

**Inequalities in lung cancer screening:
Evidence review and recommendations to inform its equitable
implementation in Surrey**

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1 Summary of review

Background: Lung cancer is the leading cause of cancer deaths in the UK and globally, yet almost 80% of cases are preventable, with around 72% caused by smoking. Lung cancer incidence and mortality rates are significantly higher for people experiencing high levels of deprivation compared to those in more affluent areas. In 2022, the UK National Screening Committee recommended introducing targeted lung cancer screening using low-dose CT scans for people aged 55 to 74 at high risk of lung cancer in the UK, with integrated smoking cessation service provision. The aim of the screening programme is to facilitate early detection, where treatment is more likely to be successful. Lung cancer screening is planned to be rolled out across Surrey from summer 2025. In order to avoid widening the existing deprivation gap in lung cancer outcomes, it is important that proactive efforts are made to ensure equitable implementation of the lung cancer screening programme. The purpose of this evidence review is to synthesise the findings of existing research into inequalities in lung cancer screening and approaches to preventing and/or addressing them, to inform the equitable implementation of lung cancer screening in Surrey.

Review methods: A narrative literature synthesis has been undertaken, guided by the integrated screening action model, to answer the following key questions: (1) What inequalities exist along the lung cancer screening pathway? (2) Which communities in Surrey are at risk of experiencing inequalities related to lung cancer screening? (3) What approaches can prevent or address lung cancer screening inequalities?

Key findings and recommendations:

Inequalities along the lung cancer screening pathway:

- Collated evidence from UK studies and pilots suggests that lung cancer screening uptake is lowest for people living in the most deprived areas and people who currently smoke (compared to those who used to smoke) with mixed evidence showing potential differences in uptake by age, sex and ethnicity. Data from other cancer screening programmes suggest inequalities in relation to disability, health literacy, ethnicity, age and inclusion health groups are likely to be seen in lung cancer. See Section 5.1.1 and 5.1.2.
- Inequalities are likely to occur at multiple points along the lung screening pathway, beyond coverage. In the context of lung cancer, inequalities in smoking cessation engagement, adherence to multiple rounds of invitation, engagement with pulmonary nodule surveillance, incidental finding follow up, continuing engagement with the diagnostic treatment pathway and psychological outcomes/experience should also be considered and addressed. See Section 5.1.3.

Communities in Surrey at risk of experiencing inequalities in lung cancer screening:

- Given the national evidence that lung cancer screening uptake is lower amongst people who currently smoke and those experiencing deprivation, it is important to identify areas in Surrey with the highest levels of deprivation, and smoking prevalence (see Section 5.2.1). By combining this analysis with insights into lung cancer incidence, under-75 mortality rate, local population demographics and inclusion health groups (See Sections 5.2.2 and 5.2.3.) the following areas and groups have been identified as priorities for targeted outreach within Surrey to prevent inequalities from arising (see Section 5.2.6.):
 - **By District and Borough:** Spelthorne, Runnymede and Reigate and Banstead
 - **By PCN:** Walton Practices Confederation, Sasse Network 3, Woking Wise 3, COCO, Care Collaborative, Healthy Horley
 - **By priority population and inclusion health groups:** People with learning disabilities and autism, People of Black and Minoritised Ethnicity, People with Severe Mental Illness, People with Drug and Alcohol Use problems, People experiencing homelessness, Gypsy Roma Traveller communities, People in contact with the justice system, and LGBTQ+ populations.

Approaches to preventing or addressing lung cancer screening inequalities:

- Interventions or approaches to reducing inequalities in lung cancer screening should target the facilitators and barriers outlined in Section 5.3.2. Key barriers include avoidance of information about lung cancer, false beliefs about eligibility, fatalism, worrying about being made to stop smoking, comorbidities and limited mobility and communication differences. Key principles underlying the recommendations made in Section 5.3.3. include:
 - Screening should not be viewed as a discrete event: barriers to access and undergo screening span across a continuum (as described in the i-SAM model)

- Individually tailored interventions are likely to be more effective than a one-size fits-all approach because they may better accommodate the person’s personal beliefs, knowledge, behaviours, and preferences;
- Targeting people who are unknown to medical services and “largely unreachable” remains a major challenge, and should be achieved by:
- Co-creating interventions with professional patient advocacy groups, relevant lay persons and stakeholders (eg, healthcare professionals, researchers, local government and community organisations etc) at all stages of design, implementation, and evaluation is essential
- It will be important to monitor emerging evidence in relation to interventions that improve equitable uptake of lung cancer screening in the UK context, as the national roll out of the programme continues.

2 Visual summary of review

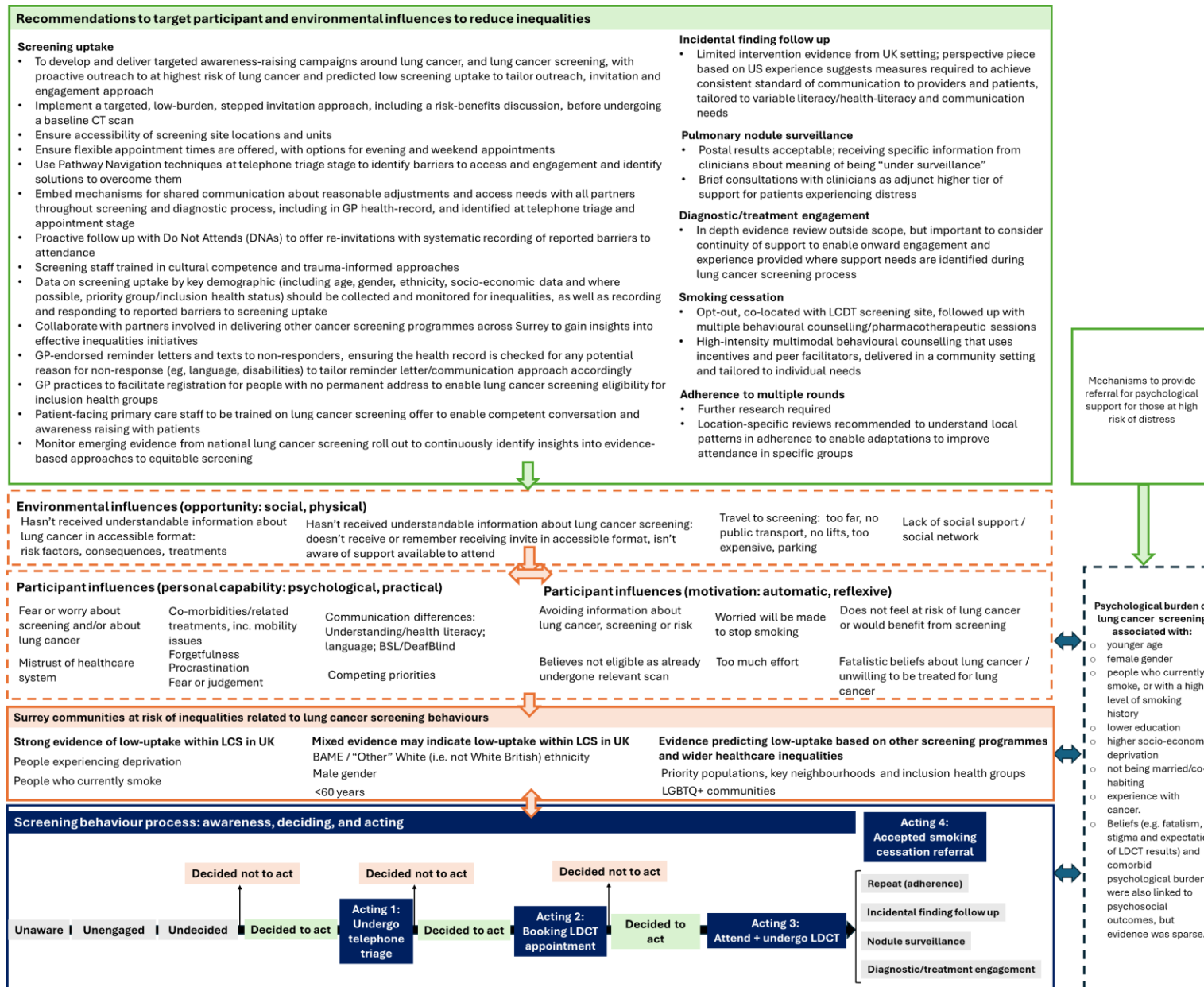


Table of Contents

1	Summary of review	2
2	Visual summary of review	4
3	Background	7
3.1.	Lung cancer global and UK burden	7
3.2.	NSC recommendation for lung cancer screening	7
3.3.	Lung cancer screening in Surrey	8
3.4.	Overview of inequalities and lung cancer	8
3.4.1.	Inequalities in lung cancer incidence	8
3.4.2.	Inequalities in lung cancer mortality.....	9
3.4.3.	Factors driving inequalities in lung cancer incidence and outcomes.....	9
3.4.4.	Inequalities in lung cancer screening	10
3.4.5.	Review objectives.....	10
4	Methods	11
5	Findings	12
5.1.	What inequalities exist along the lung cancer screening pathway?	12
5.1.1.	Inequalities in UK lung cancer screening studies	12
5.1.2.	Inequalities in other cancer screening programmes in England	14
5.1.3.	Lung cancer screening inequalities beyond uptake	16
5.2.	Which communities in Surrey are at risk of experiencing inequalities in lung cancer screening? 23	
5.2.1.	Screening coverage, smoking prevalence and lung cancer outcomes by District, Borough and PCN 23	
5.2.2.	Surrey’s key neighbourhoods	40
5.2.3.	Surrey’s priority populations	40
5.2.4.	Inclusion Health groups.....	40
5.2.5.	Intersectionality and multiple disadvantage	41
5.2.6.	Surrey populations requiring priority support to target inequalities in lung cancer screening ...	43
5.3.	What approaches can prevent or address lung cancer screening inequalities?	45
5.3.1.	Understanding drivers for disengagement	45
5.3.2.	Facilitators and barriers to engaging with lung cancer screening	46
5.3.3.	Interventions to reduce inequalities in lung cancer screening.....	48
6	Limitations	54
7	Recommendations	55
8	References	64
9	Appendices	74

Appendix 1. Characteristics and differences in uptake identified through UK-based lung screening studies 74

Appendix 2. Characteristics of key neighbourhoods identified in Surrey Health and Wellbeing Strategy (updated 2022) 78

Appendix 3. Summary of key data, including deprivation score, smoking prevalence, screening coverage, lung cancer registrations and mortality, for Surrey districts and boroughs, mapped to key neighbourhoods.79

Appendix 4. Inequalities related to lung cancer screening for Surrey Priority Populations and OHID Inclusion groups, including recommendations from literature to support uptake and participation..... 81

Appendix 5. Barriers and solutions to engaging with lung cancer screen mapped from the evidence base to inform a Pathway Navigation intervention tested in the Yorkshire Lung Screening Trial 95

Appendix 6. Replication of table summarising studies evaluating interventions designed to improve equitable lung cancer screening participation, as published in Sayani et al. (2023) (69) 102

3 Background

3.1. Lung cancer global and UK burden

Lung cancer is the leading cause of cancer deaths in the UK and globally, yet almost 80% of cases are preventable(1). Every year in the UK, around 48,000 people are diagnosed with lung cancer and about 35,000 people die from the disease every year (2). In England, the survival rate for lung cancer is one of the lowest of all cancers. Overall, around 16.2% people diagnosed with the condition live beyond 5 years. This is largely attributed to the common late diagnosis of lung cancer, due in part to late presentation of symptoms. Survival outcomes for people diagnosed with lung cancer at an early stage are much better. Approximately 65% of people diagnosed at Stage 1 live for 5 years or more (3).

Around 72% of lung cancer cases and 86% of lung cancer deaths are estimated to be caused by smoking (2). Age is a second major risk factor, with incidence and mortality rates highest in older age groups of people who currently, and used to smoke. Other risk factors include air pollution, occupational exposure to inhaled carcinogens, and pre-existing lung conditions.

The role of lung cancer screening is to use low dose computed tomography (LDCT) to facilitate early detection of the condition in those at the highest risk of the disease, when treatment is more likely to be successful.

3.2. NSC recommendation for lung cancer screening

In 2022, the UK National Screening Committee recommended introducing targeted lung cancer screening for people aged 55 to 74 at high risk of lung cancer in the UK, with integrated smoking cessation service provision(4). This recommendation was based on their evidence review showing that LDCT reduces lung cancer mortality and is acceptable to patients and professionals (with adequate resource and quality assurance)(2).

The Government announced in June 2023 that targeted lung cancer screening would be rolled out nationally across England(5). The roll out is an expansion of the Targeted Lung Health Check (TLHC) scheme which was initiated in some regions across England in 2019. TLHCs are offered to people aged between 55 and 74, registered with a GP, who smoke or who have smoked in the past. The check includes a risk assessment appointment (by phone, in person or online) asking questions around breathing, lifestyle, family and medical history, height and weight. Those deemed at higher risk of developing lung cancer during this assessment are offered a CT scan.

The TLHC programme will transition to a national lung cancer screening over the next 5 years, with the ambition to achieve 100% nationwide coverage by March 2030 (6). The nationally commissioned programme will be delivered through Cancer Alliances, who will have responsibility for local implementation of protocols as they are developed by the national team.

Within the TLHC programme, Cancer Alliances have overall responsibility for:

- Ensuring a strategic approach to core infrastructure and delivery across the Cancer Alliance.
- Agreeing expansion trajectories and areas, prioritising places with highest lung cancer mortality.
- Working with providers and ICBs to commission the core infrastructure to deliver planned trajectories for invitations, lung health checks and CT scans in line with the TLHC Standard Protocol, and support providers and commissioners with the required downstream services.
- Manage funding of local TLHC services (provided to Alliances by the National Cancer Programme via their lead ICB).
- Ensure accurate, timely collection and reporting of management information for all local services.

3.3. Lung cancer screening in Surrey

Surrey and Sussex Cancer Alliance (SSCA) are responsible for delivery of TLHCs, and the subsequent transition to the national lung cancer screening programme within Surrey. Across SSCA, the first TLHCs were launched in 2022 in Sussex (Crawley, Brighton, Hove and Slough). In 2024, the programme went live in Aldershot, Peacehaven, Newhaven, Hastings and Farnborough.

An implementation plan for Surrey roll-out has been developed based on areas deemed highest need, eligible population and lung cancer mortality rate, whilst capitalising on existing processes. The first Primary Care Networks (PCNs) planned to go live in Surrey in Summer 2025 will be those in East Surrey (served by Surrey and Sussex Healthcare NHS Trust: Healthy Horley, North Tandridge, Redhill Phoenix, South Tandridge, Care Collaborative (Redhill)).

Commissioning a lung cancer screening provider in Surrey Heartlands is currently underway. In Sussex, the lung cancer screening provider is InHealth.

3.4. Overview of inequalities and lung cancer

Health inequalities are defined by the King's Fund as "avoidable, unfair and systematic differences in health between different groups of people" (7). The term is also used to describe factors that contribute to these differences in health status, including variation in the care people receive and the opportunities they have to live healthy lives. In the context of lung cancer, there is strong evidence of inequalities in both incidence and mortality.

3.4.1. Inequalities in lung cancer incidence

Deprivation

Lung cancer incidence is significantly higher for those living in the most deprived compared to the least deprived quintiles. Data from the Cancer Registration Statistics, England, 2021 full release show that the age-standardised cancer incidence rate for small cell lung cancer are 4 times higher for females living in the most deprived areas (12 per 100,000) when compared with the least deprived areas (3 per 100,000). For males it was 3 times higher living in the most deprived areas (12 per 100,000) when compared with the least deprived areas (4 per 100,000). This is amongst the largest proportionate difference between quintiles for both females and males across all cancer types (8). In the UK, 72% lung cancer cases are caused by smoking. The association between deprivation and increased incidence is partly, but not fully, explained by the deprivation gradient seen in smoking prevalence. Those living in England's most deprived areas are 4 times more likely to smoke than those living in the least deprived areas (9).

Ethnicity, age and gender

Inequalities in incidence not only exist in relation to deprivation. A population-based cohort study published in The Lancet Regional Health analysed primary care records from a cohort of over 1.75 million adults (aged 25+) in England to explore ethnic disparities in lung cancer incidence (10). They found that between 2010-2019, **Bangladeshi males** exhibited the highest average age-standardized incidence rate at 170.2 per 100,000 person-years, followed by **White** (138.6), **Chinese** (115.1) and **Caribbean** (114.6) men. Over the course of the decade, males of Chinese, White and Bangladeshi ethnicity saw declines of 39.2%, 20% and 18.3% respectively. However, there were significant increases in incidence rates over that same decade for people of **Pakistani** (87% increase) and **Black African men** (44.7%). Rates were lower for women compared to men over that time period. White women had the highest average lung cancer incidence rate (96.9 per 100,000 person-years) followed by Chinese women (75.0), with the lowest rates seen in Indian (27.7), Pakistani (26.4), and Black African women (23.0). Incidence rates among Indian women rose by 36.2% over that time, while there were slight increases amongst white women and Bangladeshi women (0.3% and 1.0% respectively). Incidence rates generally declined among women from other ethnic groups over time.

