visuals in the “Think LUNG” infographic. Overall, they found it easy to read, *“inviting you to read the facts”* (GP2). Colours and formatting were liked (PHN1, PHN2, PHN4), with alarm red colours avoided.

Information felt engineered to fit the acronyms

While it was acknowledged that acronyms in general help remember information (GP2), the acronyms LUNG and CANCER in the “Think Lung” were perceived by GP3 as *“being kind of engineered into something...non-specific to the presentation of lung cancer.”* A number of other participants also did not favour the acronyms and queried their specificity to LC (CP1), with a comment that they felt *“very generic”* (CP2). PHNs felt that acronyms in general are good (PHN3). However, they would remember the slogans of the NHS campaigns better (e.g., *been coughing for three weeks?*) (PHN4).

Queries around who was the target audience

GP1 was unsure as to who the infographic was targeting. CPs also had queries around the target audience and were vocal in emphasising that there was no useful information for them in the infographic (CP1, CP2).

PNs felt that the infographic could go into some further detail for HCPs (PN1). CPs wanted information about the referral processes rather than presenting symptoms (CP1). They also mentioned that the infographic is potentially more suitable to educate pharmacy counter staff who are often the first people to receive patient queries for repeated cough bottles (CP2). PHNs recommended using the infographic during team meetings in order to keep information fresh in people’s minds (PHN2). In terms of the format of the infographic, electronic rather than paper format was favoured by GPs (GP5) and PHNs (PHN4).

The positive elements, areas for improvement, and recommendations to improve the “Think Lung” infographic are summarised in **Table 9** below.

Table 9. Perspectives and recommendations relating to the “Think Lung” infographic

Positive aspects	• Contains “ <i>salient</i> ” points such as understanding the patient and triggers regarding what to look for	GP, PN
	• Simple, clear, and non-threatening	PN
	• Contains sufficient information	PHN
	• Presents new information	PHN
	• Easy to read and inviting	GP2
	• Well-pitched for HCPs	PHN
	• Colours and formatting favoured	PHN
Areas for improvement	• Generic and basic	CP
	• Does not present new information	CP
	• Raised platelets as signs of LC queried	GP
	• Socio-economic deprivation as a risk factor for LC queried	PN
	• Acronyms LUNG and CANCER felt “ <i>generic and engineered</i> ” to fit the information	GP, CP
	• Uncertainty regarding the target audience	GP, CP
Recommendations	• Need for more details	PN
	• Need for information on cough duration	GP
	• Include occupational hazards as risk factors	PN
	• Need for information on referral process rather than symptoms	CP
	• Potentially more suitable to educate pharmacy counter staff	CP
	• Using the infographic during team meetings to keep information fresh in people’s minds	PHN
	• Electronic rather than paper format favoured	GP, PHN

CP=Community Pharmacist; GP=General Practitioner; HCP=Healthcare Professional; LC=Lung Cancer; PHN=Public Health Nurse; PN=Practice Nurse.

3.4 Discussion

The qualitative study in this report explored barriers and facilitators to recognising the population at high risk of LC and referring individuals with signs and symptoms indicative of LC along the appropriate healthcare pathway. Strategies to engage Primary HCPs in initiatives on early detection of LC were also investigated. The following themes were created from interviews and focus groups with 36 Primary HCPs: (1) Primary HCPs’ experiences and accounts of patient referral for LC; (2) patient help-seeking for signs and symptoms of concern; (3) facilitating early presentation and referral; and (4) perspectives on previous LC awareness campaigns.

Participants identified several typical cancer signs and symptoms as triggers for referral. Haemoptysis triggered fear among patients and HCPs and warranted immediate referral. The

Haemoptysis is a feared and highly predictive symptom of LC, yet it only occurs in 20 to 23% of patients diagnosed with LC.

perceived urgency of haemoptysis is well documented in previous studies with individuals who had symptoms suggestive of LC (Birt et al., 2014) as well as those who were at risk of developing LC (Saab et al., 2021). Indeed, haemoptysis is a highly predictive symptom of LC and is one of the ‘alarm’ symptoms warranting referral to specialist services (Hennessy et al., 2020), including RALCs, yet it only occurs in 20% to 23% of patients who have LC (Koo et al., 2018). In contrast, vague/non-respiratory signs and symptoms such as back pain, pallor, and abnormal blood tests were perceived as more difficult to interpret. Indeed, LC tends to have a broad symptom signature, potentially contributing to delays in LC referral and diagnosis (Koo et al., 2018).

Participants often refrained from using the word “cancer” during conversations with patients due to scope of practice limitations and fear of mentioning the diagnosis when there are other potential underlying diagnoses

The word “cancer” was seldom used during patient consultations due to scope of practice limitations and concerns around scaring

(i.e., benign disease or causing alarm. Interestingly, a study exploring conversations around an abnormal human papillomavirus screening test for cervical cancer found that providers, but not patients, expressed discomfort with use of the word “cancer” during specialist referral (Simon et al., 2010). In contrast, a recent study of high-risk individuals in Ireland found that the words “cancer” and “lung cancer” caused fear and panic among participants (Saab et al., 2021).

Participants felt their role was to advise, encourage, and reassure patients, while upholding and respecting their autonomy.

Despite the challenges surrounding the referral process, participants felt their role included advising, encouraging, and reassuring patients, while upholding and respecting patient autonomy. Understanding and having professional insight into a patient’s health were also highlighted as important, specifically in terms of “knowing” the patients and seeing them in their own homes. In contrast, locum pharmacists, who moved between different pharmacies, reported challenges in recognising and referring patients with possible signs and symptoms of cancer due to the lack of an established therapeutic relationship. In some cases, “knowing” the patient made it difficult for some HCPs to clearly articulate the potential seriousness of the clinical presentation and the importance of timely referral.

GPs are the primary users of the RALCs e-referral system and were the most aware of these clinics.

GPs reported positive experiences with RALCs, including confidence in the expertise of the RALC team. GPs also valued the timely access to diagnostics (including CT) afforded by the RALCs, while expressing some concern in relation to burdening the system. Issues with the e-referral system were highlighted, however, with some GPs discussing information technology challenges. Another

There was an apparent underuse of the RALCs e-referral system as compared to other rapid access cancer clinics with some GPs referring patients to RALCs only when clear and definitive LC signs and symptoms

issue identified by GPs was the potential underuse of RALCs, with some GPs referring patients to RALCs only when clear and definitive LC symptoms are noted. While it is critical to ensure that RALCs are used appropriately, and that patients referred to these services meet the designated clinical and/or

radiological criteria, as gatekeepers of the service, HCPs themselves can potentially present a barrier to patients accessing RALCs. A study on RALCs by Hennessy et al. (2020) found that 37% of patients attending the RALCs for the first time in 2012-2018 were subsequently diagnosed with LC. According to the NCCP suite of Key Performance Indicators, current target LC conversion rates at the RALCs are >25%. The considerably higher conversion rate of 37% observed by Hennessy et al. (2020) suggests that the criteria for referral to RALCs may be too stringent, or that these services may be underused by GPs. These concerns were echoed by current study participants. Increased awareness of RALCs and potential revision of existing GP referral guidelines may help to optimise use of the RALCs, supporting timely LC diagnosis. HCPs should be provided with the opportunity to revisit and source new or updated information on the RALCs. For example, education sessions through CPD programmes would enhance awareness amongst community-based HCPs.