This study did not identify any significant association between ethnicity or socioeconomic deprivation and stage of diagnosis. However, it did find **late-stage diagnoses were more likely for men compared to women, people aged 45-54** compared to those above 75 and **former and current smokers**, compared to never smokers. Males, those aged 45 – 64, former and current smokers, and **people from the most deprived backgrounds** were also at the highest risk of being diagnosed with aggressive grades of lung cancer (moderately or poorly differentiated adenocarcinoma).

3.4.2. Inequalities in lung cancer mortality

There are also huge disparities in lung cancer mortality. Compared to other cancer types, lung cancer has the largest number of excess deaths because of socio-economic variation (9,900 persons per year or 52% of all excess cancer deaths) (11). England-wide data collected prior to the introduction of the TLHC programme shows age-standardised mortality rates are 176% (females) and 170% (males) higher for those living in the most deprived areas compared with the least deprived (2007-2011) (12). A pan-European population-based study analysed data from 1990-2015 in adults aged 40-79. They found that lung cancer was the largest contributor to inequalities in total-cancer mortality in every country included in the study in men, and in most countries for women, including England (13).

Taken together, this means that people experiencing the highest levels of socio-economic deprivation are the most likely to develop lung cancer and the least likely to survive it. Analysis by the Office of National Statistics (ONS) also found age-standardised mortality rates for lung cancer in England and Wales between 2017 – 2019 are significantly higher in **Bangladeshi, mixed and white ethnic groups**, compared to all other ethnic groups except Black Caribbean and Black Other (where the difference was not significant) (14).

3.4.3. Factors driving inequalities in lung cancer incidence and outcomes

Recognising these significant disparities in incidence and outcome, The United Kingdom Lung Cancer Coalition (UKLCC) published their ‘Bridging the gap: The challenge of mitigating health inequalities in cancer’ report in November 2022. As well as socio-economic inequalities in lung cancer outcomes, the report highlights multiple other factors that may be related to disparities in outcome, as well as gaps in data required to identify and understand those disparities (see Table 1).

Table 1. Factors related to, and communities who may experience lung cancer inequalities identified by UKLCC Bridging the gap report (2022)

Factors where there are data	Factors with little or no data
Biological sex	Gender identity
Socio-economic deprivation	Religion
Age	Social values
Digital literacy	Ability to speak English
Health literacy	No fixed contact point (address, telephone etc.)
Geographical position (distance to services)	Social exclusion
	Disability (physical and learning)
	Mental health
	Literacy
Communities where there are data	Communities with little or no data
Socio-economically deprived	Religious groups
Some (not all) ethnic groups	Immigrants
Rural communities	Gypsy Roma Traveller
	Homeless people
	People in prison
	People who are HIV+
	LGBTQ+ people
	People with mental health problems
	Illicit drug users

3.4.4. Inequalities in lung cancer screening

The UK National Screening Committee evidence review confirmed that lung cancer screening has potential to significantly increase rates of early diagnosis in line with the NHS Long Term Plan ambition to diagnose 75% cancers at Stage ½ by 2028, and to reduce mortality rates for lung cancer. Emerging data from the TLHC programme published in 2023 showed that 76% of the 2,204 people diagnosed across 42 sites had their lung cancer picked up at an early stage (1 or 2), compared to less than a third in 2018, prior to the TLHC introduction (15).

Inverse equity hypothesis

The inverse equity hypothesis states that new health interventions can disproportionately benefit those from more affluent backgrounds instead of those who are most in need (16). In the case of lung cancer screening, it is essential that careful planning and monitoring is undertaken to ensure screening access is equitable, and does not perpetuate or widen the existing deprivation gap.

3.4.5. Review objectives

The purpose of this evidence review is to synthesise the findings of existing research into inequalities in lung cancer screening and approaches to preventing and/or addressing them. The review will provide evidence-based responses to the following key questions:

- 1. What inequalities exist along the lung cancer screening pathway?**
- 2. Which communities in Surrey are at risk of experiencing inequalities related to lung cancer screening?**
- 3. What approaches can prevent or address lung cancer screening inequalities?**

The responses to these questions inform evidence-based recommendations to help shape the lung cancer screening implementation plan for Surrey to prevent and/or address inequalities.

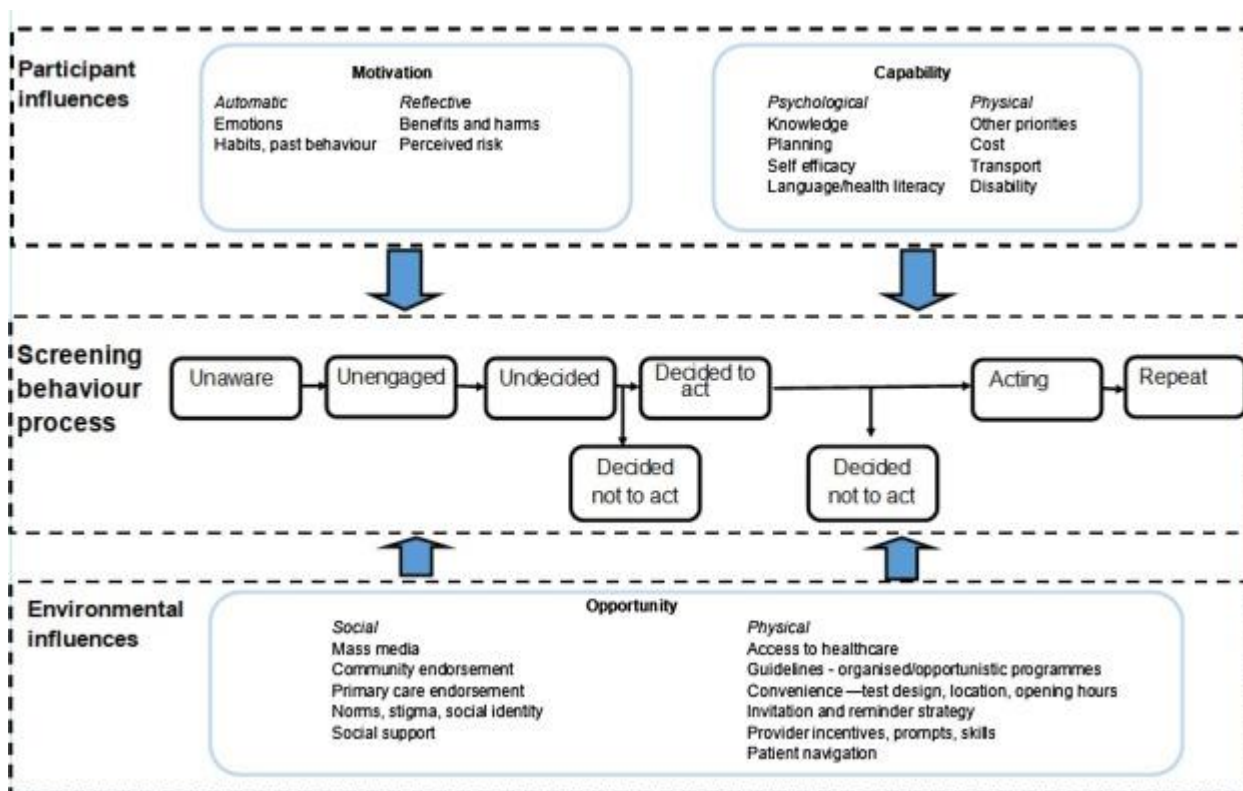
4 Methods

A narrative literature synthesis has been undertaken. This is not a systematic review and therefore is not a comprehensive analysis of all published literature to date. The review synthesises key findings from the peer-reviewed literature base; public data on screening uptake and key health metrics; and where relevant, grey literature (eg, organisational reports and guidelines, theses, conference abstracts).

The review is informed by the integrated screening action model (i-SAM) (Figure 1) (17). This model was developed to support understanding of screening behaviour and identify targets for intervention. It has three key aspects:

1. A sequence of stages that people pass through in engaging in screening behaviour (based on the Precaution Adoption Process Model)
2. Screening behaviour is shaped by the interaction between participant and environmental influences (drawing from the Access Framework)
3. Targets for intervention should focus on the sources of behaviour - 'capability', 'opportunity', and 'motivation' (based on the COM-B Model).

Figure 1. Integrated Screening Action Model (17)



5 Findings

5.1. What inequalities exist along the lung cancer screening pathway?

Most current evidence exploring inequalities in lung cancer screening is not UK specific. This is because, of the 9 Randomised Controlled Trials of lung cancer screening completed at the time of the NSC evidence review, only two (Lung Screening Uptake Trial [LSUT] and UK Lung Cancer Pilot Screening Trial [UKLS]) were UK-based. Two further UK-based lung cancer screening studies have also been conducted: the SUMMIT study and the Yorkshire Lung Screening Trial (YLST). These four UK studies provide key insights into differences, and therefore potential inequalities, in lung cancer screening uptake between groups (for example, socioeconomic deprivation, ethnicity, age and gender). There are also emerging data from the TLHC pilot sites established across England. The characteristics of these studies are summarised in [Appendix 1](#).

Important insights into potential inequalities in lung cancer screening uptake can also be derived from experience from the other cancer screening programmes currently provided in England (breast, bowel and cervical).

5.1.1. Inequalities in UK lung cancer screening studies

SUMMARY

Collated evidence from UK studies and pilots suggests that lung cancer screening uptake is lowest for **people living in the most deprived areas and people who currently smoke** (compared to those who used to smoke) with mixed evidence showing potential differences in uptake by age, sex and ethnicity. See [Appendix 1](#) for details and a summary below.

Smoking status

Lung cancer screening uptake is consistently significantly lower among people who currently smoke, compared to those who used to smoke in UK lung screening studies (UKLS, LSUT, YLST, SUMMIT).

Deprivation

Uptake was significantly lower in the most deprived compared to the least deprived quintiles across all studies.

- UKLS found that individuals in the **most deprived quintile** were almost twice as likely to decline screening compared with those in the highest quintile (adjusted OR=0.56, $p<0.001$). People experiencing the highest levels of deprivation (IMD quintile 1) were less than half as likely to report travel as a barrier to attending compared to more affluent non-attenders (IMD quintiles 3-5) suggesting transport is not the key driver for this pattern (OR=2.37, $p=0.005$; OR=2.91, $p<0.001$; OR=2.25, $p=0.009$ respectively).
- LSUT found individuals categorized within the three least deprived (study-specific) quintiles had higher odds of attending their initial lung health check appointment compared with those in the **most deprived quintile** (adjusted OR, 1.62; 95% CI, 1.21–2.15 and adjusted OR, 1.68; 95% CI, 1.26–2.25, respectively). However, they found no association between deprivation and attendance at the LDCT scan among those invited following their initial health check appointment.
- YLST found the odds of responding to the invitation to a lung health check telephone appointment were 42% lower in the **most deprived IMD quintile** compared with the least deprived (adjusted OR 0.58, 95% CI 0.54–0.62), and that non-attendance to the LDCT increased with deprivation (adjusted OR 0.78, 95% CI 0.62–0.98 for the most deprived IMD quintile compared with the least deprived).

- SUMMIT also found uptake was significantly higher among groups living in the least deprived areas compared with those in the **most deprived** (1.89 [1.76–2.04] for the most vs the least deprived areas; $p < 0.0001$),

Ethnicity

Evidence was mixed across studies:

- YLST found that people of **Asian/Asian British and Mixed ethnicity** were less likely to respond to invitation than people of White ethnicity (adjusted OR 0.79, 95% CI 0.68–0.90 and 0.93, 95% CI 0.89–0.97, respectively).
- LSUT found that compared to those of a **white ethnic background**, individuals of other ethnic background were more likely to attend (adjusted OR, 2.34; 95% CI, 1.30–4.20) and those with no recorded ethnic group were less likely to attend (adjusted OR, 0.09; 95% CI, 0.04–0.19).
- SUMMIT found that, when adjusting for gender, age, IMD quintile and smoking status, uptake was significantly higher for individuals of Asian ethnicity (1.14 [1.09–1.20] vs **White ethnicity**; $p < 0.0001$). Uptake was lower among individuals with **Black ethnicity** than among those with White ethnicity (OR 0.97 [0.93–1.03]). When ethnicity was subdivided into 16 groups, uptake was lower among individuals of **other White ethnicity** than among those with White British ethnicity (0.86 [0.83–0.90]), whereas uptake was higher among Chinese (1.33 [1.13–1.56]), Indian (1.29 [1.19–1.40]), and other Asian (1.19 [1.08–1.31]) ethnicities than among those with White British ethnicity. The higher response rates from individuals of Asian ethnic backgrounds were driven by uptake from Indian and other Asian backgrounds, whereas uptake from **Bangladeshi and Pakistani backgrounds** was lower in absolute terms.
- Uptake by ethnicity was not reported in UKLS.

Sex

Evidence was mixed across studies:

- UKLS found **women** were less likely to take part than men (adjusted OR 0.64; $p < 0.001$).
- YLST (adjusted OR 0.81, 95% CI 0.78–0.84) and SUMMIT (OR 0.91, 95% CI 0.88–0.94; $p < 0.0001$) found **men** were less likely to take part than women.
- LSUT found no association between sex and uptake.

Age

Evidence was mixed across studies:

- YLST and SUMMIT reported uptake was significantly higher among older age-groups (In YLST, those aged ≥ 75 years were twice as likely to respond compared with those aged < 60 years; SUMMIT: uptake higher in those aged 65–69 years vs those aged 55–59 years).
- UKLS reported older individuals were less likely to participate in screening compared with younger individuals aged ≤ 65 years in UKLS; emotional barriers were more commonly reported for this age group than for younger participants.
- LSUT found no association between age and uptake.

5.1.2. Inequalities in other cancer screening programmes in England

SUMMARY

Inequalities in breast, bowel and cervical cancer screening in England are seen in relation to **socioeconomic deprivation**, **sex** (bowel screening uptake is lower for men compared to women), **ethnicity** (uptake is generally lower for minoritised ethnic groups compared to people of white British ethnicity), **age** (cervical screening uptake is higher in women aged 50 – 64 years, compared to those aged 25 – 49 years) and **disability** (people with disabilities, particularly those with disabilities relating to self-care or vision, are less likely to take part in breast, bowel and lung cancer screening compared to people without disabilities). **Health literacy and cancer awareness** are highlighted as key contributing factors. There are many **invisible inequalities** (for example, in relation to inclusion health groups) that are not seen in the data, and thus not fully understood.

The Surrey Screening Joint Strategic Needs Assessment (JSNA) has highlighted the following cross-pathway inequalities across other cancer screening programmes (18):

Socioeconomic factors

- Large inequalities are seen in the uptake of bowel, breast and cervical screening programmes in people in more deprived areas when compared to least deprived areas.

Gender

- Men have a lower uptake of bowel cancer screening (51% compared to 56% for women) but are more likely to be diagnosed and die from bowel cancer (male: female ratio 12:10) (Von Wagner et al, 2011; Moser et al, 2009; Marlow et al, 2015).

Ethnicity

- Uptake of bowel cancer screening in England is lower in areas with more ethnic diversity (38% compared to 52%- 58% in other areas) (Von Wagner et al, 2011; Cancer research UK, 2016; Tanton et al, 2015; Douglas et al, 2016).
- Overall, women from ethnic minority groups are less likely to attend cervical cancer screening compared to white British women. However, this disparity varies amongst different ethnic groups (e.g., the likelihood of non-attendance for Indian and Bangladeshi women is lower compared to white British women).
- Some evidence suggests that women from ethnic minority groups are less likely to attend breast cancer screening compared to white British women (Renshaw et al, 2010; Jack et al, 2014).

Age

- Cervical cancer screening uptake is significantly higher among 50 to 64 year olds than among 25 to 49 year olds (Cancer Research UK, 2023).

Disability

- People with disabilities are less likely to participate in breast, bowel and cervical cancer screening compared to those without disabilities. This is particularly the case for those with disabilities relating to self-care or vision, or for those with three or more disabilities (Floud et al, 2017; Osborn et al, 2012).
- The 2022/23 Surrey Learning Disabilities Mortality Review (LeDeR) programme annual report found that there has been a very low uptake of cancer screening across the breast, bowel and cervical cancer screening programmes (see Table 2). The report stated that none of the 9 women eligible for breast

screening had it carried out; only 8 out of 31 people eligible were screened for bowel cancer; and only 2 out of the 25 eligible women were screened for cervical cancer.

Table 2. Screening uptake in people with learning disabilities whose review had been completed (2022/23 LeDeR programme report).

Screening type	Age range	People eligible	People received screening	People not attended	People declined	People where it was felt to not be in their best interest	Reasonable adjustments made
Breast	Women aged 50-70 yrs	9	0	3	2	2	1
Bowel	60-74 yrs	31	8	n/a	6	?	3
Cervical	25-64 years	25	2	?	?	?	1

Health literacy and cancer awareness

The JSNA highlights that differences in health literacy, awareness of symptoms and attitudes about cancer contribute to low cancer screening uptake, as well as being linked to healthier behaviours and stage of diagnosis.

LGBTQ+

The JSNA highlights inequalities in screening access for the trans community, and highlights the importance of ensuring GP records are up to date and accurate to ensure appropriate screening invitation.

LGBTQ+ communities are likely to face other barriers to screening access beyond recording of gender, which should be considered in relation to lung cancer screening implementation.

The UKLCC ‘Bridging the gap’ report draws attention to the higher rates of smoking and alcohol consumption within LGBTQ+ communities (1). A blog by PHE highlighted a [Stonewall report](#) reporting that 14% of LGBT people, and 37% of trans people, have avoided accessing healthcare services due to fear of discrimination (19). And screening processes, in particular cervical and breast, pose barriers for trans and non-binary people (20). It is possible that the thoracic CT scan as part of lung cancer screening may also pose a similar barrier. However, as highlighted by the Bridging the Gap report and PHE blog, data reporting screening uptake for LGBTQ+ communities remains limited. A literature review published in 2023 examined evidence around participation, barriers, and facilitators of cancer screening among LGBTQ+ populations across 50 international studies (21). They found that, compared to heterosexual counterparts, lesbian and bisexual women were less likely to participate in [cervical cancer screening](#) and [mammography](#), but gay and bisexual men were more likely to participate in [colorectal cancer screening](#). Transgender individuals had lower rates of screening than cisgender individuals for all [cancer types](#). However, the studies were conducted across multiple different health care systems and a robust meta-analysis was not completed.

Implications and recommendations

Although inequalities in screening are well documented, the full extent of inequalities within all screening programmes are not known because:

- Relevant data is not collected, particularly in relation to local barriers on screening uptake amongst vulnerable populations and seldom heard groups.
- Data may be collected on IT systems, but is not easily accessible for analysis.

- There is a lack of evidence on the reasons for the inequality and how we can effectively tackle the issues.

The JSNA highlights that action must be taken to ensure sufficient information is collected to enable identification and reduction of the impact of inequalities in screening. This includes enabling collection of data by key demographic, socio-economic data and research to better understand local barriers in screening uptake (PHE Screening inequalities strategy – GOV.UK (www.gov.uk)).

The JSNA also notes that, even when people who experience health inequalities do attend for screening, they may be unable to maximise the benefits (for example, by engaging in further diagnostic and treatment processes).

5.1.3. Lung cancer screening inequalities beyond uptake

SUMMARY

Inequalities can occur at multiple points along a screening pathway, beyond those related to uptake described in section 4.1.1. In the context of lung cancer screening, this includes potential inequalities in **smoking cessation engagement, adherence to multiple rounds of invitation, engagement with pulmonary nodule surveillance, follow-up of incidental findings, engagement with the continuing diagnostic and treatment pathway and psychological outcomes/patient experience.** These potential point of inequality are described below.

Smoking cessation

- The UK National Screening Committee recommendation to introduce targeted lung cancer screening for people aged 55 to 74 at high risk of lung cancer in the UK includes an integrated smoking cessation service provision. Stopping smoking significantly reduces lung cancer risk at any age.
- Studies have found that lung cancer screening can act as a ‘teachable moment’ (i.e. a brief period in which motivation to stop smoking is enhanced) to encourage smoking cessation (22), and receiving a positive CT screening result may provide an additional cue to action in prompting cessation (23). For instance, The UK Lung Screening Trial, found there were net cessation rates of 15% at two-year follow-up amongst screening participants, compared to 4% in the general population (24).
- Other factors associated with increased likelihood of stopping smoking in the context of lung cancer screening studies include: older age (23–25), being less socio-economically deprived (23), higher education (26), being married (23), having lower nicotine dependency (23,25), higher levels of concern about lung cancer and greater perceived benefits of stopping smoking (27), and having an intention to stop smoking (25,26).
- An embedded study, interviewing YLST participants who declined smoking cessation, which recruited 80% people from the 5 most deprived deciles nationally, identified barriers to taking up the stop smoking support offer within the lung cancer screening trial, summarised in Table 3 (28):

Table 3. Barriers to engaging in smoking cessation in context of lung cancer screening (28)

Factors contributing to willingness to engage in smoking cessation in context of lung cancer screening	Description
Beliefs About Smoking and Smoking Cessation	<ul style="list-style-type: none"> • Quitting smoking caused feelings of anxiety leading them to smoke more. • Many expressed fatalistic views and a general lack of control over their health. • Some believed the damage to their health from smoking was irreversible and that changing their smoking habits would not make a major difference

Smoking as a Coping Mechanism	<ul style="list-style-type: none"> • Most didn't want to quit smoking because it was the only way they knew how to cope with life stressors, such as "financial worries, supporting unwell family members, and pre-existing health conditions" they viewed these stressors that "outweighed their need and desire to quit smoking."
Risk-Minimizing Beliefs	<ul style="list-style-type: none"> • Some viewed smoking as risky but also held simultaneous views about the dangers of stopping, such as negative consequences to their health after quitting smoking. • There were mixed views about the impact of smoking on their health, with some comparing their smoking to other smokers, and feeling a sense of control over how much they smoked, or justified their current habits by comparing to how much they smoked in the past
Self-Efficacy	<ul style="list-style-type: none"> • Some lacked the confidence to initiate a quit attempt, feeling they did not possess the willpower or strength to enact or sustain a quit attempt, even if they were faced with poor health.
Moral Obligation to Accept Support	<ul style="list-style-type: none"> • Participants who declined smoking cessation support after initially agreeing to receiving smoking cessation support said they initially accepted the support because they "did not want to let the service down."
Cutting Down as an End Goal	<ul style="list-style-type: none"> • Some participants who declined ongoing support after 4 weeks said they had achieved their goal by reducing the quantity they smoked and felt positive about that; quitting was not their end goal.
Physical and Psychological Barriers	<ul style="list-style-type: none"> • Most participants described "comorbid physical and mental (including undiagnosed depression and anxiety) health conditions", including clinically diagnosed COPD and sleep apnoea, and other ongoing, undiagnosed issues such as backache. Participants described how their physical health impacted their mental health and their smoking behaviour, seeing smoking as a way to cope with physical pain/issues. • Others saw age as a barrier to quitting, say they didn't want to stop at this stage of life.
Perceived Effectiveness of Stop-Smoking Services and Smoking Cessation Aids	<ul style="list-style-type: none"> • Most participants had previously experienced unpleasant side effects from Nicotine Replacement Therapy (eg, patches burning arm), and were generally negative about e-cigarettes. • Some didn't know about local stop smoking services, or how they could help them during a quit attempt, and were sceptical about behavioural or group support.
Social Influences on Smoking and Smoking Cessation	<ul style="list-style-type: none"> • Some participants discussed being socially isolated, and that some people in their social circle didn't want to visit them due to their smoking status, resulting in shame and worry. As a result of this, participants reported lacking social support for quitting smoking. • Others said the smoking behaviours of others in the house made it harder to quit.

- In line with the inverse equity hypothesis, it is important that efforts are made to ensure equity of the smoking cessation offer, in particular, ensuring smoking cessation support offered at screening is acceptable and accessible for people experiencing deprivation (a cohort who are less likely to take up screening, less likely to stop smoking in the context of lung cancer screening, and more likely to experience inequalities in access and engagement with the lung cancer pathway).
- Brief and low intensity smoking cessation interventions involving signposting to external services have typically been ineffective when evaluated in the lung cancer screening context (29). Based on evidence reviews, the research team who developed the smoking cessation offer evaluated as part of the Yorkshire Lung Screening Trial (YLST) suggested that such low intensity interventions are likely to be inadequate for the population of long-term (and often life-long) smokers eligible for lung cancer screening who typically (30):
 - have higher dependence on nicotine (31)
 - less success in quitting (32)
 - are over-represented in socioeconomically deprived groups where cessation is most challenging (33)

- A 2019 systematic review of smoking cessation interventions for people likely to be eligible for lung cancer screening (older adults from socio-economically deprived backgrounds) found that there were limited high-quality data to identify the optimal form of behavioural smoking cessation interventions for the population (34). However, from the 11 studies they identified for inclusion, they found “intense multimodal behavioural counselling that uses incentives and peer facilitators, delivered in a community setting and tailored to individual needs indicated a positive impact on smoking outcomes.” (34)
- A more recent review systematic review (2023) focusing on strategies to deliver smoking cessation interventions during targeted lung health screening also reported that higher intensity smoking cessation interventions, such as immediate smoking cessation support at screening, followed by multiple sessions of behavioural counselling and/or pharmacotherapy, were most effective within lung cancer screening (35,36). Specifically, high intensity interventions were superior when compared to:
 - usual care, such as signposting to external smoking cessation services, websites or apps (odds ratio (OR) 2.11, 95%: 1.53-2.90, p<0.001)
 - and lower-intensity interventions such as leaflets or brief counselling (OR 2.07, 95% confidence interval (CI) 1.26-3.40, p=0.004).

Incidental finding follow up

- The road-map to implementing a UK national lung cancer screening programme published in 2023 in The Lancet Oncology said it was critical that ‘clear and unambiguous guidelines’ are developed for clinicians about the threshold for onward referrals and protocols for the management of incidental findings to minimise any anxiety, harm and costs associated with unnecessary tests. Most incidental findings are benign, with the majority being pulmonary (69%; see below for pulmonary nodule surveillance discussion); cardiovascular (67%); and gastrointestinal findings (25%)(37). However, some are more serious and require follow-up. The road-map advises it is crucial that radiology reporting and management of incidental findings by the clinical team are audited regularly and form part of formal screening Quality Assurance for any program.
- Evidence about inequalities in incidental finding follow-up in UK cancer screening programmes is limited. But insights from research into incidental pulmonary nodule follow up in the US suggest there are inequalities in patient-provider communication related to ethnicity, with one study finding providers are less likely to communicate information about incidental medical findings to ‘patients of colour’ compared to White patients (38). A cohort study of 1513 patients with potentially actionable incidental findings on abdominal radiography found 36.6% did not undergo follow-up imaging within 1 year and were lost to follow-up; a smaller percentage of those from **minoritised ethnicities** and at a **greater distance from the hospital**, engaged in follow-up compared to white patients, and those closer to the hospital (39). A perspective piece published in Mayo Clinic Proceedings (2021) suggested discrepancies in incidental finding follow-up are seen more broadly across wider health care settings, and arise from reporting ambiguities, misinterpretations by referring physicians, and inconsistent communication to providers or patients, which may be compounded by socioeconomic and health-literacy factors (40).

Pulmonary nodule surveillance

- In UK Lung Cancer Screening (LCS) trials, 13–24% of participants are reported to have indeterminate pulmonary nodules identified by their LDCT scans (41). Often these nodules are benign, but require 2-year surveillance following British Thoracic Society Guidelines (42). This process of identification and surveillance causes clinically significant short-term distress for a significant minority of patients, who can experience the process as a ‘near-cancer’ diagnosis, and anxiety related to a prolonged state of uncertainty about whether they have cancer (43). Contrary to some health care professionals’ anecdotal perceptions, distress reduces (and does not motivate) adherence to attend surveillance scans (44). Quality of communication is therefore integral to patient-centred outcomes, ensuring sufficient understanding of what a pulmonary nodule is and the importance of engaging with surveillance, without causing undue distress (44).

- Studies have shown adherence to pulmonary nodule surveillance can be as low as 40%. A study analysing factors associated with incidental pulmonary nodule surveillance adherence identified that, irrespective of clinical context of nodule identification (eg, both within and without of screening contexts), sex, ethnicity, and marital status were predictors of adherence. This finding highlights the importance of understanding personalised communication needs to ensure disparities do not emerge in relation to surveillance adherence (45).
- Slatore and Wiener recommend evidence-based, person-centred communication approaches based on a programme of research around pulmonary nodule communication, to minimise distress and maximise adherence to surveillance/follow-up, including (43,44):
 - A physician communication style which emphasises the patient as a person (expressing interest and a positive partnership approach)
 - Communication that mentioned the possibility of cancer was frequently perceived as re-assuring, not distressing
 - Distress consistently undermines patient’s adherence to surveillance, consistent with findings from other screening settings
- Studies suggest most people find communication of nodule results by post acceptable, but that verbal communication may be important for some at high-risk of distress. In the UK-based SUMMIT study, participants with indeterminate pulmonary nodules by a LDCT lung cancer screening scan requiring a three-month interval LDCT were informed of their result by postal letter and given a face-to-face appointment with a study practitioner at their interval LDCT appointment. During the face-to-face appointment, participants were verbally asked about their preferred methods of results communication. 82.8% (1573/1,900) were satisfied with receiving the results by letter, and 86.3% said it was their preferred communication letter. Participants from less deprived socioeconomic quintiles were more likely to report that the letter contained insufficient information, and individuals aged ≥ 70 years were less likely to do so (41). In another study, 39 participants from four lung cancer screening sites in England who had undergone a pulmonary nodule surveillance scan patients were interviewed about their experience of nodule communication. This study found a wide range of psychological responses to their nodule communication, and identified the following factors as important in determining response (46):
 - Confidence that clinicians will keep an eye on their nodule, and reassurance from the repeated screening rounds increased perceived support and satisfaction.
 - Individual perceptions of personal and family respiratory history, lung cancer risk and lack of support from important others
 - Verbal communication with healthcare professionals provided reassurance and improved understanding over results letters. Participants who only received brief written communication, without being able to ask further questions, reported lower knowledge about their result, uncertainty over what came next, and concern about nodules being lung cancer.
 - Participants said that receiving specific information from clinicians about the meaning of “being under surveillance” could help minimise distress and anxiety, and maximise their understanding of risks and benefits. The study suggested that brief consultations with clinicians could be an “adjunct higher tier of support for patients experiencing distress”.

Psychological outcomes and patient experience

- Whilst lung cancer screening is proven to reduce lung cancer mortality, the psychosocial consequences of undergoing screening must also be considered when considering implementation, both in relation to their potential effects on uptake and adherence, as well as their impact on participant wellbeing and experience (47,48).
- A systematic review published in 2024 mapped evidence relating to individual-level risk factors for psychosocial burden during lung cancer screening, as a precursor to developing strategies to identify and support participants, and improve lung cancer screening engagement (48). The authors noted that more robust evaluation is required due to the high study heterogeneity and risk of bias. Across 35 international

studies (17 of which were in the US, and 8 in the UK), they found that psychological burden varied, and was often associated with :

- younger age
 - female gender
 - people who currently smoke, or with a higher level of smoking history
 - lower education
 - higher socio-economic deprivation
 - not being married/co-habiting
 - experience with cancer
 - Beliefs (e.g. fatalism, stigma and expectation of LDCT results) and comorbid psychological burden were also linked to psychosocial outcomes, but evidence was sparse.
- The UKLS study concluded that, whilst lung cancer screening using LDCT appears to have no clinically significant long-term psychosocial impact, strategies for engaging and supporting underserved groups are key to implementing routine lung cancer screening in the UK (47).
 - One study, embedded in the UK's SUMMIT trial, focused on exploring which psychological factors are associated with screening uptake behaviour (49). The found statistically significant associations between psychological factors and the following demographic characteristics:
 - **Gender:** Compared with women, men reported: more positive perceptions of personal and treatment control; lower perceived risk of lung cancer; being less likely to perceive lung cancer as stigmatized; being more optimistic about survival ; lower perceived knowledge about lung cancer among men.
 - **Age:** Older age was associated with: more positive perceived consequences; greater treatment control; lower perceived stigma; higher perceived prospect of surviving early-stage lung cancer; less personal control over lung cancer; lower perceptions of personal risk; seeing less benefit in smoking cessation and early diagnosis.
 - **Relationship status:** those who were single, separated, widowed, or divorced reported more negative perceptions than those who were married, in a civil partnership, or cohabiting in relation to: treatment control; treatment intentions; perceived chances of survival; early diagnosis as a behavioural response.
 - **Ethnicity:** Compared with those of a White ethnic background, participants of Black and Asian ethnic backgrounds perceived the consequences of lung cancer and the effectiveness of treatment in controlling lung cancer more positively; were less likely to perceive lung cancer to be stigmatized; had lower coherence (knowledge) of lung cancer
 - Those of mixed or other ethnic backgrounds also held more positive perceptions of treatment control than participants who were White. Participants of other ethnic minority backgrounds held more negative perceptions of their personal control over lung cancer, the consequences, their coherence, and the benefits of early diagnosis. Participants of Asian ethnic backgrounds also held more negative perceptions of early diagnosis, and the chances of survival, and their emotional response to lung cancer.
 - **Deprivation:** Lower levels of area-level deprivation (i.e. greater affluence) was associated with: greater perceived personal control and benefit from early diagnosis, more negative perceptions of the consequences of lung cancer; increased likelihood of perceiving lung cancer to be stigmatized; increased likelihood of perceiving smoking cessation to be less effective in reducing risk.
 - **Smoking status:** People who currently smoke are at higher risk of increased distress

Adherence to multiple rounds of invitation

- In the Targeted Lung Health Check programme, participants who undergo a baseline screening scan that does not detect suspected lung cancer, or an indeterminate nodule $\geq 80\text{mm}^3$ or $\geq 5\text{mm}$ diameter, are re-

invited to a LCDT 24 months following the baseline scan. Repeat scans are offered every 24 months until an individual is no longer eligible by age or another exclusion criteria. To maximise the full benefits of population-level lung cancer screening, it is important to ensure adherence to ongoing screening rounds.