A Key Performance Indicator for the RALCs is that all patients referred are seen within 10 working days.

Participants, particularly CPs, often did not know the outcome of their referrals due to the lack of communication in the healthcare system.

Lack of communication and the resulting disruption in continuity of care for patients with suspected LC were highlighted as healthcare system flaws. The greatest challenges appeared to be the lack of integrated care

and appropriate communication between HCP groups. HCP groups that are not directly engaged in referral to secondary care (e.g., CPs and PHNs) expressed their frustration at the lack of communication once a patient had been referred to the GP. To address this challenge, participants recommended enhancing continuity of care through interprofessional communication.

Potential barriers for help-seeking for symptoms of concern were explored in depth with the participants who identified several healthcare- and patient-related barriers to help-seeking. For instance, the cost of GP visits and long waiting times emerged as potential barriers. These findings are well documented in our previous research with at-risk patients (Saab et al., 2020b; 2021b), as well as in the wider literature (Fish et al., 2015; O'Mahony et al., 2013). However, in the current study, there was no full agreement on how cost impacted on patients with LC symptoms due to the eligibility of most high-risk groups for GP visit/medical cards.

There was no full agreement on how cost impacted on patients with LC symptoms due to the eligibility of most high-risk groups for GP visit/medical cards.

The probability of having a missed LC on CT is much lower than on chest X-ray.

Recommendations regarding diagnostic imaging for patients with suspected LC require careful consideration. Current NCCP GP LC Referral Guidelines describe indications for urgent chest X-ray and include a recommendation not to delay RALC referral by ordering an outpatient CT if there is a suspicion of LC, as the RALC can arrange both imaging and bronchoscopy. However, Hennessy et al. (2020) found that patients who underwent CT prior to RALC referral experienced a shorter time to diagnosis than those who underwent CT post-RALC referral. The authors advised that these findings be considered in updates/revision of national LC policy. Key considerations in any such revision to LC policy/guidelines include GP direct access to diagnostics (CT) and capacity to deliver diagnostic services. International evidence demonstrates that the probability of having a missed LC on CT is much lower than on chest X-ray (Del Ciello et al., 2017). Of note, previous misdiagnosis and resulting mistrust in the healthcare system are recognised impediments to subsequent help-seeking (Scott & Walter, 2010). However, the risk/benefit ratio of recommended diagnostic modalities/pathways for specific patient cohorts requires careful consideration. For example, the radiation dose associated with a CT, and the cost of delivering CT scans, far exceeds that of x-ray. Additional concerns include the potential for over diagnosis.

Current study participants also acknowledged that perceived judgment by Primary HCPs prevents some patients from seeking their help for symptoms of concern. This is a common phenomenon in the health literature, where one poor experience with HCPs can undermine future engagement, particularly for an illness that is associated with lifestyle behaviours like smoking (Doyle et al., 2013). This was also evident in our previous research with at-risk individuals who stated that bad experiences with the healthcare system and HCPs would deter them from seeking medical attention for LC alarm symptoms (Saab et al., 2020b; 2021b). Such experiences were also linked to smoking and the embarrassment, guilt, and fear from judgement associated with this behaviour. Indeed, higher levels of perceived LC stigma are associated with a longer wait to seek medical help for symptoms of concern (Carter-Harris et al., 2015).

Fear of being judged by HCPs can affect patient help-seeking for symptoms of concern.

CPs believed that pharmacies were more female gender friendly which could potentially prevent men from entering a pharmacy and seeking help from a CP.

Other emotional factors linked to help-seeking delay which were identified by current study participants and are well documented in the wider literature (Cassim et al., 2019; Saab et al., 2020b; 2020a)

relate to the different emotions that a potential cancer diagnosis triggers including fear, denial, and anger. This was particularly evident among men and more so among those residing in rural areas where access to healthcare services is more limited. Interestingly, participants also believed that pharmacies were more female gender friendly which could potentially prevent men from entering a

pharmacy and seeking help from a CP. A conceptual theoretical review of the literature on health- and help-seeking among men concluded that healthcare initiatives directed at increasing rural men's engagement with healthcare services can reach this underserved population by considering factors that are important to this population such as social networks and local gender norms (Hiebert et al., 2018). In the Irish context, the Men's Sheds Association (<http://menssheds.ie>) is a non-profit organisation employed to reach men and improve health literacy. Individual Men's Sheds work at a community level to advise and improve men's health (Drummond et al., 2019). A study exploring Men's Sheds members' experiences found that the Sheds instilled a sense of belonging, helped establish reciprocal networks of support, helped men use or learn skills, and helped build men's self-confidence and self-worth (Lefkowich & Richardson, 2018). Therefore, Men's Sheds could be a useful route to educating men about LC, particularly those living in rural areas.

There is a need for **community initiatives to reach out to individuals, particularly men who are living in rural areas.**

The impact of the COVID-19 pandemic on LC help-seeking was identified as follows:

- Stigma relating to cough
- Lack of in-person contact with HCPs
- COVID-19-related health issues prioritised
- Fear of contracting or transmitting COVID-19 in healthcare settings

Participants believed that the advent of the COVID-19 pandemic has exacerbated the delay in help-seeking and subsequent LC diagnosis due to factors like fear of contacting COVID-19 in healthcare facilities, stigma surrounding a cough during the pandemic, and

prioritising COVID-19-related health concerns. This delay was evident in a survey in the UK which found that approximately half of patients who reported experiencing cancer alarm signs and symptoms did not contact their GP due to concerns about catching or transmitting COVID-19 (Quinn-Scoggins & Cannings-John, 2021). Similarly, a pre-post survey in Spain found that patients reported significantly longer waiting times to help-seeking for cancer symptoms after the pandemic (Petrova et al., 2021). Moreover, akin to findings from our present study, the British and Spanish studies found that patients did not want to overburden the healthcare system, and therefore decided to delay help-seeking for cancer symptoms (Petrova et al., 2021; Quinn-Scoggins & Cannings-John, 2021).

While some GPs in the present study perceived telephone consultations as helpful during the COVID-19 pandemic, other HCPs felt the lack of in-person contact could lead to missed LC diagnosis, particularly when physical changes such as weight loss cannot be readily appraised during telephone consultations. CPs also discussed the dangers of remote prescribing (e.g., antibiotics) without seeing or assessing the

Telephone consultations during the COVID-19 pandemic were welcomed by some participants, while others warned about the risk of missed LC diagnosis, particularly when physical changes such as weight loss are present.

patient. While telephone/video consultations provide an appropriate alternative to in-person consultations in certain circumstances (Downes et al., 2017), several challenges exist, including limited staff training in telephone consultations, suboptimal patient-physician interaction, insufficient technical support, concerns around privacy and confidentiality, and inconsistencies in documentation (Hasani et al., 2020).

A public health approach to the delivery of essential health services while living with COVID-19 was perceived as essential. Indeed, as the public health approach to 'living with COVID-19' continues to evolve, further emphasis is required on the availability, accessibility, and urgency of attendance for non-COVID-19 health concerns (World Health Organization, 2020a). Public information/awareness campaigns must be patient-centric and family inclusive and should signpost patients to appropriate care pathways.

Systems level barriers to early diagnosis of LC identified in this study included siloed provision of care and lack of communication between HCP groups

A number of systems factors that can act as barriers to timely cancer diagnosis were identified. For example, Ireland operates a mixed public/private healthcare system, with some primary HCPs publicly employed by the HSE (main provider of public health and social care services in Ireland), while others are privately employed, adding to the complexity of proposed solutions to achieve integrated care. Considerations include governance, professional roles and scope of practice, information communication technology solutions, and data protection issues. E-referral systems have the potential to enhance interdisciplinary communication and facilitate continuity of care (Martirosov et al., 2020). Suboptimal continuity of care also increases the risk of patients "falling through the cracks." Potential solutions may include creating new roles, such as nurse navigators, who act as the primary point of contact for patients diagnosed with cancer and serve as a liaison between the patient and other HCPs (Haase et al., 2020; Shusted et al., 2019).

Participants highlighted the importance of CPD in educating HCPs about LC. CPD offers HCPs opportunities to sustain, enhance and expand their knowledge and skills, therefore improving patient care (Coventry et al., 2015). Several barriers to

Nurses highlighted the importance of face-to-face education, CPD courses on LC, using HSELand, and training by nurse specialists, while acknowledging the financial limitations of undertaking CPD.

CPD exist for some cohorts (e.g., privately employed nurses) and are well documented in the wider literature, with financial cost presenting a major barrier (Palma et al., 2020). This aligns with current study findings. Other barriers to CPD uptake include understaffing, difficulty taking time off, concerns that CPD would compromise work/life balance/ time outside work, and lack of organisational support (Coventry et al., 2015; Katsikitis et al., 2013; Palma et al., 2020; Summers, 2015).

Professional organisations and e-mail communications were also recommended to spread the word about LC and RALCs; however, some participants warned about e-mail fatigue. Indeed, while electronic fora like webinars, online conferences, and e-mails can be conducive to the acquisition of new information, particularly in the context of the COVID-19 pandemic, e-mail overload may deter HCPs from engaging with educational initiatives (Paul and Levi, 2014; Wood and Krasowski, 2020).

Professional organisations were perceived as essential sources of information on LC referral by GPs and CPs.

Simple, memorable, and brief referral checklists, flowcharts, and algorithms were recommended by all, with some participants recommending embedding those into Ireland's Chronic Disease Management Programme.

Simple, memorable, and brief referral checklists, flowcharts, and algorithms were recommended. However, participants stressed the importance of avoiding overloading HCPs with too many checklists, which could lead to disengagement. GPs and PNs,

who use Ireland's Chronic Disease Management Programme, recommended integrating a cancer module into this system or embedding a LC checklist into existing modules (e.g., the COPD module).

CPs, who sometimes reported feeling like "outsiders" in the system, believed that interdisciplinary education has the potential to raise LC awareness and facilitate collaboration

CPs highlighted the importance of **interprofessional education** on LC referral.

among HCPs. Indeed, there is substantial evidence to support the beneficial impact of interdisciplinary education models on patient outcomes (Bridges et al., 2011). The use of positive

CPs and PHNs recommended using patient stories to engage HCPs in LC education.

patient stories and testimonials was identified as another means to engage HCPs in LC education. In fact, the use of patient stories is a well-established strategy to educate HCPs

(Haigh and Hardy, 2011). Laing et al. (2017) found that digital stories of patients with cancer helped HCPs understand the patient experience. This was thought to lead to more efficient patient care and clinical decision-making.

Participants were shown posters and leaflets from two NHS patient-focussed LC awareness campaigns. They were also shown an HCP-focussed infographic titled "Think Lung" developed by the NCCP (**Figure 2 above**) (Kennedy et al., 2021; HSE, 2021b). This sparked conversations around the content, layout, and potential effectiveness of the two campaigns and the infographic.

In terms of the NHS patient-focussed LC awareness campaigns, there was a clear divide between the different HCP groups. While several CPs appreciated the level of detail in the English campaign, most Nurses

The English campaign "Be Clear on Cancer" was found to significantly increase LC awareness and help-seeking and reduce the number of patients diagnosed with late-stage LC.

(i.e., PNs and PHNs) as well as GPs commented on the length of the “Be Clear on Cancer” leaflet and the resulting risk of information overload. In contrast, the Scottish campaign was perceived as less clinical, more positive and upbeat due to the positive slogan “Don’t Get Scared Get Checked,” and more appropriate to the target population. The use of a celebrity (i.e., Sir Alex Ferguson) on the cover of the Scottish campaign was also perceived as effective. Similar feedback was provided by at-risk individuals in our previous study who appreciated the acknowledgement of their potential fears and the positivity and clarity of the messages in both campaigns, particularly the Scottish one (Saab et al., 2020a; 2020b). Of note, the English campaign “Be Clear on Cancer” has been evaluated on several occasions and was found to significantly increase LC awareness and help-seeking and reduce the number of patients diagnosed with late-stage LC (Ironmonger et al., 2015; Moffat et al., 2015; Power & Wardle, 2015). For instance, Ironmonger et al. (2015) found that the campaign was successful in increasing awareness of cough ($p<0.001$), breathlessness ($p=0.024$), haemoptysis ($p<0.001$), chest pain ($p=0.015$) and unexplained weight loss ($p<0.001$) as symptoms of LC. Recall and recognition of a persistent cough or hoarseness as signs of LC also increased significantly from 67% pre-campaign to 78% post-campaign ($p<0.001$) (Power & Wardle, 2015). As for prompted awareness, the proportion of participants identifying a ‘cough for 3 weeks or more that doesn’t go away’ as definite warning sign of LC increased from 18% precampaign to 33% post-campaign ($p<0.001$) (Moffat et al., 2015). However, subsequent evaluations of this campaign demonstrated that the increase in symptom awareness, presentation, and GP-ordered chest X-rays did not translate into increased urgent suspected cancer referrals or clinical outcomes changes (McCutchan et al., 2020; Lai et al., 2021).

Recommendations to improve the “Think Lung” infographic included: defining the target population, rethinking the use of acronyms, reconsidering the relevance of some information like raised platelets, adding environmental hazards and occupational exposure to the list of LC risk factors, adding the cough duration, and including information on the referral process.