- A systematic review and meta-analysis of real-world evidence from 15 cohorts in the US (the first country to widely implement CT screening for lung cancer) reported just 55% adherence (from a total of 16,863 participants) across all follow-up periods (50). The review found that **people who currently smoke, people of ethnicities other than White, those younger than 65 years, and those with less than a college education** had lower adherence to screening.
- Adherence to screening will differ between health systems owing to population and programme differences. However, there is minimal published evidence to date reporting factors associated with lung cancer screening adherence outside of North America. The Yorkshire Lung Screening Trial team therefore recommend that national programmes should measure adherence, assess associated factors and, if necessary, modify their processes to address any issues (51).
- The YLST was framed as a routine NHS screening service, and therefore provides real-world evidence into likely uptake and adherence rates within a UK lung screening context. Participation in the baseline LDCT scan in the YLST was reported as 51% (one of the highest proportions in lung cancer screening studies) (52). A pre-print provides preliminary insights about adherence to their second screening round in the YLST, offered approximately two years following the baseline scan (although this paper has not yet been peer-reviewed and therefore cannot be used to inform clinical or public health practice) (51):
 - In this study, participants were invited for their second screening by telephone, with subsequent written confirmation of the screening appointment. If uncontactable by phone following two attempts, participants were offered a fixed appointment time by letter. If they did not attend, up to two further attempts were made to contact by phone, and a second appointment arranged if needed. Of the 5,975 people invited to a second-round screening scan in whom screening was deemed appropriate and possible, 5,184 (86.8%) attended (March 2021 – December 2022). 791 people did not attend (13.2%) either because they cancelled or declined the second screen (n=594), did not attend a booked screening appointment (n=149), or failed to respond to phone and text contact (n=48). This 86.8% adherence level is lower than the US NLST and NELSON trials (adherence after a 2-year interval 92% and 91% respectively) (53,54), which may reflect healthy volunteer bias. Meta-analyses of real-world evidence from the US have estimated adherence at 55 – 65% (50,55).
- In the YLST adherence study, multivariable modelling estimated the odds of attending were:
 - 22% lower for those in **the most deprived IMD quintile group** compared to the least deprived group (OR 0.78, 95% CI 0.60- 1.02)
 - 43% lower in people who were **currently smoking** at the baseline screen compared to people who had quit smoking (OR 0.57, 95% CI 0.48-0.66).
 - Twice and three times higher for those who had an indeterminate (OR 2.10, 95% CI 1.61- 2.73) or positive (OR 3.16, 95% CI 0.98-10.19) baseline screening outcome respectively; an incidental finding at baseline was not associated with attendance.
 - Age, sex, ethnicity, COPD-assessment score, MRC dyspnoea score, EQ5D visual analogue score, WHO performance status and Cancer Worry Score were not associated with attendance.
- Two previous meta-analyses have variously reported lower levels of adherence in people of ethnicities other than white, and younger age groups, which were not seen in the YLST adherence study (50,55). The YLST study authors state this underlines the local-level differences in adherence between different geographies, and thus the need for programmes in each location to “review factors associated with adherence to enable adaptations to be made to attempt to improve attendance in specific groups”.
- The YLST adherence paper, which is largest study to date reporting factors relating to adherence in a population outside North America, concludes that “given the links between deprivation, current smoking status and lung cancer risk, further research is needed to guide interventions that might

increase adherence in these groups who have the most to gain by continued participation in screening programmes”.

Engagement with diagnostic and treatment pathway

- Whilst detailed exploration of ongoing engagement with the diagnostic and treatment pathway is beyond the scope of this review, it is vital to view lung cancer screening as one part of a continuous pathway (56). The National Optimal Lung Cancer Pathway is complex, with inequalities associated with deprivation, ethnicity and rurality/urban geographies known to occur, for example, in relation to undergoing diagnostic biopsies, and engagement with pre-surgical prehabilitation (57). Where support needs are identified to facilitate uptake and engagement with the lung cancer screening component of the pathway, measures to ensure communication about and continuity of support to enable onward engagement and experience should be put in place.

5.2. Which communities in Surrey are at risk of experiencing inequalities in lung cancer screening?

In addition to inequalities identified at a national level, it is critical to consider the groups in Surrey at risk of low uptake. This place-based approach sits in line with the “Plus” component (locally-identified at-risk groups) of the CORE20Plus5 healthcare inequalities framework. This insight can in part be derived from the Surrey Joint Strategic Needs Assessments on the Surrey Context (58), Screening (59) and Smoking, Vaping and Tobacco Control (60), as well as by considering the needs of the key neighbourhoods and priority populations identified in the Surrey Health and Wellbeing Strategy (61). It is also important to consider inclusion health groups, defined within NHS England’s national framework for action on inclusion health as an umbrella term to describe people who are socially excluded and typically experience “multiple interacting risk factors for poor health, such as stigma, discrimination, poverty, violence, and complex trauma” (62).

National evidence shows lung cancer screening uptake is lower amongst people experiencing the highest levels of deprivation. In Surrey, there are 21 key neighbourhoods identified by the Index of Multiple Deprivation as having the highest levels of deprivation. These wards, and their corresponding Primary Care Networks, are shown in [Appendix 2](#), and on the [Healthy Surrey HWB Strategy website](#).

5.2.1. Screening coverage, smoking prevalence and lung cancer outcomes by District, Borough and PCN

SUMMARY

National evidence shows lung cancer screening uptake is lower amongst people who currently smoke, compared to those who used to smoke. Analysing areas in Surrey with the highest prevalence of smoking provides insight into both relative screening need, and areas where uptake could be hypothesised to be lowest. This section maps smoking prevalence, screening coverage across other cancer-screening programmes, and lung cancer incidence and mortality rates in Surrey, to provide insights into the groups in Surrey at high risk of lung cancer, and of low-uptake of lung cancer screening.

Table 5 summarises the key groups in Surrey at high risk of low lung cancer screening uptake, including by:

- District and Borough: **Spelthorne, Runnymede and Reigate and Banstead**
- PCN: **Walton Practices Confederation, Sasse Network 3, Woking Wise 3, COCO, Care Collaborative, Healthy Horley**
- Priority population and inclusion health groups: **People with learning disabilities and autism, People of Black and Minoritised Ethnicity, People with Severe Mental Illness, People with Drug and Alcohol Use problems, People experiencing homelessness, Gypsy Roma Traveller communities, People in contact with the justice system, and LGBTQ+ populations.**

Bowel screening coverage (aged 60 – 74 years old)

- **See Figures 2A and 2B**
- **By district and borough (2022/23 Proportion %):**
 - In Surrey, based on 95% confidence intervals, coverage is significantly lower than the Surrey average (74.2%) in **Elmbridge, Spelthorne, Runnymede and Woking** (although

coverage in these areas remains similar to the England average (72.0%). Coverage in all other Surrey districts and boroughs is higher than the England average. Runnymede and Spelthorne are the two districts with the highest levels of deprivation in the county, measured by IMD 2019 score (12.0 and 14.9 respectively).

- **By PCN:**

- For 2022/23, coverage in **Walton Practices Confederation, SASSE Network 3 and Woking Wise 2** is significantly lower than England average (72.0%). **Walton Practices Confederation, SASSE Network 3 and Woking Wise 2, Cobham and Oxshott, COCO, Woking Wise 3, Wham, and East Elmbridge PCNs** are all significantly lower than Surrey Heartlands average (73.9%)
- New data published for 2023/24 at PCN (not District and Borough level) shows **Sasse Network 3** (68.5%) and **Walton Practices Confederation** (68.6%) continue to lay significantly below the England average (71.8%), as they did in 2022/23. And as in 2022/23, these two PCNs, as well as **Cobham and Oxshott (69.6%), Woking Wise 2 (70.7%) and COCO PCN (71.9%)** are significantly lower than the Surrey Heartlands average (74.0%), but this year have been joined by **Central and North Guildford (72.3%) and Sasse Network 2 (71.4%)** as significantly below Surrey Heartlands average (74.0%).
- In Frimley ICB, coverage in the PCNs (Surrey Heath, Windsor and Farnham) that serve Surrey are higher than the England and Frimley ICB (73.0%) average for 2023/24

- **Trends:**

- Trend for a consistent increase in coverage from 2015 (60.1% to 2023 (74.2%) across Surrey, and in all districts and boroughs. On a national level, bowel screening coverage (2023) is significantly lower in the most deprived 40% districts (created by ranking lower tier local authorities from most to least deprived and dividing into ten categories) than the England average (72.0%).

- **On a national level:**

- Bowel cancer screening coverage in districts in the four most deprived deciles (created by ranking lower tier local authorities in England from most to least deprived and dividing these into ten categories with approximately equal numbers of local authorities in each) is significantly lower than the England average (District & UA deprivation deciles in England, IMD 2019, 4/21 geography)

Breast screening coverage (aged 53 – 70 years)

- **See Figures 3A and 3B**

- **By district and borough (2022/23 Proportion %)::**

- In Surrey, based on 95% confidence intervals, coverage is significantly lower than the Surrey average (68.0%) in **Elmbridge, Epsom and Ewell, Runnymede, Woking and Spelthorne**. Indeed, coverage in Elmbridge, Epsom and Ewell and Runnymede are all lower than the England average (66.2%). Coverage in Woking and Spelthorne is similar to the England average, whilst all other districts and boroughs are higher than the England average. Spelthorne and Runnymede are the two most deprived districts and boroughs in Surrey.

- **By PCN:**

- For 2022/23 Coverage in **Cobham and Oxshott PCN, COCO PCN, Woking Wise 2 PCN and East Elmbridge PCN** is significantly lower than both the England average (66.6%) and the Surrey Heartland average (68.0%)

- New data published for 2023/24 at PCN (not District and Borough level) shows **Woking Wise 2 PCN** (lowest coverage at 64.9%), **COCO PCN, Cobham and Oxshott PCN** and **East Elmbridge PCN** continue to fall below the England (69.9%) average, as do **Woking Wise 3, Sasse Network 2** and **Sasse Network 3**. Similar to the England average, but below the Surrey Heartlands (71.3%) average are North Tandridge, Central and North Guildford, Health Horley and Sasse Network 1.
- In Frimley ICB, coverage in the PCNs (Surrey Heath, Windsor and Farnham) that serve Surrey are higher than the England and Frimley ICB (73.0%) average for 2023/24
- **Trends:**
 - There is an overall trend for decreasing coverage on a national level from 2010 (76.9%) to 2023 (66.2%), although the largest dip was seen from 2020 (74.1%) to 2021 (64.1%) corresponding with the COVID-19 pandemic, with a gradual increase since then back up to 66.2% representing gradual pandemic recovery.
 - Across some Surrey district and boroughs a similar pattern is seen, with a dip during the pandemic and gradual post-pandemic recovery. However, in **Elmbridge**, coverage has continued to fall from 68.2% in 2021 to 64.5% in 2023; in **Epsom and Ewell** coverage fell from 70.4% (2021) to 65.0% (2023); in **Runnymede** there was a small recovery from 64.8% in 2021 to 67.0% in 2022, but this fell again to 65.1% in 2023.
- **On a national level:**
 - Breast screening coverage (2023, age 50 – 64) is significantly lower in the most deprived 40% districts (created by ranking lower tier local authorities from most to least deprived and diving into ten categories) than the England average (66.2%).

Cervical screening coverage (aged 50 – 64 years old):

- **See Figures 4A and 4B**
- Insights are summarised for the 50 – 64 age group (not the 25 – 49) as this age-group is most similar to those who will be invited to lung cancer screening.
- **By district and borough (2022/23 Proportion %):**
 - In Surrey, based on 95% confidence intervals, coverage is significantly lower than both the Surrey average (74.9%) and England average (74.4%) in **Elmbridge, Epsom and Ewell** and **Spelthorne**. And in **Woking**, coverage is similar to the England average but lower than the Surrey average. In Runnymede, coverage is also similar to the England and Surrey average. All other districts and boroughs have higher coverage than the England average.
- **By PCN:**
 - For 2022/23 Coverage in **Walton Practices Confederation, Cobham and Oxshott, Integrated Care Partnership, Sasse Network 3 PCN** is significantly lower than England average (74.9%). Coverage in these PCNs, as well as **Woking Wise 3 PCN** is significantly lower than Surrey Heartlands average (75.4%).
 - New data published for 2023/24 at PCN (not District and Borough level) shows , **Cobham and Oxshott (lowest at 70.3%), Walton Practices Confederation, Integrated Care Partnership, Sasse Network 3 PCN** continue to fall below the England (74.9%) and Surrey Heartlands (**75.6%**) average, joined by **Woking Wise 3**. At the time of writing, OHID
 - In Frimley ICB, coverage in the PCNs (Surrey Heath, Windsor and Farnham) that serve Surrey are higher than the England and Frimley ICB (76.4%) average for 2023/24

- **Trends:**

- There is a trend for a consistent decrease in coverage from 2011 to 2023 on a national level. A shallowed decrease in coverage has also been observed in Surrey between 2010 to 2021, although since 2022 there have been small improvements in coverage within Surrey from 74.2% in 2021 to 74.7 in 2022 and 74.9 in 2023. However, in some districts and boroughs this increase is not seen:
 - coverage in **Epsom and Ewell** has continued to fall, dipping from 73.8% (2022) to 73.1% (2023)
 - coverage dipped slightly from 73.7% (2022) to 73.6% (2023) in **Spelthorne**;
 - in **Woking** from 74.8% (2022) to 73.8% (2023).
- However, these recent decreases are small, and do not represent a significant year-on-year difference based on 95% confidence intervals.

- **On a national level:**

- Cervical screening coverage (2023, age 50 – 64) is significantly lower in the most deprived 50% districts (created by ranking lower tier local authorities from most to least deprived and dividing into ten categories) than the England average (74.4%).

Summary of smoking prevalence:

- **See Figures 5A and 5B**

- The latest data on current smoking prevalence (3 year data from APS, 2021-2023) shows that the districts and boroughs with the highest prevalence are **Tandridge, Reigate and Banstead**, and **Guildford**. Given people who currently smoke are less likely to take up lung cancer screening offers than those who used to smoke, it will be important to consider approaches to ensure this population is engaged with, particularly in these areas of high current smoking prevalence. People who used to smoke will also be invited to undergo triage to check eligibility for lung cancer screening.
- The areas with the highest proportion of former smokers are **Tandridge** and **Waverley**.
- It's important to be aware that there is estimated to be an approximately thirty-year lag time between smoking prevalence and lung cancer rates, so current rates of lung cancer largely reflect patterns of cigarette smoking in the 1990's (2).