As for the NCCP’s HCP-focussed infographic “Think Lung,” participants believed that the infographic was simple, easy to read, and provided important information. However, some HCPs, particularly CPs and GPs perceived the infographic as basic and more suitable for pharmacy counter staff rather

than CPs. Others queried the relevance of some information such as raised platelets and recommended adding environmental hazards and occupational exposure to the list of risk factors as well as including the referral process as part of the infographic. The acronyms used, particularly LUNG, felt engineered to fit the information. The use of acronyms in healthcare is common and is known to facilitate communication between HCPs.

3.5 Strengths and limitations

To the best of our knowledge, this is the first study to explore Primary HCPs' experiences of recognising and referring patients with symptoms suggestive of LC. Several measures were taken to enhance data trustworthiness and transferability, such as having each of the team members cross-check the data coding process, keeping reflexive memos following interviews and focus groups, seeking participation nationally, and achieving data saturation for each of the HCP groups.

Only Primary HCPs who volunteered to participate in the study were interviewed, with associated risk of self-selection bias. In accordance with public health and government guidance relating to the COVID-19 pandemic, all interviews and focus groups were conducted virtually. While this approach was feasible, the human element of qualitative interviewing was lacking.

3.6 Conclusion

This research offers valuable insights from Primary HCPs regarding the referral of individuals with signs and symptoms suggestive of LC. Responsibility for referral to specialist care remains with GPs, who are the gatekeepers to secondary care in Ireland. Other Primary HCPs can advise and encourage patients to consult their GP as an initial step before specialist referral. Recommendations to promote early and timely referral by Primary HCPs are summarised in **Figure 3**. Education for Primary HCPs is recommended in the form of communications from professional organisations, webinars, interdisciplinary team meetings and educational interventions delivered by LC specialists and use of positive patient testimonials. LC referral checklists and algorithms should be simple, clear, and visually appealing, either developed as standalone tools or embedded into existing primary care software/programmes. The need for enhanced integration of care and improved communication between the different healthcare disciplines is also clearly identified.

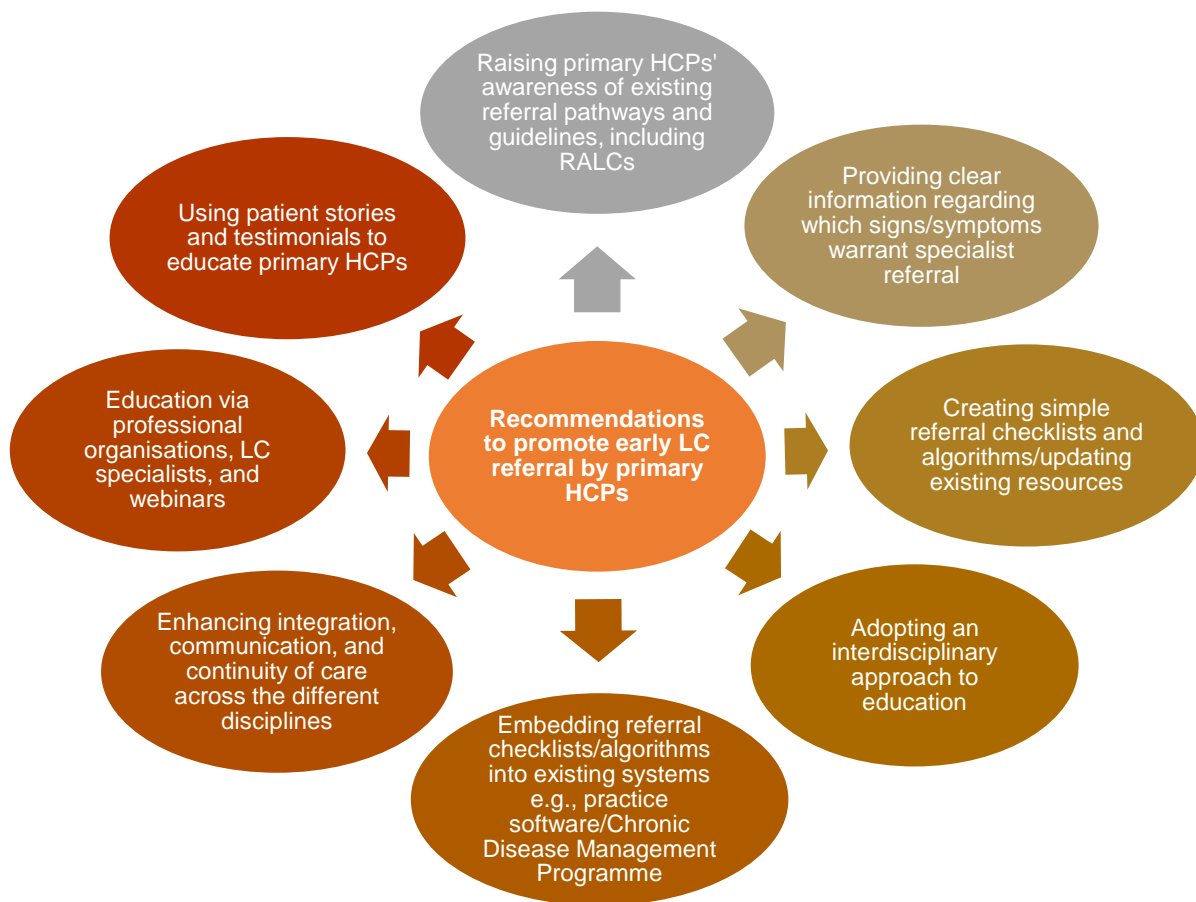


Figure 3. Summary of recommendations to promote early referral by Primary HCPs.

This study also offers rich insights from Primary HCPs regarding barriers to patient help-seeking for signs and symptoms suggestive of LC. Some participants believed that the high cost of a GP visit for those without a medical/GP visit card, perceived long waiting times, and previous bad experiences with the healthcare system would deter patients from seeking help for symptoms of concern. Perceived patient-related barriers to help-seeking related to the different emotions that may be triggered by a potential cancer diagnosis, in addition to embarrassment and guilt felt by patients due to smoking. Certain socio-demographic factors were also perceived to impede help-seeking including drug use, homelessness, living in rural areas, and being male and older. The impact of the COVID-19 pandemic featured strongly, with many participants believing that the fear of contracting or transmitting COVID-19 reduced patient visits. While virtual GP consultations were perceived as practical during the pandemic, some participants expressed concerns around missed cancers. Participants recommended several strategies (**summarised Figure 4**) to enable patients to seek medical help for symptoms of concern including targeted educational campaigns/interventions focussing on symptoms (e.g., cough) rather than behaviours (e.g., smoking), accessible and free health services, and using patients' support networks to promote early help-seeking.

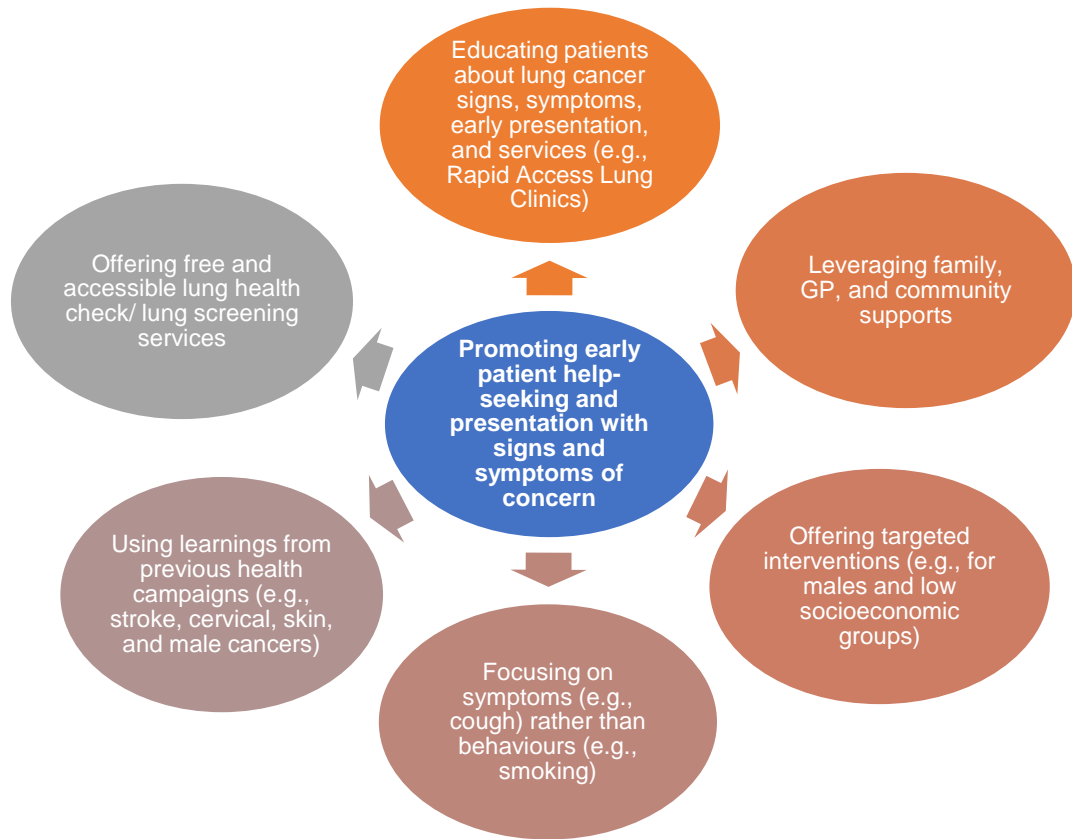


Figure 4. Summary of recommendations to promote early patient presentation and help-seeking for symptoms of concern.

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Appendices

Appendix 1. Data extraction from the included studies (n=5)

Author(s), Year & Country	Aim	Design & Theory	Sample & Setting	Relevant Outcomes	Intervention	Procedures & Instruments	Follow-up time(s)	Relevant Findings ^a	LOE ^{**}
Athey et al. 2012) England	To evaluate the effectiveness of a mixed method community based social marketing intervention on LC diagnosis	Pre-post telephone survey	n=1,601 members of the public (n=801 pre-test and 800 post-test) from 6 priority communities served by 11 General Practitioner (GP) surgeries (Intervention Group [IG]) and 5 communities served by nine GP surgeries (Control Group [CG]) Community and GP surgeries	Chest x-ray rates LC diagnosis Stage at diagnosis	Push-pull approach. <i>Push:</i> public awareness campaign designed by creative, media, and public relations agencies; face-to-face events; and conversations that focused on raising awareness of the importance of seeking medical advice and requesting a chest x-ray for a cough lasting more than 3 weeks <i>Pull:</i> Training HCPs (HCPs) for the initiative i.e., sharing insights, training, and capacity management in GP surgeries. HCPs reminded of National Institute for Health and Care Excellence chest x-ray referral criteria. Community pharmacists encouraged to promote campaign materials to patients buying over-the-counter cough medication. GP practices visited and training delivered prior to the public campaign	Public awareness campaign evaluated by a telephone survey Retrospective chest-x-ray data from the Radiology Information System. The numbers of x-rays requested by the practices over the 6 weeks before and after the interventions were recorded. These were compared with the GP x-ray request rates. Data compared between 12 months pre-test and 12 months post-test	12 months	Q1: Compared to 6 weeks pre-test and during campaign, chest x-ray referrals increased by 289 (22%). 169 more x-rays obtained (19% increase) in CG and 120 more x-rays in IG (27% increase) Q1: 12 months post-test: continued increase in chest x-rays requested in IG (extra 567 chest x-rays [20% increase]) vs 32 fewer x-rays (2% fall) in CG Q1: Statistically significant increase in the number of chest x-rays over time between IG and CG (Incidence Rate Ratio [IRR]=1.22, 95%Confidence Interval [CI] 1.12-1.33, p=0.001) Q1: Compared with 12 months pre-test, LC diagnoses increased by 27% in IG and fell by 10% in CG. This was not statistically significant (IRR=1.42; 95%CI 0.83-2.44; p=0.199) Q1: No significant stage shift found at 3 months, 6 months, or 1 year post-test	2+
Emery et al. (2017)	To measure the effect of	2x2 Factorial cluster	n=1,358 participants with	Total Diagnostic Interval (TDI)	<i>Community Intervention:</i> Modified "Find Cancer	Trial Area A received the community symptom	3 months	Q1: No statistically significant differences in the TDI at the community or GP levels, or by factorial design for	1+