Lung cancer incidence and registrations

- **See Figure 6**

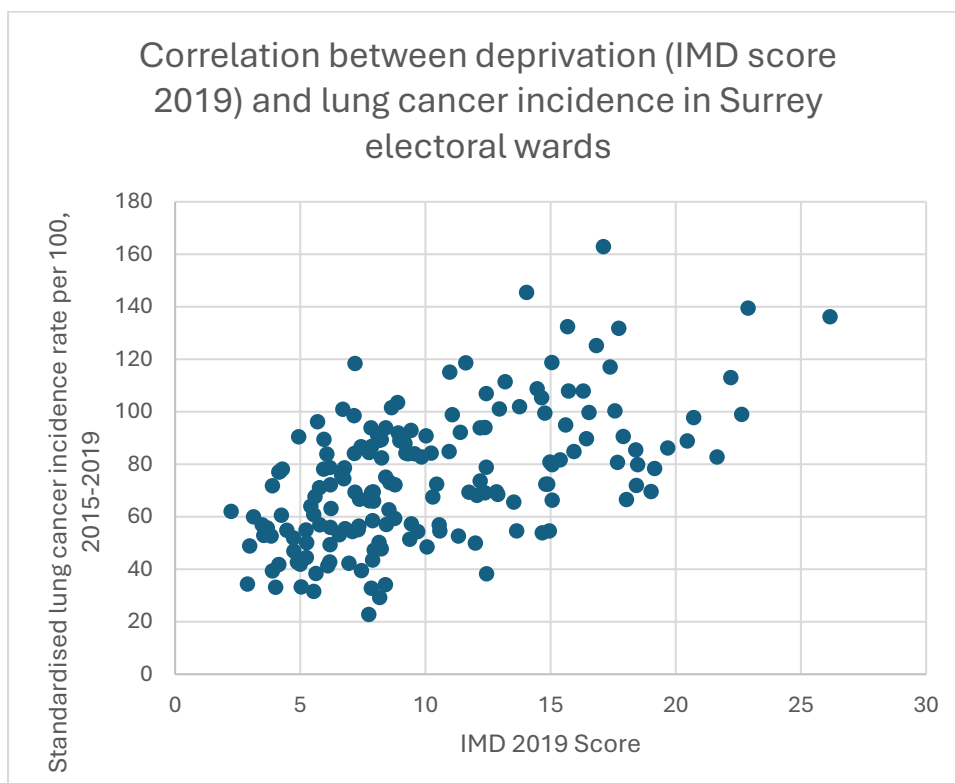
- Standardised rate of lung cancer registrations (2017 – 2019) per 100,000 range across Surrey districts and boroughs from 48.6 in Waverley to 70.7 in Spelthorne. Rates in Spelthorne (70.7) and Runnymede (69.9) are significantly higher than the Surrey rate (55.3), and similar to England (77.1). The rate across all other districts and boroughs is similar to Surrey average, and better than England.
- These data are not provided by district and borough.
- Across electoral wards in Surrey, lung cancer incidence rate varies from 22.8 per 100 in Oxted North and Tandridge, to 163.0 in Staines South. The Surrey rate is 73.8 per 100. As shown in Figure

7, deprivation is positively associated lung cancer incidence across Surrey’s electoral wards (i.e. incidence is higher in electoral wards with the highest levels of deprivation)

- The 16 electoral wards with the highest lung cancer incidence are as follows. Those in bold are significantly higher than the England rate (100), and those with a * are significantly higher than the Surrey rate (73.8). Of these 16, 7 are in Surrey’s 21 key neighbourhoods (as annotated below):

- **Staines South (163.0)**
- **Horley West & Sidlow (145.4)**
- Sunbury Common (139.5)*
- Stanwell North (136.3)* - key neighbourhood – top 5 priority (IMD decile 3)
- Egham Hythe (132.4)*
- Chertsey St Ann’s (131.8)* - key neighbourhood (IMD decile 3)
- Tattenham Corner and Preston (125.2)* - key neighbourhood (IMD decile 3)
- Beare Green (118.8)
- Molesey West (118.7)*
- Dorking North (118.4)
- Walton North (117.1)* - key neighbourhood (IMD decile 4)
- Ash South and Tongham (115.1)*
- Old Dean (113.0) – key neighbourhood (IMD decile 4)
- Farnham Upper Hale (111.5) – key neighbourhood (IMD decile 3)
- Addlestone South (108.8)
- Horley Central and South (108.0)* - key neighbourhood (IMD decile 3)

Figure 7. Correlation between deprivation and lung cancer incidence in Surrey



Lung cancer mortality and under-75 mortality

- See Figures 8A and 8B.
- These data are available at the District and Borough level.
- Mortality rate from lung cancer, all ages, all persons (2021-23), per 100,000
 - All person lung cancer mortality rate is similar across all districts and boroughs to the Surrey average (32.3) which is lower than England (47.5). The rate is significantly lowest in Mole Valley (25.6) and highest (although not significantly based on 95% CIs) in **Runnymede** (39.1) and **Spelthorne** (35.5)
 - For males, rate is similar across districts and boroughs to Surrey average (39.2), ranging from 31.5 in Mole Valley to 45.7 in **Spelthorne**. Second highest is 45.6 in **Reigate and Banstead**.
 - For females, rates are lower than for males, again with similar rate across districts and boroughs to Surrey average (33.5) ranging from 20.6 in Mole Valley to 33.5 in **Runnymede**. Second highest is 31.5 in Elmbridge.
- Under-75 mortality rate is an indicator of health inequalities. The under-75 mortality rate from lung cancer (2021-23), per 100,000 in Surrey are:
 - For all person, this ranges from 12.3 in Woking to 21.5 in **Reigate and Banstead**. Surrey average is 16.2, to which all districts and boroughs are statistically similar, except Reigate and Banstead which is significantly higher based on 95% CIs.
 - For males, rates are higher, ranging from 11.3 in Elmbridge to 28.5 in Reigate and Banstead, which again is the only district with a significantly higher rate than the Surrey average.
 - For females, rates are lower and range from 8.4 in Woking to 170 in Waverley, and are all statistically similar to the Surrey average (13.4)

Figure 2A. Bowel screening coverage: aged 60 – 74 years old 2022/23 Proportion % by Surrey District and Borough

Area ▲▼	Recent Trend	Count ▲▼	Value ▲▼		95% Lower CI	95% Upper CI
England	↑	6,675,948	72.0*		72.0	72.0
Surrey	↑	144,479	74.2*		74.0	74.4
Waverley	↑	17,008	76.9		76.3	77.4
Surrey Heath	↑	11,486	76.1		75.5	76.8
Guildford	↑	16,660	75.9		75.3	76.5
Tandridge	↑	11,616	75.5		74.8	76.2
Mole Valley	↑	12,726	75.4		74.7	76.0
Reigate and Banstead	↑	17,357	74.3		73.7	74.9
Epsom and Ewell	↑	9,337	74.2		73.4	75.0
Woking	↑	11,090	71.8		71.1	72.5
Runnymede	↑	9,528	71.8		71.0	72.5
Spelthorne	↑	11,653	71.6		70.9	72.3
Elmbridge	↑	16,018	71.6		71.0	72.2

Source: NHS England, Bowel Cancer Screening Programme

Benchmarked against Surrey:

Better 95% Similar Worse 95% Not compared

Recent trends: – Could not be calculated ➔ No significant change ⬆ Increasing & getting worse ⬆ Increasing & getting better ⬇ Decreasing & getting worse ⬇ Decreasing & getting better

Figure 2B. Bowel screening coverage: aged 60 – 74 years old 2023/24 Proportion % by Surrey Heartlands PCN

	Trend				Lower CI	Upper CI
England	↑	6,767,130	71.8		71.8	71.9
Surrey Heartlands ICB - 92A	↑	126,670	74.0		73.7	74.4
Guildford East PCN	↑	7,775	78.7*	H	77.4	79.9
Leatherhead PCN	↑	5,975	77.3*	H	75.8	78.8
Banstead Healthcare PCN	↑	6,610	77.1*	H	75.7	78.5
East Waverley PCN	↑	7,585	76.9*	H	75.6	78.2
West of Waverley PCN	↑	6,365	76.7*	H	75.2	78.1
Integrated Care Partnership PCN	↑	3,935	76.1*	H	74.2	77.9
Woking Wise 1 PCN	↑	3,430	75.1*	H	73.0	77.0
South Tandridge PCN	↑	4,505	75.0*	H	73.2	76.6
North Tandridge PCN	↑	4,175	74.8*	H	73.0	76.6
Dorking PCN	↑	6,355	74.5*	H	73.0	75.9
WB PCN	↑	3,505	74.1*	H	72.1	76.0
Sasse Network 1 PCN	↑	6,245	74.0*	H	72.5	75.4
Healthy Horley PCN	↑	5,025	73.9*	H	72.2	75.5
East Elmbridge PCN	↑	6,870	73.3*	H	71.9	74.7
Epsom PCN	↑	6,300	73.2*	H	71.7	74.7
Woking Wise 3 PCN	↑	3,350	72.7*	H	70.6	74.6
Wham PCN	↑	4,785	72.4*	H	70.7	74.1
Care Collaborative (Redhill) PCN	↑	4,480	72.3*	H	70.5	74.0
Redhill Phoenix PCN	↑	2,820	72.3*	H	70.0	74.5
Central and North Guildford PCN	↑	5,415	72.3*	H	70.7	73.9
COCO PCN	↑	4,795	71.9*	H	70.2	73.6
Sasse Network 2 PCN	↑	4,165	71.4*	H	69.6	73.2
Woking Wise 2 PCN	↑	3,560	70.7*	H	68.7	72.6
Cobham and Oxshott PCN	↑	2,300	69.6*	H	67.1	72.0
Walton Practices Confederation PCN	↑	2,030	68.6*	H	65.9	71.2
Sasse Network 3 PCN	↑	4,155	68.5*	H	66.6	70.3

Benchmark against all in Surrey Heartlands ICB average:

Lower 95% Similar Higher 95% Not compared

Recent trends: — Could not be calculated ↗ No significant change ↑ Increasing ↓ Decreasing

Source: OHID Fingertips

Figure 3A. Breast screening coverage: aged 53 – 70 years old 2022/23 Proportion % by Surrey District and Borough

Area ▲▼	Recent Trend	Count ▲▼	Value ▲▼	95% Lower CI	95% Upper CI
England	↓	4,307,866	66.2*		66.2
Surrey	↓	94,932	68.0*		67.7
Waverley	↓	11,248	72.5		71.8
Surrey Heath	↓	7,645	70.6		69.8
Mole Valley	→	8,089	69.6		68.8
Guildford	↓	11,026	69.6		68.9
Reigate and Banstead	↓	11,456	68.5		67.8
Tandridge	↓	7,468	68.3		67.5
Spelthorne	↓	7,768	66.4		65.6
Woking	↓	7,326	65.7		64.8
Runnymede	↓	6,287	65.1		64.2
Epsom and Ewell	↓	5,882	65.0		64.0
Elmbridge	↓	10,737	64.5		63.7

Source: NHS England, Breast Screening Programme

Benchmarked against Surrey:

Better 95%
Similar
Worse 95%
Not compared

Recent trends: – Could not be calculated → No significant change ↑ Increasing & getting worse ↗ Increasing & getting better ↓ Decreasing & getting worse ↘ Decreasing & getting better

Figure 3B. Breast screening coverage: aged 53 – 70 years old 2023/24 Proportion % by Surrey Heartlands PCN

Area ▲▼	Recent Trend	Count ▲▼	Value ▲▼	95.0% Lower CI	95.0% Upper CI
England	–	4,625,845	69.9	69.8	70.0
Surrey Heartlands ICB - 92A	–	86,420	71.3	70.9	71.7
Leatherhead PCN	–	4,190	79.4*	77.6	81.0
East Waverley PCN	–	5,310	78.0*	76.4	79.5
Redhill Phoenix PCN	–	2,225	77.5*	75.0	79.8
Banstead Healthcare PCN	–	4,515	76.4*	74.6	78.1
Guildford East PCN	–	5,400	75.9*	74.3	77.5
Dorking PCN	–	4,265	74.5*	72.7	76.2
Epsom PCN	–	4,475	72.7*	70.9	74.4
West of Waverley PCN	–	4,295	72.6*	70.7	74.3
Woking Wise 1 PCN	–	2,300	72.3*	69.8	74.7
Care Collaborative (Redhill) PCN	–	3,395	71.8*	69.7	73.8
WB PCN	–	2,315	71.5*	68.9	73.8
South Tandridge PCN	–	2,970	71.0*	68.8	73.1
Wham PCN	–	3,435	70.6*	68.5	72.6
Integrated Care Partnership PCN	–	2,505	69.7*	67.3	72.0
Sasse Network 1 PCN	–	4,040	69.4*	67.5	71.2
Walton Practices Confederation PCN	–	1,460	68.5*	65.4	71.6
Healthy Horley PCN	–	3,195	68.5*	66.4	70.6
Central and North Guildford PCN	–	3,615	68.5*	66.5	70.4
North Tandridge PCN	–	2,750	68.4*	66.1	70.6
East Elmbridge PCN	–	4,605	67.3*	65.5	69.1
Woking Wise 3 PCN	–	2,195	67.0*	64.4	69.5
Cobham and Oxshott PCN	–	1,610	66.7*	63.6	69.6
Sasse Network 2 PCN	–	2,835	66.4*	64.1	68.6
Sasse Network 3 PCN	–	2,860	66.1*	63.9	68.3
COCO PCN	–	3,105	66.0*	63.8	68.1
Woking Wise 2 PCN	–	2,450	64.9*	62.5	67.3

Source: NHS England. Breast Screening Programme

Benchmark against Surrey Heartlands ICB

Lower 95% Similar Higher 95% Not compared

Recent trends: – Could not be calculated ➡ No significant change ⬆ Increasing ⬇ Decreasing

Source: [OHID Fingertips](#)

Figure 4A. Cervical screening coverage: aged 50 – 64 years old 2022/23 Proportion % by Surrey District and Borough

Area ▲▼	Recent Trend	Count ▲▼	Value ▲▼	95% Lower CI	95% Upper CI
England	↓	4,043,554	74.4*	74.4	74.5
Surrey	↓	91,820	74.9*	74.6	75.1
Tandridge	→	7,226	77.2	76.3	78.0
Waverley	→	10,292	77.0	76.3	77.7
Surrey Heath	→	7,126	76.5	75.6	77.4
Guildford	→	10,342	75.8	75.0	76.5
Reigate and Banstead	→	11,131	75.6	74.9	76.2
Mole Valley	→	7,398	75.3	74.5	76.2
Runnymede	→	6,263	74.3	73.4	75.3
Woking	↓	7,304	73.8	72.9	74.6
Spelthorne	→	7,482	73.6	72.7	74.4
Epsom and Ewell	↓	5,988	73.1	72.1	74.0
Elmbridge	→	11,268	71.9	71.2	72.6

Source: NHS England, Cervical Screening Programme

Benchmarked against Surrey county:

Better 95% Similar Worse 95% Not compared

Recent trends: – Could not be calculated → No significant change ↑ Increasing & getting worse ↑ Increasing & getting better ↓ Decreasing & getting worse ↓ Decreasing & getting better

Figure 4B. Cervical screening coverage: aged 50 – 64 years old 2023/24 Proportion % by Surrey Heartlands PCN

Area	Recent Trend	Count	Value	Lower CI	Upper CI
England	→	4,066,260	74.9	74.8	74.9
Surrey Heartlands ICB - 92A	→	80,090	75.6*	75.2	76.0
Guildford East PCN	→	5,020	80.4*	78.8	81.9
North Tandridge PCN	→	2,830	80.1*	77.9	82.1
Banstead Healthcare PCN	↑	3,810	77.7*	75.8	79.5
South Tandridge PCN	→	2,745	77.2*	75.0	79.3
WB PCN	→	2,150	77.2*	74.7	79.6
West of Waverley PCN	→	3,910	76.9*	75.0	78.7
Leatherhead PCN	→	3,400	76.7*	74.7	78.7
East Waverley PCN	→	4,355	76.4*	74.6	78.1
COCO PCN	↑	3,080	76.2*	74.1	78.2
Sasse Network 1 PCN	→	3,750	75.9*	74.0	77.7
Care Collaborative (Redhill) PCN	↑	3,260	75.7*	73.7	77.7
Redhill Phoenix PCN	→	1,965	75.6*	72.9	78.1
Woking Wise 1 PCN	↓	2,085	75.5*	72.9	78.0
Healthy Horley PCN	→	2,935	75.4*	73.3	77.5
Epsom PCN	→	4,145	75.3*	73.5	77.0
Dorking PCN	→	3,640	75.3*	73.3	77.2
Sasse Network 2 PCN	→	2,835	75.2*	73.0	77.3
East Elmbridge PCN	↑	4,785	75.0*	73.3	76.6
Wham PCN	→	3,375	74.8*	72.7	76.7
Central and North Guildford PCN	→	3,320	74.2*	72.1	76.2
Woking Wise 2 PCN	→	2,570	73.9*	71.5	76.1
Sasse Network 3 PCN	→	2,760	72.5*	70.2	74.7
Woking Wise 3 PCN	↓	2,075	72.0*	69.4	74.6
Integrated Care Partnership PCN	↓	2,245	71.0*	68.5	73.5
Walton Practices Confederation PCN	→	1,390	70.4*	67.1	73.5
Cobham and Oxshott PCN	→	1,575	70.3*	67.2	73.2

Source: NHS England, Cervical Screening Programme

Benchmark against all in Surrey Heartlands ICB:

Lower 95% Similar Higher 95% Not compared

Recent trends: — Could not be calculated → No significant change ↑ Increasing ↓ Decreasing

Source: [OHID Fingertips](#)