Author(s), Year & Country	Aim	Design & Theory	Sample & Setting	Relevant Outcomes	Intervention	Procedures & Instruments	Follow-up time(s)	Relevant Findings*	LOE**
Australia	community-based symptom awareness and general practice-based educational interventions on the time to diagnosis in rural patients presenting with breast, prostate, colorectal or LC	randomised controlled trial (RCT) The Model of Pathways to Treatment	breast, prostate, colorectal, and LC (of those, n=117 participants had LC) from Trial Area A and Trial Area B Community	i.e., time from first symptom to cancer diagnosis	Early" United Kingdom-based campaign tailored for rural Australians. <i>GP intervention:</i> GP education resource card with symptom risk assessment charts and local cancer referral pathways created and implemented through multiple academic visits, to promote earlier recognition and investigation of suspicious symptoms by GPs and clarifying cancerdiagnostic pathways	awareness campaign and Trial Area B acted as the community campaign control region. Within both Trial Areas, general practices were randomised to the GP intervention or control. SYMPTOM questionnaire and GP record audit tool were used to calculate TDI: <i>SYMPTOM questionnaire:</i> Participants answered items specific to LC to capture details of symptoms, their date of onset and time taken to seek help <i>GP record audit tool:</i> Captured information on the date, type and duration of symptoms within the last 12 months and referral information		any tumour group. For LC: community intervention vs control: Median TDI 114.5 vs 114 days, Mean Difference=0.06, 95%CI 0.39-0.5, p=0.79; GP intervention vs control: 115 vs 125 days; Mean Difference=0.02, 95%CI 0.56-0.60, p=0.45	
Guldbrandt et al. (2014) Denmark	To describe the usage and outcome of a technological upgrade in a GP update format and implementing direct access to chest low dose computed tomography (LDCT) from general practice for patients with respiratory symptoms	Cohort study nested in an RCT	n=133 GPs (64 participated in continuing medical education [CME] and 69 did not participate in CME) 60 general practices and Department of Radiology in a University Hospital	Amount of diagnostic workup needed Cancer incidence Use of fast-track referral option for suspected LC (In this programme, GPs can refer patients with "reasonable suspicion" of LC to a fast-	<i>IG:</i> Six times within a 3-month period, GPs were informed by letter about the intervention. Letters included information concerning the referral procedures and indications for the CT to let GPs substitute the radiograph with chest LDCT when ruling out LC GPs invited to sit in 1 of 8 1-hour small-group-based CME meetings on the state-of-the-art knowledge on LC early detection	Data obtained from GP referral notes on symptoms, known diseases, and smoking history Danish Lung Cancer Registry used for information on subsequent LC diagnosis Danish Deprivation Index used for information on deprivation rates in different GP clinics Health Service Registry used to gather information	19 months	Q1: 91 (68.4%) GPs used direct CTs Q1: Referral rate to direct CT was significantly (61%) higher (95%CI 54-66%) among GPs working in a clinic with one or more CME-participating GPs Q1: 335 patients referred to LC fast-track. Of those, 33 (10%) had confirmed LC diagnosis. Of those, 8 (23.5%) had early-stage LC and 26 (76.5%) had advanced LC Q1: Referral rate to the LC fast-track programme was 0.13 (95%CI 0.09 to 0.19) for CME-participating GPs vs 0.14 (95%CI 0.09-0.20) for non-participating GPs (p=0.503) Q1: PPV for LC diagnosis as a result of referral to a fast-track LC pathway was 13.3% (95%CI 8.7 to	2+

Author(s), Year & Country	Aim	Design & Theory	Sample & Setting	Relevant Outcomes	Intervention	Procedures & Instruments	Follow-up time(s)	Relevant Findings*	LOE**
				track evaluation, a maximum of 72 hours waiting time. This programme offers direct access to chest CT from general practice for patients with respiratory symptoms since 2008) Stage at diagnosis	Algorithms for positive predictive values (PPV) in primary care used GPs received information about CT, how to use them, and how to interpret the reports CG: GPs did not participate in CME	about GP list size and age/gender distribution of patients listed with the GP Indirect sex-age standardisation used to compare referral rates between CME-attending GPs and non-attending GPs		19.1%) for CME-participating GPs and 6.1% (95%CI 3-11%) for non-participating GPs (p=0.027; i.e., 2.2 higher PPV)	
Gulbrandt et al. (2015) Denmark	To measure the effect of direct access to LDCT from general practice in early LC detection on time to diagnosis and stage at diagnosis	Cluster RCT	n=266 GPs (n=133 IG and n=133 CG) 119 General practices and Department of Radiology in a University Hospital	Primary care interval Diagnostic interval Stage at diagnosis	IG: Six times within a 3-month period, GPs were informed by letter about the intervention. Letters included information concerning the referral procedures and indications for the CT GPs invited to sit in 1-hour small-group-based CME meetings to increase their awareness of LC GPs received information about the CT, how to use them, and how to interpret the reports If nodules (4-10 mm) could not be categorised as benign, GP referred patient to follow-up program (3, 6, or 12 months after first scan) as decided by the chest physicians. If CT revealed suspicion of LC, GP	Danish Lung Cancer Registry and the Danish National Patient Registry used to identify LC cases Danish Deprivation Index used to gather information about deprivation level in the different GP clinics' population Data on patient comorbidity obtained from GP Questionnaire Data on identified LC patient's socio-economic position collected from Statistics Denmark	3, 6, or 12 months after the first scan (according to the size and the characteristics of the nodules)	Q1: No statistically significant difference in primary care interval between patients in IG (Median=14 days, inter quartile intervals [IQI]=4-53) and patients in CG (Median=18 days, IQI=5-69, prevalence ratio [PR]=0.99, 95%CI 0.65-1.54, p=0.455) Q1: No statistically significant difference in diagnostic interval between patients in IG (Median=44 days, IQI=17-83) and patients in CG (Median=36 days, IQI=17-112, PR=0.8, 95%CI 0.5-1.27, p=0.299) Q1: Primary care interval and diagnostic interval in IG statistically significantly shorter if the GP participated in CME (primary care interval Median=9 days [with CME] vs. 37 days [without CME], p=0.048; diagnostic interval Median=23 days [with CME] vs. 66 days [without CME], p=0.008) Q1: Non-statistically significant higher risk of having a long diagnostic interval for patients in the CG (Risk difference=13.5%, 95%CI -11-37.9%, p=0.280). No statistically significant difference in risk for having a long primary care interval was observed using this approach (RD=1.1%, 95%CI 23.9 to 26.1%, p=0.929) Q1: Non-statistically significant difference in stage of LC at diagnosis between CG and IG for all patients (p=0.586 for advanced [stage IV] LC and p=0.595 for localised [stage IA-IIIa] LC)	1+