Figure 5A. % Active Smokers GPPS 2024

Area ▲▼	Recent Trend	Count ▲▼	Value ▲▼	95% Lower CI	95% Upper CI
England	➔	-	13.1	-	-
Surrey Heartlands ICB - 92A	➔	-	-	-	-
Sasse Network 3 PCN	➔	-	15.4*	-	-
Woking Wise 3 PCN	➔	-	14.1*	-	-
Walton Practices Confederation PCN	➔	-	13.8*	-	-
Integrated Care Partnership PCN	➔	-	12.1*	-	-
Sasse Network 1 PCN	➔	-	11.8*	-	-
South Tandridge PCN	➔	-	11.6*	-	-
COCO PCN	➔	-	11.5*	-	-
Leatherhead PCN	➔	-	11.1*	-	-
North Tandridge PCN	➔	-	11.1*	-	-
Central and North Guildford PCN	➔	-	11.0*	-	-
Epsom PCN	➔	-	10.4*	-	-
Redhill Phoenix PCN	➔	-	10.4*	-	-
Woking Wise 1 PCN	➔	-	10.3*	-	-
Wham PCN	➔	-	10.0*	-	-
Dorking PCN	➔	-	9.9*	-	-
East Elmbridge PCN	➔	-	9.8*	-	-
West of Waverley PCN	➔	-	9.4*	-	-
Woking Wise 2 PCN	➔	-	9.3*	-	-
East Waverley PCN	➔	-	9.0*	-	-
Sasse Network 2 PCN	➔	-	8.8*	-	-
Healthy Horley PCN	➔	-	8.6*	-	-
Guildford East PCN	➔	-	6.9*	-	-
WB PCN	➔	-	6.7*	-	-
Care Collaborative (Redhill) PCN	➔	-	6.6*	-	-
Banstead Healthcare PCN	➔	-	6.2*	-	-
Cobham and Oxshott PCN	➔	-	5.6*	-	-

Quintiles: Best Worst Not applicable

Recent trends: — Could not be calculated ➔ No significant change

Figure 5B. Smoking prevalence in adults (18+) – current smokers (APS) 3 year range 2021-2023 proportion %

Area ▲▼	Recent Trend	Count ▲▼	Value ▲▼	95% Lower CI	95% Upper CI
England	–	-	12.4	12.2	12.6
Surrey	–	-	9.0	7.7	10.3
Tandridge	–	-	12.3	7.0	17.6
Reigate and Banstead	–	-	10.8	6.8	14.7
Guildford	–	-	10.6	5.7	15.6
Runnymede	–	-	10.3	5.2	15.4
Mole Valley	–	-	9.9	4.9	14.9
Spelthorne	–	-	9.8	5.9	13.8
Waverley	–	-	8.6	4.5	12.7
Elmbridge	–	-	8.5	5.0	11.9
Epsom and Ewell	–	-	6.1	2.2	10.1
Surrey Heath	–	-	5.6	2.5	8.8
Woking	–	-	4.0	1.6	6.5

Source: OHID, based on Office for National Statistics data

Benchmark against Surrey

Better 95% Similar Worse 95% Not compared

Recent trends: – Could not be calculated ➔ No significant change ⬆ Increasing & getting worse ⬆ Increasing & getting better ⬇ Decreasing & getting worse ⬇ Decreasing & getting better

Figure 6. Lung cancer registrations 2017-2019 Directly standardised rate per 100,000

Area ▲▼	Recent Trend	Count ▲▼	Value ▲▼	95% Lower CI	95% Upper CI
England	–	119,263	77.1	76.6	77.5
Surrey	–	1,902	55.3	52.8	57.8
Spelthorne	–	200	70.7	61.2	81.4
Runnymede	–	160	69.9	59.3	81.7
Reigate and Banstead	–	240	59.1	51.8	67.2
Mole Valley	–	183	57.9	49.7	67.1
Elmbridge	–	209	54.9	47.6	63.0
Epsom and Ewell	–	120	54.4	45.0	65.1
Woking	–	134	49.9	41.7	59.2
Guildford	–	185	49.9	42.9	57.8
Surrey Heath	–	136	49.8	41.7	59.1
Tandridge	–	133	48.7	40.7	57.8
Waverley	–	202	48.6	42.0	55.9

Source: OHID, based on NHS England and Office for National Statistics data

[Indicator Definitions and Supporting Information](#)

Benchmark against Surrey

Better 95%
Similar
Worse 95%
Not compared

Recent trends: – Could not be calculated
 → No significant change
 ↑ Increasing & getting worse
 ↗ Increasing & getting better
 ↓ Decreasing & getting worse
 ↘ Decreasing & getting better

Figure 8A. Mortality rate from lung cancer (Persons) 2021-23 Directly standardised rate per 100,000

Area ▲▼	Recent Trend	Count ▲▼	Value ▲▼	95% Lower CI	95% Upper CI
England	–	79,181	47.5	47.2	47.9
Surrey	–	1,208	32.3	30.5	34.2
Runnymede	–	98	39.1	31.7	47.7
Spelthorne	–	108	35.5	29.0	42.9
Guildford	–	141	34.6	29.1	40.8
Reigate and Banstead	–	150	34.2	29.0	40.2
Epsom and Ewell	–	80	33.5	26.5	41.7
Waverley	–	149	32.3	27.2	38.0
Elmbridge	–	131	31.0	25.9	36.9
Surrey Heath	–	92	30.6	24.7	37.6
Tandridge	–	92	30.3	24.4	37.2
Woking	–	81	28.5	22.6	35.5
Mole Valley	–	86	25.6	20.5	31.7

Source: OHID, based on Office for National Statistics data

Benchmark against Surrey:

Better 95%
Similar
Worse 95%
Not compared

Recent trends: – Could not be calculated
 ➔ No significant change
 ⬆ Increasing & getting worse
 ⬆ Increasing & getting better
 ⬇ Decreasing & getting worse
 ⬇ Decreasing & getting better

Figure 8B. Under-75 mortality rate from lung cancer (Persons) 2021-23 Directly standardised rate per 100,000

Area ▲▼	Recent Trend	Count ▲▼	Value ▲▼	95% Lower CI	95% Upper CI
England	–	37,322	25.3	25.1	25.6
Surrey	–	504	16.2	14.8	17.7
Reigate and Banstead	–	82	21.5	17.1	26.7
Runnymede	–	42	20.2	14.6	27.4
Guildford	–	64	18.2	14.0	23.3
Spelthorne	–	46	17.8	13.0	23.8
Waverley	–	63	17.4	13.4	22.3
Surrey Heath	–	36	14.8	10.4	20.6
Epsom and Ewell	–	28	14.0	9.3	20.2
Elmbridge	–	48	13.4	9.9	17.8
Mole Valley	–	34	12.7	8.8	17.8
Tandridge	–	31	12.4	8.4	17.6
Woking	–	30	12.3	8.3	17.5

Source: OHID, based on Office for National Statistics data

[Indicator Definitions and Supporting Information](#)

Benchmark against Surrey:

Better 95% Similar Worse 95% Not compared

Recent trends: – Could not be calculated ➔ No significant change ⬆ Increasing & getting worse ⬆ Increasing & getting better ⬇ Decreasing & getting worse ⬇ Decreasing & getting better

5.2.2. Surrey's key neighbourhoods

The Surrey Health and Wellbeing Strategy identifies 21 electoral wards (see [Appendix 2](#)) as the 'Key Neighbourhoods' for initial focus on reducing health inequalities, based on the 2019 Index of Multiple Deprivation's rankings for the Lower Super Output Areas in Surrey that these wards encompass (61). The top 5 are the initial priority areas, based on deprivation levels (Table 4):

Table 4. Five priority areas with highest levels of deprivation (IMD 2019) with Surrey Health and Wellbeing Strategy.

Lower Super Output Area (LSOA)	IMD Decile	Electoral Ward/Key Neighbourhoods	District / Borough	Primary Care Network	Health Areas
1. Reigate / Banstead 008A	2	Hooley, Merstham and Netherne	Reigate & Banstead	Horley	East Surrey (SH)
2. Woking 004F Note: LSOA boundary change; now within 004G	2	Canalside	Woking	WISE 3	NW Surrey (SH)
3. Guildford 012D	2	Westborough	Guildford	GRIPC	Guildford and Waverley (SH)
4. Guildford 007C	2	Bellfields and Slyfield. Note: Ward name change only, previously known as Stoke	Guildford	GRIPC	Guildford and Waverley (SH)
5. Spelthorne 001B	3	Stanwell North	Spelthorne	SASSE 3	NW Surrey (SH)

As described in Section 2, deprivation is associated with low cancer screening uptake and higher smoking and lung cancer prevalence. Therefore, the key neighbourhoods should be considered priority areas of focus for targeting interventions to prevent inequalities in lung cancer screening uptake.

The [Smoking, Tobacco and Vaping Control JSNA chapter](#) identified smoking prevalence by GP practice serving the 21 key neighbourhoods.

Screening uptake and lung cancer incidence at PCN/electoral ward level is described above in [Section 4.2.1](#).

PCNs serving key neighbourhoods with screening uptake lower than ICB and/or national averages, and/or lung cancer incidence rates higher than Surrey averages, are summarised in [Appendix 3](#).

5.2.3. Surrey's priority populations

The priority populations identified in Surrey Health and Wellbeing Strategy are those considered to be at the highest risk of poor health outcomes in the county, and are listed in Figure 9 and on the [Healthy Surrey HWB Strategy website](#). Evidence relating to cancer and cancer screening inequalities, including narratives on approaches that have been suggested to facilitate uptake of cancer screening amongst those groups is summarised in [Appendix 4](#). Many priority populations experience high levels of deprivation and higher smoking prevalence – two factors associated with low cancer screening uptake.

5.2.4. Inclusion Health groups

OHID's Inclusion Health Groups are shown in Figure 9. As defined by NHS England's Inclusion Health framework, "inclusion health is an umbrella term used to describe people who are socially excluded" who are likely to have the following experiences in common:

- Discrimination and stigma
- Violence and the experience of trauma

- Poverty
- Invisibility in health datasets

These experiences result in:

- Insecure and inadequate housing
- Very poor access to healthcare services due to service design
- Poor experience of public services
- Poorer health than people in other socially disadvantaged groups.

The NHS England framework for action on inclusion health outlines 5 key actions to reduce healthcare inequalities for inclusion health groups:

1. Commit to action on inclusion health
2. Understand the characteristics and needs of people in inclusion health groups
3. Develop the workforce for inclusion health
4. Deliver integrated and accessible services for inclusion health
5. Demonstrate impact and improvement through action on inclusion health

There is some overlap between inclusion health groups and Surrey's priority populations. The inequalities faced, and evidence-based recommendations to reducing inequalities for inclusion health groups are summarised in [Appendix 4](#).

There is very little data to demonstrate low cancer screening uptake among inclusion health groups, as data is not routinely collected on these groups in current screening programmes. However, overall, inclusion health groups typically have higher levels of smoking prevalence, higher rates of cancer incidence and mortality, and experience multiple, intersecting barriers to engaging with cancer screening (as summarised in [Appendix 4](#)). Particularly given the extremely high smoking prevalence amongst inclusion health groups (the key factor driving lung cancer incidence) it is critical that targeted efforts are made to make lung cancer screening more accessible for these groups to avoid further widening the gap in outcomes for these populations.

5.2.5. Intersectionality and multiple disadvantage

Whilst the priority population and inclusion health approaches help identify groups of people at high risk of poor outcomes, many people will belong to more than one of these groups and many will simultaneously experience socio-economic deprivation. The inequalities associated with belonging to each of these groups interacting and compound (an effect known as 'intersectionality') (63). There is a need to achieve balance between highly-personalised targeting of support to prevent group-specific inequalities arising in relation to lung cancer screening, whilst recognising and responding appropriately to the overlap of many of barriers and facilitators to uptake shared between groups. This perspective is crucial to optimise population-level implementation of lung cancer screening whilst ensuring inequalities are minimised, or ultimately, eradicated.

Easy-read invitations and communications are one example of how interventions can have impact across group-specific inequalities. Easy-read invitations are recommended to improve access of screening for people with learning disabilities. However, easy-read materials would also improve accessibility for many populations, including but not limited to those with limited literacy and health literacy (negatively correlated with deprivation), people who do not speak English as a first language and people with multiple, competing priorities. Easy-read and simple-to-interpret infographics and videos should be considered as the standard format for screening communications, as a measure to have broad impact across multiple, intersecting aspects of inequality.

Inclusion health groups often have high levels of smoking prevalence (for example, ASH report prevalence as 77% among people who are homeless, 80% among people entering prison, 77% among people receiving treatment for opioid addiction(60)), a major risk factor for lung cancer incidence, as well as for low uptake of lung cancer screening. Inclusion health groups also tend to experience high levels of deprivation, another factor associated with low lung cancer screening uptake. Members of inclusion health groups experience distinct and

overlapping factors that can hinder access to and engagement with cancer screening, including not being registered with GPs, inconsistent contact details (postal and telephone contact), competing priorities, fatalism, and transport. Trauma-informed approaches are key for people experiencing multiple disadvantage; the Surrey JSNA chapter recommends that all staff interacting with people with people with experience of multiple-disadvantage should undertake the foundation Trauma Informed Approach modules: ‘Understanding trauma informed care’.

Further facilitators and barriers to screening are explored in [Section 4.3](#).

Figure 9. Surrey’s priority populations and OHID Inclusion Health groups

Groups highlighted in yellow represent an overlap between priority populations and inclusion health groups

Intersectionality and multiple disadvantage

Interacting, additive and mutually reinforcing inequalities

21 key neighbourhoods	Surrey Priority Populations	OHID Inclusion groups
<p>Wards which include the most deprived “pockets” within the county, based on Index of Multiple Deprivation score</p>	<p><i>Communities which are often overlooked and most at risk of experiencing poor health outcomes identified by Surrey’s COVID Community Impact Assessment and Rapid Needs Assessments.</i></p> <div style="background-color: yellow; padding: 2px;"> <p>People experiencing homelessness Gypsy Roma Traveller community People with drug and alcohol problems</p> </div> <p>Carers and young carers Adults with learning disabilities and/or autism People with long term health conditions, disabilities or sensory impairments Older people 80+ and those in care homes Black and Minority Ethnic groups Young people out of work People experiencing domestic abuse People with serious mental illness Adults with care experience</p>	<p><i>Population groups who are socially excluded, who typically experience multiple overlapping risk factors for poor health and are often not accounted for in electronic records.</i></p> <div style="background-color: yellow; padding: 2px;"> <p>People experiencing homelessness Gypsy Roma Traveller community People with drug and alcohol problems</p> </div> <p>Sex workers Vulnerable migrants and refugees Victims of modern slavery Prisons and those in contact with the criminal justice system</p>

5.2.6. Surrey populations requiring priority support to target inequalities in lung cancer screening

Based on the evidence relating to smoking prevalence, lung cancer incidence and screening participation summarised above and in [Appendix 4](#), it will be of particular importance to undertake targeted approaches to facilitating equitable access to lung cancer screening for the groups described in Table 5. It will be crucial to monitor data by demographic as the programme is implemented to monitor differences in uptake and guide future targeted action.