Author(s), Year & Country	Aim	Design & Theory	Sample & Setting	Relevant Outcomes	Intervention	Procedures & Instruments	Follow-up time(s)	Relevant Findings [*]	LOE ^{**}
					referred patients (fast track) to standard diagnostics CG: Usual care			Q1: Non-statistically significant difference in stage of LC at diagnosis between CG and IG for patients whose GP was involved in the diagnosis (p=0.47 for advanced [stage IV] LC and p=0.658 for localised [stage IA-IIIa] LC)	
Prades et al. (2011) Spain	To reduce the time between well-founded suspicion of breast, colorectal and LC and the start of treatment	Mixed -methods study of a Cancer Fast-track Programme (CFP)	n=56,020 individuals included in the CFP (quantitative) n=83 HCPs (qualitative) The Catalonian Health Service (private and publicly owned health facilities)	LC patients diagnosed through CFP route Patients referred from GPs Compliance with referral guidelines LC detection rate Mean time between detection of suspected cancer and start of treatment Distribution of the wait	CFP programme was launched in 2005 for cancers registering the highest incidence and mortality rates. Its aim is to reduce the lag (time elapsed) between suspicion, diagnosis, and treatment of cancer, by designing circuits that would foster the rapid coordination of the process circuit (30 days between well-founded suspicion of cancer and the start of initial treatment) Healthcare authorities issued organisational recommendations for effective implementation of these circuits, for example, clinician responsible for disease, definition of maximum waiting times for diagnosis, study without hospitalisation where possible or coordination mechanisms in the event of referral to another hospital	Quantitative analysis of the CFP was performed using data generated by the hospitals based on seven FastTrack monitoring indicators for the period 2006-2009. All new cancer diagnoses were included but cases of relapse were excluded	Not reported	Q1: Decrease in the proportion of overall LCs diagnosed via the CFP (cancer detection rate) from 2006 (60.2 [95%CI 59.8-63.4]) to 2009 (53.2 [95%CI 51.5-54.9]) Q1: Decrease in the proportion of LC patients referred by a GP from 2006 (60.6 [95%CI 59-62.3]) to 2009 (41.4 [95%CI 39.7-42.9]) Q1: LC detection rate decreased from 49.9 (95%CI 48.2 to 51.6) in 2006 to 39.7 (95%CI 38.1-41.2) in 2009 Q1: Mean time from detection of suspected LC in symptomatic patients in primary care to start of initial treatment increased from 30.8 days (2006) to 36.7 days (2009) Q1: Increase in proportion of LC patients waiting over 45 days from the time of detection of suspected cancer to start of initial treatment (13.6% in 2006 vs 22.6% in 2009) Increase in proportion of LC cases waiting between 30-45 days (23.7% in 2006 to 26.1% in 2009) Q2: Increase in compliance with referral guidelines from 70.8% in 2006 (95%CI 69.1-72.1) to 82.3% in 2009 (95%CI 81.1-83.5)	2+

*Findings presented according to the review objectives:

Q1: Patient outcomes

Q2: HCP outcomes

**Level of evidence (LOE) assessment using the Scottish Intercollegiate Guidelines Network grading system

Abbreviations: ALT=Alanine Aminotransferase; CFP=Cancer Fast-track Programme; CG=Control Group; CI=Confidence Interval; CME=Continuing Medical Education; DFS=Disease Free Survival; GP=General Practitioner; HCP=HCP; IG=Intervention Group; IQR=Inter Quartile Interval; IRR=Incidence Rate Ratio; LC=Lung Cancer; LCSP=Lung Cancer Strategist Programme; LDCT=Low Dose Computed Tomography; MDT=Multidisciplinary Team; OS=Overall Survival; PPV=Positive Predictive Value; PR=Prevalence Ratio; RCT=Randomised Controlled Trial; TDI=Total Diagnostic Interval.

Appendix 2. Quality appraisal for non-randomised studies and randomised controlled trials using the Mixed Methods Appraisal Tool (n=5)

Study designs	Author(s) & year	Quality appraisal items*											
		1	2	3	4	5	6	7	8	9	10	11	12
Non-randomised studies**	Athey et al. (2012)	Y	Y	CT	Y	Y	N	Y					
	Guldbrant et al. (2014)	Y	Y	Y	Y	Y	CT	Y					
	Prades et al. (2011)	Y	Y	CT	Y	Y	CT	Y					
Randomised controlled trials***	Emery et al. (2017)	Y	Y						Y	Y	N	Y	Y
	Gudlbrant et al. (2015)	Y	Y						Y	Y	Y	N	Y

***All studies:**

1=Clear research questions/aims

2=Data collected address research question/aims

****Non-randomised studies:**

3=Participants representative of target population

4=Measurements appropriate regarding both the outcome and the intervention

5=Complete outcome data

6=Confounders accounted for in the design and analysis

7=The intervention administered as intended

*****Randomised controlled trials:**

8=Randomisation appropriately performed

9=Groups comparable at baseline

10=There are complete outcome data

11=Outcome assessors blinded to the intervention

12=Participants adhered to the assigned intervention

Abbreviations: CT=can't tell; N=no; Y=yes.

Appendix 3. Socio-demographic questionnaire

Please answer all 8 questions below:

1. Age (tick one):

- 21–30 years
- 31–40 years
- 41–50 years
- 51–60 years
- > 60 years

2. Gender (tick one):

- Male
- Female
- Other (please specify):

3. Highest level of education (tick one):

- Certificate
- Diploma
- Higher/postgraduate diploma
- Bachelor's degree
- Master's degree
- PhD/Doctorate
- Other (please specify):

4. Years of experience since primary qualification: years

5. Current role (tick one):

- General Practitioner (Qualified)
- General Practitioner (Trainee)
- Practice Nurse
- Public Health Nurse
- Pharmacist
- Other (please specify):

6. Time in current professional role: years

7. County of work:

8. Place of work (tick one):

- Urban
- Rural

Appendix 4A. Semi-structured qualitative interview guide for General Practitioners

1. Think of a time you had to refer somebody with suspected lung cancer:

- a. What made you suspect it was lung cancer? (*probes: signs, symptoms, risk factors, patient profile, etc.*)
- b. How did you break the news to this individual?
- c. How did this individual take the news?
- d. Can you please talk me through the referral process? (*to whom, where, how long, etc.*)
- e. How long did this consultation take? was it longer than an average consultation?
- f. Would you have done anything differently? If so, please elaborate.
- g. If all tests came back negative, what did you do next? Was there any follow up?

If to this point the participant does not mention Rapid Access Lung Clinics, ask:

- h. Have you heard of Rapid Access Lung Clinics? If so, have you referred anyone to those clinics? Why/ why not? How did you refer? (*e.g., electronic referral/paper referral*)

2. I would like you to reflect on help-seeking for lung cancer:

- a. What do you think would stop a person from seeking help from a GP for symptoms indicative of lung cancer?
- b. What do you think would encourage a person to seek help from a GP for symptoms indicative of lung cancer?

3. Last year, we interviewed 46 individuals who were at risk for lung cancer. A number of these individuals refused to seek help from their GP due the (i) cost of a GP visit, (ii) previous bad experiences with the healthcare system, (iii) long waiting time to get a GP appointment, and (iv) some GPs' perceived negative attitudes towards smokers (e.g., shaming and blaming everything on smoking).

- a. What do you think can be done to address such barriers?

4. We would like to hear your perspectives about potential interventions to help GPs recognise and refer high-risk individuals with symptoms indicative of lung cancer along the appropriate healthcare pathway:

- a. What interventions can you think of/recommend? (*content, format, delivery etc.*)
- b. How can these interventions be implemented?
- c. Can you think of similar interventions which have worked in the past?
- d. Can you see anything similar being done in Ireland? How?

5. Share with participants the (i) "Be Clear on Cancer" poster, leaflet and symptom checker card, (ii) "Detect Cancer Early" poster and leaflet, and (iii) "Think Lung" infographic, give them 5-10min to go over those, then ask:

- a. How did you find the interventions? (*format, colour, information, celebrity, personal stories*)
- b. Do you think these resources would be useful to your patients? If so, which one(s)? Why?
- c. Would you like to add anything before we end our interview?