Table 5. Summary of Surrey populations to target with support to prevent inequalities in lung cancer screening

Category	Target groups	Rationale
District and Borough	Spelthorne	<ul style="list-style-type: none"> Low screening uptake across other cancer screening programmes High lung cancer registrations and highest all person lung cancer mortality rates in Surrey
	Runnymede	<ul style="list-style-type: none"> Low screening uptake across other cancer screening programmes High lung cancer registrations and highest all person lung cancer mortality rates in Surrey
	Reigate and Banstead	<ul style="list-style-type: none"> High smoking prevalence High lung cancer registrations, and highest under-75 mortality rate from lung cancer in Surrey
PCN	Walton Practices Confederation (<i>Serve Walton South (Elmbridge 004B) and Walton North (Elmbridge 008A) – IMD Decile 3 and 4 respectively</i>)	<ul style="list-style-type: none"> Serve key neighbourhood (high deprivation), high proportion of current smokers Bowel and cervical coverage: significantly lower than England and Surrey Heartlands average in 2022/23 and 2023/24 Lung cancer incidence rate in Walton North is significantly higher than the Surrey rate
	Sasse Network 3 (<i>Serves Stanwell North (Spelthorne 001B) – IMD Decile 3 (top 5 priority ward)</i>)	<ul style="list-style-type: none"> Serve key neighbourhood (high deprivation), high proportion of current smokers Bowel, cervical and breast coverage: significantly lower than England and Surrey Heartlands average 2022/23 and 2023/24 Lung cancer incidence rate in Stanwell North is significantly higher than the Surrey rate
	Woking Wise 3 (<i>Serves Canalside (Woking 004G) – IMD Decile 2 (top 5 priority ward)</i>)	<ul style="list-style-type: none"> Serve key neighbourhood (high deprivation), high proportion of current smokers Bowel, cervical coverage and breast: significantly lower than Surrey Heartlands average in 2022/23, and cervical and breast also lower than England average in 2023/24
	COCO (<i>Serves Chertsey St Ann’s (Runnymede 006D) – IMD Decile 3</i>)	<ul style="list-style-type: none"> Serve key neighbourhood (high deprivation), high proportion of current smokers Bowel coverage: significantly lower than Surrey Heartlands average in 2022/23 and 2023/24 Breast coverage: significantly lower than England and Surrey Heartlands average in 2022/23, and 2023/24 Lung cancer incidence rate in Chertsey St Ann’s is significantly higher than the Surrey rate
	Healthy Horley (<i>Serves Hooley, Merstham and Netherne (Reigate/Banstead)</i>)	<ul style="list-style-type: none"> Serve key neighbourhood (high deprivation) Breast coverage: significantly lower than Surrey Heartlands average in 2023/24

	008A) – IMD Decile 2 (top 5 priority ward)	
	Care Collaborative (Serves Horley Central and South and Redhill West and Wray Common)	<ul style="list-style-type: none"> • Serve key neighbourhood (high deprivation) • Lung cancer incidence rate in Horley Central and South significantly higher than Surrey rate
	GRIPC (Serves Westborough, and Bellfields and Sly)	<ul style="list-style-type: none"> • Serves key neighbourhood (high deprivation) • High smoking prevalence in Guildford
Priority Population / Inclusion Health groups	People of Black and Minoritised Ethnicity (in particular, people of Bangladeshi, Mixed and White Other ethnicity).	<ul style="list-style-type: none"> • Low screening uptake across other cancer screening programmes for Black and Minoritised Ethnic groups highlighted in Screening JSNA • Mortality rates for lung cancer in England and Wales between 2017 – 2019 are significantly higher in Bangladeshi, mixed and white ethnic groups, compared to all other ethnic groups except Black Caribbean and Black Other (where the difference was not significant) (14). • Some trials lung cancer screening trials have reported lower screening uptake among minoritised ethnic groups: the YLST reported low uptake among people of Asian/Asian British and Mixed ethnicity. In SUMMIT low uptake among people of Black and ‘Other White’ ethnicity were reported. SUMMIT also reported that, whilst uptake among people of Asian backgrounds was higher than people of white ethnic background, uptake by people from Bangladeshi and Pakistani backgrounds were lower in absolute terms). However, evidence was mixed between trials (see Section 4.1.1.) • Smoking data in Surrey are not currently collected by ethnicity, but Office for National Statistics (2019) data reported in the Surrey Tobacco JSNA show that for both men and women, the highest smoking prevalence was seen in the mixed ethnic group with large differences between sexes particularly in Asian (13.9% in men and 2.9% in women), Chinese (12.6% in men and 4.0% in women) and Black (12.9% in men and 6.9% in women) groups.
	People with learning disabilities and autism	<ul style="list-style-type: none"> • Low screening uptake across other cancer screening programmes highlighted in Screening JSNA and Surrey Heartlands LeDeR review.
	People with Severe Mental Illness	<ul style="list-style-type: none"> • High smoking prevalence, low cancer screening uptake, high risk of lung cancer, limited data in context of lung cancer screening uptake, but multiple known barriers to engagement with screening (See Appendix 4 for details by population group).
	People with drug and alcohol use problems	
	People experiencing homelessness	
	Gypsy Roma Traveller communities	
	People in contact with the justice system	
	LGBTQ+ community	

5.3. What approaches can prevent or address lung cancer screening inequalities?

To minimise any differences in lung cancer screening uptake and engagement arising between groups in Surrey, it is crucial to understand the factors driving these differences (eg, facilitators and barriers). This enables the development, evaluation and implementation of evidence-based approaches to supporting equitable lung cancer screening uptake and engagement.

The i-SAM model (see **Figure 1**) demonstrates how participant influences (motivation and capability) and environmental influences (opportunity) can alter screening behaviour from awareness, engagement, decision-to-act, acting (eg, undergoing screening) and repeating this behaviour.

5.3.1. Understanding drivers for disengagement

Screening programmes should be non-coercive, and respect people’s right to making an informed choice (64). The aim of the communication and invitation process around a screening programme should be to ensure that all eligible individuals receive and understand all information that is required for them to make an informed choice about whether to undergo screening (65). This information must cover:

- who is eligible
- what is involved (i.e. the screening process)
- the risks and benefits of undergoing screening
- knowing about the support that can be provided and adjustments that can be made, to make the process accessible and acceptable.

When considering an individual’s choice about whether to engage with a screening programme, this can be categorised in one of four ways: informed (target category), misinformed, disengaged or inclined (see **Table 6**).

If implemented well, all people who are eligible for a screening programme should fall into the informed category by the time they make their decision about engaging. To prevent inequalities arising in screening, targeted resource should be provided to effectively inform groups at the highest risk of falling into the misinformed, disengaged or inclined categories.

Table 6. Categories of people deciding to engage/disengage

Category (<i>i-SAM</i>)	Description	Examples of at-risk groups
Informed:	A person with sufficient knowledge and understanding of lung cancer and the screening process, of its risks and benefits, and of the support available to overcome emotional and practical barriers. If fully informed, and the individual chooses not to engage, this is an informed choice and should be respected.	This is the target category. All people should be supported to make an informed choice.
Misinformed: <i>(Decision-to-act)</i>	A person who has misconceptions about lung cancer or the lung cancer screening process, its risks and benefits, or has emotional (eg, fear, fatalism) or practical (eg, transport, appointment timings) which stop them engaging with or attending lung screening. People in this category are aware of lung cancer screening, but their understanding of it is inaccurate or incomplete. People in this category should have the opportunity for misinformation and misperceptions about lung cancer, the screening process and its risks/benefits to be corrected, including having misinformation/misperceptions about the emotional and practical support provided to attend.	<ul style="list-style-type: none"> • Limited health literacy (associated with higher levels of deprivation and inclusion health groups) • Deaf/blind community • Limited English proficiency (associated with minoritised ethnic groups including people of white, non-British ethnicity)

		<ul style="list-style-type: none"> • People with learning disabilities and autism • People with SMI • People who currently smoke (evidence suggests higher levels of fatalism and emotional barriers)
Disengaged: <i>(Awareness, engagement)</i>	A person with limited or no awareness of lung cancer and/or lung cancer screening. People fall into this category if they do not receive the invitation, or do not/cannot read or understand the invitation. People in this category should be identified along with the reasons for the lack of engagement identified (eg, did not receive invitation; invitation received but unable to read it), and reasonable adjustments made to the invitation and communication process to enable them to engage with the lung cancer screening process.	<ul style="list-style-type: none"> • Inclusion health groups (at highest risk of not receiving invitation)
Inclined: <i>(Acting)</i>	A person who is interested in, or had intended to engage in lung cancer screening, but might have forgotten to respond to their invitation or attend an appointment. This could be due to conflicting priorities, procrastination (often related to other emotional and physical barriers) or just forgetfulness. People in this category should be reminded that screening is still available, and reasonable adjustments can be made to the process to facilitate their attendance (eg, appointment timings, reassurance).	<ul style="list-style-type: none"> • People with multiple co-morbidities • Carers • People of working age • People with learning disabilities and autism • People with SMI

5.3.2. Facilitators and barriers to engaging with lung cancer screening

Multiple barriers and facilitators to engaging with lung cancer screening in England have been identified through existing trials, and emerging insights from the Targeted Lung Health Check programme.

The team delivering the Yorkshire Lung Screening Trial (YLST) summarised barriers and solutions to engagement from the literature as part of their approach to developing and evaluating a Pathway Navigation intervention that aimed to improve uptake and reduce inequalities in screening within the YLST (65). They mapped these barriers and strategies/solutions to the core domains within the COM-B model (capability, opportunity and motivation), and sought stakeholder and patient and public input into how these could be implemented as solutions within a Pathway Navigation intervention. The detailed list of facilitators and solutions proposed as part of their Pathway Navigation Intervention are described in [Appendix 5](#) and summarised in Figure 10 (65). The Pathway Navigation intervention is being tested as part of a nested randomised controlled trial within the YLST (65).

In Surrey, there is the opportunity to plan the implementation of the lung screening programme to proactively embed some of the suggested solutions from the outset, and to highlight available support across multiple communication channels.

Figure 10. Summary of barriers and facilitators to lung cancer screening participation identified by the Yorkshire Lung Screening Trial team based on existing trials, PPIE and stakeholder feedback (65)



5.3.3. Interventions to reduce inequalities in lung cancer screening

Interventions, or approaches to reducing inequalities in lung cancer screening should target the facilitators and barriers described in [Figure 10](#).

Underlying principles

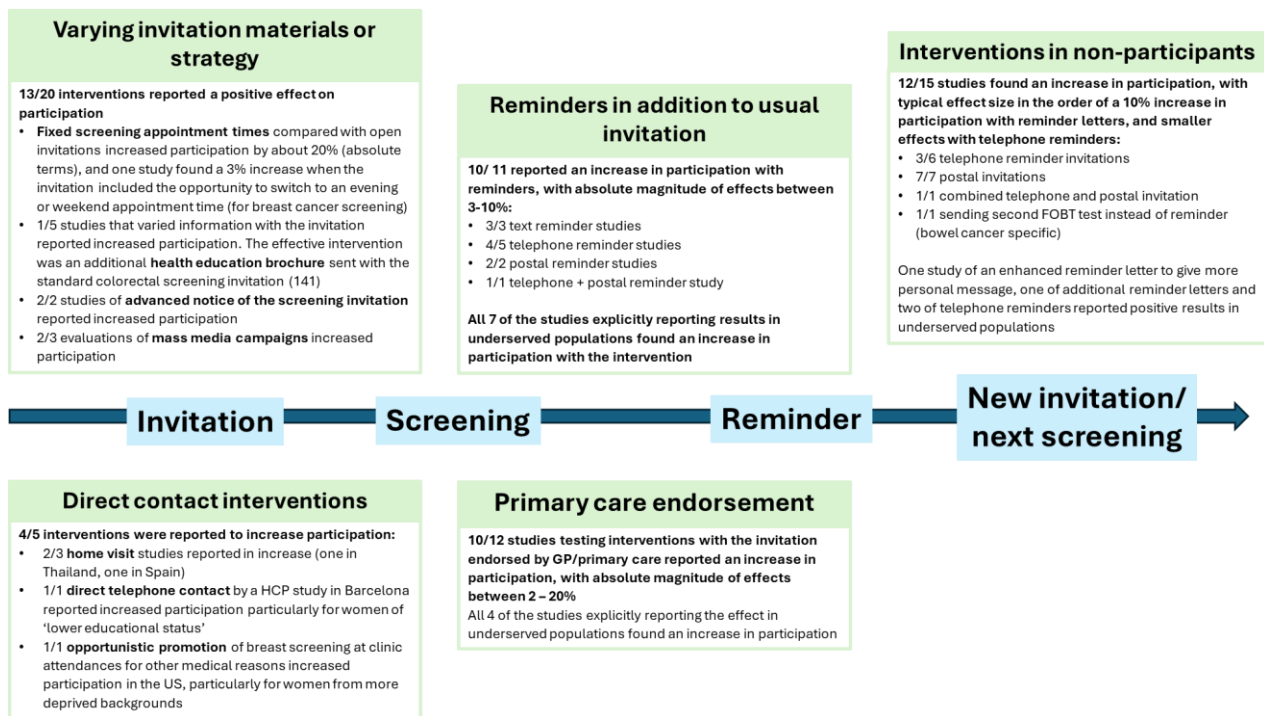
A paper capturing the perspectives of patients, advocacy groups and empowerment organisations on the effectiveness of interventions to reduce cancer screening inequities identified the following key themes (66):

- **Screening should not be viewed as a discrete event:** barriers to access and undergo screening span across a continuum (as described in the i-SAM model)
- **Individually tailored interventions** are likely to be more effective than a one-size fits-all approach because they may better accommodate the person’s personal beliefs, knowledge, behaviours, and preferences;
- **Targeting people who are unknown to medical services** and “largely unreachable” remains a major challenge;
- **Co-creating interventions with professional patient advocacy groups, relevant lay persons and stakeholders** (eg, healthcare professionals, researchers, local government and community organisations etc) at all stages of design, implementation, and evaluation is essential

Evidence for interventions that can facilitate cancer screening uptake (cross-cancer type)

- A rapid review of 68 papers reporting on 71 intervention studies testing approaches to improving participation in cancer screening identified 6 domains of intervention that were found to “more consistently improve participation...including in underserved populations” (see [Figure 11](#)). The authors recommend the following interventions could lead to small but ‘arguably worthwhile’ increases in participation rates in deprived and underserved populations:
 - Pre-screening reminders
 - GP endorsements
 - More personalised reminders for non-participants (either by enhanced written or telephone contact from primary care)
- However, the categorisation of interventions is an over-simplification; many studies evaluate multi-component interventions that combine for example, primary care endorsement, multilingual approaches and offers of transport to screening centre (as in Bell and colleagues approach to increasing breast cancer screening participation in inner city and ethnic minority groups at Cardiff GP practices) (67).

Figure 11. Image adapted from “Rapid review of evaluation of interventions to improve participation in cancer screening services” (64)



- In 2022, OHID published a systematic review of interventions to improve participation in population screening (cancer and non-cancer) among underserved groups (68). They identified thirty-six trials relating to young person and adult screening programmes, reporting 193 comparisons of screening uptake within underserved groups. Most of this evidence related to cancer screening uptake, and to underserved groups defined by socioeconomic status, ethnicity, age, sex, and screening history. They identified gaps in the evidence relating to interventions that could improve screening uptake for people not registered with a GP, homeless people, rough sleepers, asylum seekers, gypsy and traveller groups, sex workers, those in prison, those experiencing severe and enduring mental health problems, and people with drug or alcohol problems or communication difficulties, as well as those with protected characteristics. The review identified strong and consistent evidence for:
 - Reminders that include a timed appointment**
 - GP letters for non-responders**
- There was some evidence supporting:
 - Annual reminders for non-responders**
 - Pre-appointment reminders by post or text-message**
- There was weaker or unconfirmed evidence for:
 - Timed office-hour appointments with an offer to switch to out of hours
 - GP letters near the time of invitation
 - GP endorsed invitations
 - enhanced reminder letters
 - telephone reminder letters for non-responders
 - a psycho-educational booklet.
- The review identified little or no evidence to favour nurse or link worker telephone calls or home visits, tailored invitations referencing screening history, simplified or narrative leaflets, anticipated regret questions or planning tools addressing barriers to screening. However, whilst the existing evidence does not confirm the effectiveness of these interventions, none have been tested in the context of lung cancer screening (68).

- OHID have also [collated guidance and resources of evidence-based approaches](#) to reducing inequalities in population screening by ensuring that all eligible people have access resources. This includes guidance on:
 - How screening providers should make reasonable adjustments for people with a learning disability; AND Cancer screening and people with learning disabilities
 - Access for people with severe mental illness
 - Support for carers (statutory guidance)
 - Effective text message use
 - A health equity audit guide
 - NHS population screening: information for transgender people (promotional material)
 - Equitable access to screening: statutory duties under Equality Act guidance
 - Guidance on reducing inequalities for breast, cervical and bowel cancer screening

Evidence for interventions that can facilitate lung cancer screening uptake

To date, no systematic review has specifically meta-analysed randomised controlled trial evidence of interventions to facilitate lung cancer screening participation, or reduce lung cancer screening inequalities. As lung cancer screening is implemented across England and the UK, evidence will continue to be generated to facilitate such meta-analyses. It will be important to monitor emerging evidence published in relation to approaches to facilitating equitable screening uptake, particularly from UK implementation settings.

For now, existing evidence from international lung screening programmes, and emerging insights from UK lung screening trials and targeted lung health check pilot sites, can be used to inform equitable implementation approaches:

- An ‘equity-oriented’ scoping review of interventions designed to increase the uptake of lung cancer screening published in 2023 summarised the results of 35 peer-reviewed articles (of which 8 were based in the UK, and 10 were randomised controlled trials) and one piece of peer-reviewed literature (69). The findings of all studies are included in [Appendix 6](#). The review aimed to identify relevant interventions, their reported effectiveness, any positive or negative impacts of the interventions on lung cancer screening, as well as key knowledge and implementation gaps. The review was guided by the ‘equity-oriented lung cancer screening framework’ (see [Figure 12](#)). Of the two randomised studies conducted in the UK, both were embedded within the LSUT trial in an outpatient clinic at a London hospital:
 - A **targeted, stepped and low-burden invitation approach**, with an accompanying leaflet targeting psychological barriers and low-burden information, reduced the social gradient of lung cancer screening uptake compared to when provided with a less-targeted leaflet, by better engaging those living in areas of highest deprivation and lung cancer incidence (70).
 - An informational film provided alongside a leaflet (leaflet alone is the control condition) improved knowledge of lung cancer screening and reduced decisional conflict compared to the leaflet alone, but did not affect uptake (71).
- The other 6 randomised studies were conducted in Japan (n= 1)) and US (n=5) and reported mixed results:
 - A trial in US comparing LDCT uptake between people who received a **Pathway Navigation** intervention (with shared decision-making about screening, help scheduling appointments with primary care physicians and to overcome barriers to screening and follow up). The proportion of people undergoing LDCT screening was significantly higher in the intervention arm (23.5%) compared to usual care (no navigation, 8.6%) (72).
 - A US study sent recruitment packages to clients of smoking quitline call centers. Clients received either a patient decision aid video (intervention) or a brochure (control) about lung cancer screening. People receiving the video felt significantly more informed about screening options and clearer about harms and benefits compared to control. However, these did not

translate to rates of scheduling a CT scan, with no significant difference between groups (although the study was not powered to assess this difference) (73).