Appendix 4B. Semi-structured qualitative interview guide for Public Health Nurses

1. Think of a time you had to refer somebody with suspected lung cancer to a GP:

- a. What made you suspect that this person might have had lung cancer? (*probes: signs, symptoms, risk factors, patient profile, etc.*)
- b. During what type of meeting have you noticed this information? (*e.g., changing a wound dressing, etc.*)
- c. If the discussion of lung cancer signs/symptoms was opportunistic/not the primary purpose of the visit, how long did this discussion take?
- d. How did you raise the subject?
- e. Can you please talk me through the referral process? (*to whom, where, how long until patient was seen, etc.*)
- f. Were you informed about the outcome of the referral to the GP? (*e.g., patient informed you, GP informed you, etc.*)

If to this point the participant does not mention Rapid Access Lung Clinics, ask:

- g. What do you know about the Rapid Access Lung Clinics?

2. I would like you to reflect on help-seeking for lung cancer:

- a. What do you think would stop a person from seeking help from a HCP for symptoms indicative of lung cancer?
- b. What do you think would encourage a person to seek help from a HCP for symptoms indicative of lung cancer?

3. Last year, we interviewed 46 individuals who were at risk for lung cancer. A number of these individuals refused to seek help from their GP due the (i) cost of a GP visit, (ii) previous bad experiences with the healthcare system, (iii) long waiting time to get a GP appointment, and (iv) some GPs' perceived negative attitudes towards smokers (e.g., shaming and blaming everything on smoking).

- a. What do you think can be done to address such barriers?

4. We would like to hear your perspectives about potential interventions to help PHNs recognise and refer high-risk individuals with symptoms indicative of lung cancer along the appropriate healthcare pathway:

- a. What interventions can you think of/recommend? (*content, format, delivery etc.*)
- b. How can these interventions be implemented?
- c. Can you think of similar interventions which have worked in the past?
- d. Can you see anything similar being done in Ireland? How?

5. Share with participants the (i) "Be Clear on Cancer" poster, leaflet and symptom checker card, (ii) "Detect Cancer Early" poster and leaflet, and (iii) "Think Lung" infographic, give them 5-10min to go over those, then ask:

- a. How did you find the interventions? (*format, colour, information, celebrity, personal stories*)
- b. Do you think these resources would be useful to your patients? If so, which one(s)? Why?
- c. Would you like to add anything before we end our interview?

Appendix 4C. Semi-structured qualitative interview guide for Practice Nurses

1. Think of a time you suspected that somebody in your practice might have lung cancer:

- a. What made you suspect that this person might have had lung cancer? (*probes: signs, symptoms, risk factors, patient profile, etc.*)
- b. During what type of consultation have you noticed this information? (*e.g., spirometry, peak flow, bloods, etc.*)
- c. What was your next step after this consultation? Was there any follow up?
- d. Would you have done anything differently? If so, please elaborate.

If to this point the participant does not mention Rapid Access Lung Clinics, ask:

- e. Have you heard of Rapid Access Lung Clinics? If so, do you know if your practice referred anyone to those clinics? Why/ why not? How did they refer? (*e.g., electronic referral/paper referral*)

2. I would like you to reflect on help-seeking for lung cancer:

- a. What do you think would stop a person from visiting a General Practice for symptoms indicative of lung cancer?
- b. What do you think would encourage a person to visit a General Practice for symptoms indicative of lung cancer?

3. Last year, we interviewed 46 individuals who were at risk for lung cancer. A number of these individuals refused to visit a General Practice due the (i) cost of a GP visit, (ii) previous bad experiences with the healthcare system, (iii) long waiting time to get a GP appointment, and (iv) some GPs' perceived negative attitudes towards smokers (e.g., shaming and blaming everything on smoking).

- a. What do you think can be done to address such barriers?

4. We would like to hear your perspectives about potential interventions to help Practice Nurses recognise and refer high-risk individuals with symptoms indicative of lung cancer along the appropriate healthcare pathway:

- a. What interventions can you think of/recommend? (*content, format, delivery etc.*)
- b. How can these interventions be implemented?
- c. Can you think of similar interventions which have worked in the past?
- d. Can you see anything similar being done in Ireland? How?

5. Share with participants the (i) "Be Clear on Cancer" poster, leaflet and symptom checker card, (ii) "Detect Cancer Early" poster and leaflet, and (iii) "Think Lung" infographic, give them 5-10min to go over those, then ask:

- a. How did you find the interventions? (*format, colour, information, celebrity, personal stories*)
- b. Do you think these resources would be useful to your patients? If so, which one(s)? Why?
- c. Would you like to add anything before we end our interview?

Appendix 4D. Semi-structured qualitative interview guide for Community Pharmacists

1. **Think of a time you had to refer somebody with suspected lung cancer? (i.e., to a GP):**
 - a. What made you suspect it might have been lung cancer? (*probes: signs, symptoms, risk factors, patient profile, etc.*)
 - b. How did you communicate this to the patient?
 - c. How did this individual react to this information/referral?
 - d. How long did this consultation/discussion take? was it longer than an average consultation?
 - e. What other options/approaches could you have taken? (*e.g., emergency department referral*)
 - f. What happened next? was there any follow up? Was there any feedback from the patient or their GP?

If to this point the participant does not mention Rapid Access Lung Clinics, ask:

- g. What do you know about the Rapid Access Lung Clinics?
2. **I would like you to reflect on help-seeking for lung cancer:**
 - a. What do you think would stop a person from seeking help from a Pharmacist for symptoms indicative of lung cancer?
 - b. What do you think would encourage a person to seek help from a Pharmacist for symptoms indicative of lung cancer?
 3. Last year, we interviewed 46 individuals who were at risk for lung cancer. A number of these individuals refused to seek help from their GP due the (i) cost of a GP visit, (ii) previous bad experiences with the healthcare system, (iii) long waiting time to get a GP appointment, and (iv) some GPs' perceived negative attitudes towards smokers (*e.g., shaming and blaming everything on smoking*).
 - a. What do you think can be done to address such barriers?
 4. Some participants indicated that as a first step they would go to their local pharmacy and buy a cough syrup.
 - a. What are your views on this? (*probes: opportunity to discuss the 'alarm' symptoms*).
 5. **We would like to hear your perspectives about potential interventions to help Pharmacists recognise and refer high-risk individuals with symptoms indicative of lung cancer along the appropriate healthcare pathway:**
 - a. What interventions can you think of/recommend? (*content, format, delivery etc.*)
 - b. How can these interventions be implemented?
 - c. Can you think of similar interventions which have worked in the past?
 - d. Can you see anything similar being done in Ireland? How?
 6. **Share with participants the (i) "Be Clear on Cancer" poster, leaflet and symptom checker card, (ii) "Detect Cancer Early" poster and leaflet, and (iii) "Think Lung" infographic, give them 5-10min to go over those, then ask:**
 - a. How did you find these interventions? (*format, colour, information, celebrity, personal stories*)
 - b. Which of these resources would be most useful to your patients? Why/why not?
 - c. Would you like to add anything before we end our interview?