- An educational leaflet sent with an invitation non-significantly increased uptake compared to invitation alone in Japanese areas with low uptake (74).
 - 4 participants who received electronic messages sent through an e-portal about screening and eligibility underwent screening compared to 1 in the usual care control in US primary care or pulmonary clinics, but this is not powered to test effectiveness (75).
 - A study in Kentucky found regions exposed to a campaign created with community members including postcards, flyers, TV, newspaper and radio adverts and a supportive website reported an incremental increase in LDCT uptake compared to regions that did not receive the campaign (non-RCT design) (76)
 - A US study randomised participants to view combinations of construal level (intervention) and regulatory focus (control) (i.e. prevention focus) images. After viewing the images, participants were asked about their likelihood to undergo LCS. High construal/**promotion focus images (i.e. big picture messages describing the benefits of screening) led to greater willingness to screen** compared to images representing other psychological states (p=0.04) (77).
 - The authors synthesised the evidence across all studies to conclude that interventions that were most effective in improving access to LCS:
 - **Targeted priority populations**
 - **Raised community-level awareness**
 - **Tailored materials for sociocultural acceptability**
 - **Did not depend on prior patient engagement/registration** with the health care system
 - **Proactively considered costs related to participation**
 - Enhanced utilisation through **informed decision-making**
- A systematic review synthesised evidence from 22 studies around education messages and strategies to inform the public, potential screening candidates and healthcare providers about lung cancer screening (78). The review identified a lack of consistent evidence to demonstrate which strategies are most effective for increasing awareness and education about LCS at the participant, healthcare professional and community level. Based on the evidence, they developed a series of recommendations (summarised in **Figure 12**) in relation to the following intervention types:
 - LCS awareness campaigns:
 - Potential screening candidates
 - General population
 - Health professionals
 - Behavioural interventions
 - Attitudes, perceptions and knowledge of screening
- The road-map to implementing a UK national lung cancer screening programme published in 2023 in *The Lancet Oncology* provides a policy-review and consensus of an expert multi-professional group on the requirements and priorities for implementing lung cancer screening. As part of this road-map, the group provide the following guidance on how to support equitable participation in lung cancer screening:
 - Importance of using **evidence-based approaches to contact potential screening candidates** is crucial to minimise risk of widening existing inequalities.
 - Individuals at highest risk of lung cancer are the least likely to respond to a screening invitation. The article highlights inequalities in uptake related to socio-economic position, smoking status, ethnicity and region. The most common reasons for this are **difficulty accessing services, cancer fear, fatalism and stigma associated with lung cancer and smoking**.
 - Wider social determinants of health, or environmental conditions, underpin the balance of risks and benefits of lung cancer screening participation. For example, people experiencing

- deprivation may perceive or experience the time and resource required to participate in screening as a greater burden than their more affluent counterparts
- The road-map described behavioural science-informed approaches to counteracting inequalities, mapped to the COM-B model:
 - **Improving awareness of lung cancer screening and its availability** (capability)
 - **Enabling easier physical access and support** (opportunity)
 - **Counter-acting deep seated perceptions of risk-based eligibility for lung cancer screening, particularly among those with long-standing smoking histories** (motivation)
 - The road map proposed evidence-based multi-level (individual, interpersonal, organisational and wider-system) interventions can target these COM components of behaviour, including **tailored messaging**, and a **targeted, stepped and low-burden invitation approach**. These interventions should be **co-designed and evaluated based on local knowledge, community engagement and evidence** from other screening programmes to optimise equitable participation. And the **process should be applied across the screening pathway** from awareness, invitation and eligibility assessment, through to surveillance, participation in subsequent screening rounds and decisions about diagnostic-work up and treatment. Specific suggested intervention approaches related to inequalities include:
 - **Shared-decision making** is important to support the “complex cognitive and emotional demands” and LCS programmes “need to be organised in a way that supports integration of shared decision-making”, given eligibility, false positive and negative findings, and lung cancer mortality reduction are poorly understood.
 - **Community outreach** in the form of local communications (eg, local radio, bus stop and engagement events, community educators or ‘champions’) have been used by existing TLHC pilots and should be supported by materials adapted to the needs of the local population and evaluated for acceptability. This can be facilitated by charity and third-sector support (eg, by Roy Castle Lung Foundation events and media activity <https://roycastle.org/lung-health-checks/>), with patient and public involvement and behavioural scientists to support evidence-based design and evaluation
 - **Pathway Navigators** were highlighted as potentially playing an important role in enabling access to lung screening, integrated smoking cessation and treatment for high-risk individuals from under-represented communities. They have also been identified as an important way of improving adherence. Pathway Navigation has been shown to reduce inequalities in lung cancer screening uptake in a US trial, and has been tested in in a UK lung cancer screening context as part of the YLST, with results anticipated to be published in 2025.
 - **A “one-stop-shop community-based service”** designed to address barriers to participation, including: immediate access to a mobile CT scanner located in areas of high deprivation, and a targeted, low-burden, stepped invitation approach. The road map emphasises the importance of ensuring services are accessible for people for whom transport and perception of healthcare models might be misaligned with provision. And highlighted the importance of including a screening risk-benefits discussion before undergoing the baseline CT scan, and for GPs to receive prompt electronic copies of the outcome.
 - **Co-located, opt-out access to smoking cessation practitioners:** The road-map discusses the importance of capitalising on lung cancer screening as a powerful opportunity to offer smoking cessation support, given evidence that cessation rates are higher during LCS, particularly when receiving an abnormal scan result. Adding stop-smoking interventions alongside LCS is also highly likely to be cost-effective based on cost-effectiveness data. Evidence supports implementing stop-smoking as opt-out, and where possible, as an integrated service with immediate access to a co-located

smoking cessation practitioner who can provide immediate access to nicotine replacement therapy (including consideration of e-cigarettes). Onward referral of screening attendees to existing national services could be ineffective and was highlighted as risking widening health inequalities.

Figure 11. Equity-oriented framework for lung cancer screening

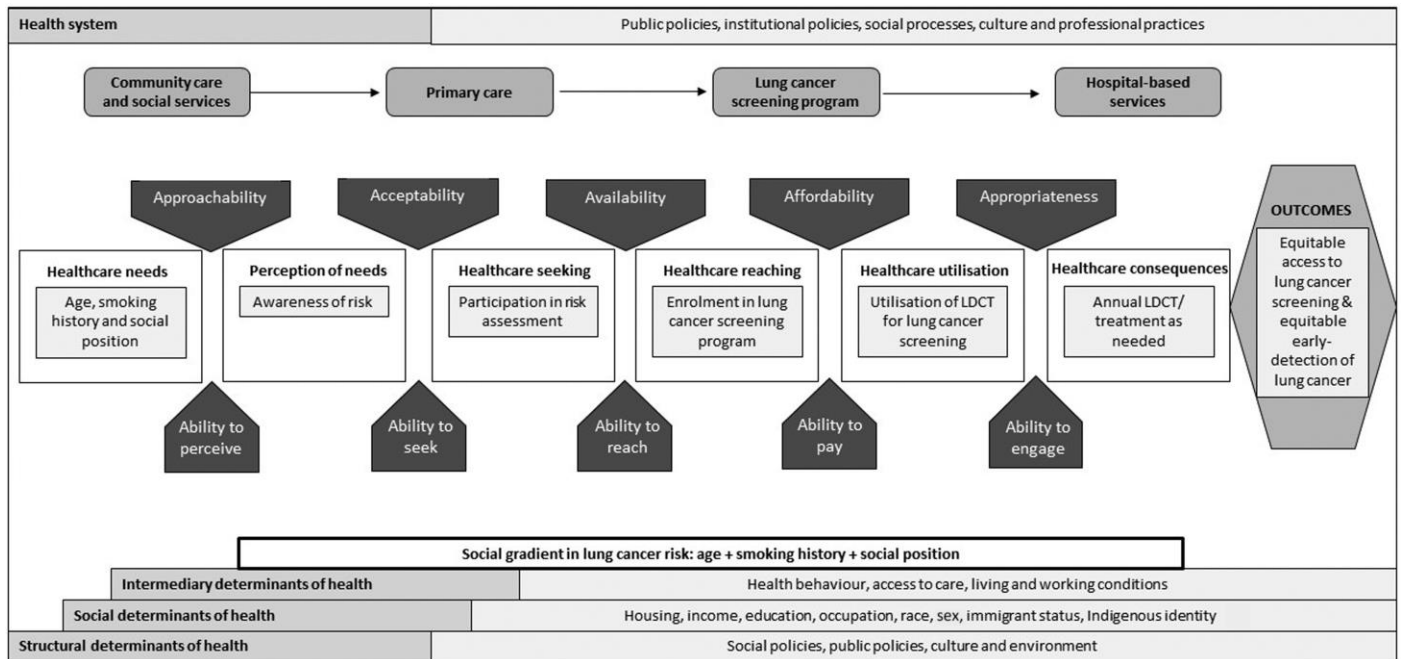
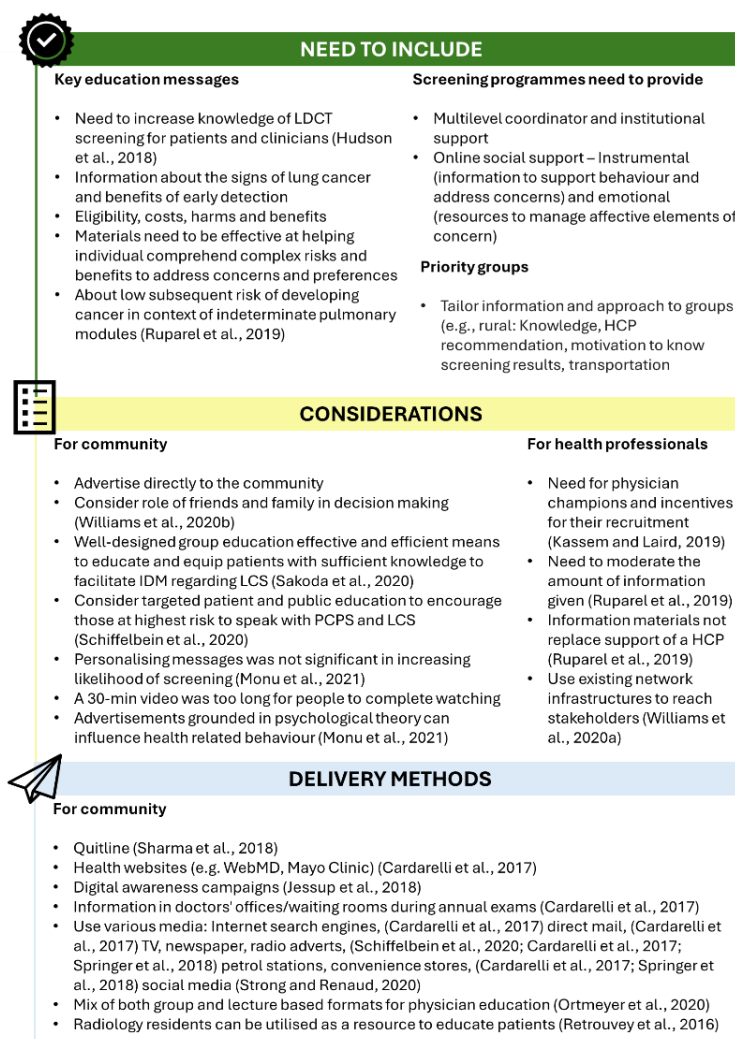


Figure 12. Recommendations from systematic review of education messages and strategies to inform the public, potential screening candidates and healthcare providers about lung cancer screening (78)



6 Limitations

This review has synthesised evidence in response to the three guiding research questions. However, it is not a systematic review, and does not provide meta-analytic responses to whether interventions are effective based on synthesised randomised controlled trial data. The recommendations are drawn from expert consensus based on evidence derived largely from UK lung cancer screening pilot trials, and from insights from international lung cancer screening programmes and UK-based cancer screening programmes (breast, bowel, cervical). However, lung screening trials have not been conducted within the Surrey population, nor are they as ecologically valid as insights from real-world lung screening implementation. It will be important to monitor emerging evidence as lung cancer screening continues to be implemented across the country and county to further inform equitable approaches to implementation in Surrey. It will also be crucial to regularly monitor uptake and engagement data in Surrey once the screening is launched to efficiently identify and address signs of inequalities, guide by Health Equity Audit methodology. In particular, evidence around access to and engagement of inclusion health groups with lung cancer screening (and cancer screening more widely) remains limited. In the case of lung cancer screening, given the high prevalence of smoking within many inclusion health groups, it is particularly vital these populations are targeted through tailored outreach with local communities and groups working.

7 Recommendations

The narrative review above synthesises evidence in relation to where inequalities exist along the lung cancer screening pathway, populations in Surrey at risk of experiencing inequalities in lung cancer screening, and evidence for interventions to reduced inequalities in lung cancer screening. **Figure 13** maps the key findings from each of these sections to the i-SAM model.

The following recommendations draw on this evidence to guide Surrey partners when planning the implementation of lung cancer screening in Surrey, to minimise the any inequalities in access to and engagement with the pathway. The recommendations relate to roles of partners within current Targeted Lung Cancer Screening programme. However, these roles may changes as the programme transitions to a national lung cancer screening programme over the next 5 years. However, the principles outlined in the rationale, guidance and insight remain relevant through this transition.

Partner	Recommendation	Rationale, guidance and insight
1. SSCA and commissioned service provider	1.1. To develop and deliver targeted awareness-raising campaigns around lung cancer, and lung cancer screening, with proactive outreach to groups at highest risk of lung cancer and predicted low screening uptake (see high priority groups below)	<p>The Lancet Road-Map for equitable lung cancer screening implementation recommends targeted communications to raise awareness among target groups at high risk of low uptake. Communications should be:</p> <ul style="list-style-type: none"> • Available in multiple and accessible formats (digital, paper-based, video, easy-read, translated) • Aligned with national, ICB, primary care, and local authority level campaigns • Designed to address common barriers to engaging with lung cancer screening (difficulty accessing services, cancer fear, fatalism and stigma associated with lung cancer and smoking). Including accessible information about: <ul style="list-style-type: none"> ○ Lung cancer, its symptoms and risk-factors, and treatments, including: <ul style="list-style-type: none"> ▪ Benefits of stopping smoking balanced with knowledge that risk remains elevated for people who used to smoke ▪ Positive outcomes related to early diagnosis ○ Lung cancer screening, including: <ul style="list-style-type: none"> ▪ Eligibility criteria, what it involves, what support is available to help attend • Informed by work with local authority, local VCSE organisations, community groups and relevant professional services to tailor materials and communication channels to needs of priority communities (see 1.1.1 – 1.1.9) • Cover multiple channels, informed by work with local authority, relevant services and community groups, to ensure targeted reach, including but not limited to: <ul style="list-style-type: none"> ○ Local resident magazines, press releases and digital channels (eg, social media); posters and information across venues including hairdressers, pharmacies, libraries, gyms, job centres, public toilets, community and Pride events, stop smoking services • People who currently smoke, members of Surrey priority populations and/or inclusion health groups are at high risk of lung cancer and experience multiple barriers to screening access (see below). Proactive engagement with commissioned services and VCSE organisations already working with these groups in Surrey is required to inform targeted approaches.
	1.1.1. People who currently smoke – highest priority	<ul style="list-style-type: none"> ○ Lung screening trials show lung cancer screening uptake is lower in people who currently smoke, compared to those who

		<p>used to, and is correlated with deprivation. Smoking causes 72% of lung cancer cases.</p> <ul style="list-style-type: none"> ○ Targeted lung cancer screening awareness raising should be delivered in collaboration with Surrey’s commissioned smoking cessation services (including One You Surrey) to encourage uptake among people who currently smoke, or have recently quit. ○ Outreach to people who smoke who do not have the intention to stop smoking (i.e. those unlikely to be currently engaged with Surrey’s smoking cessation services) should be planned collaboratively with Surrey County Council Public Health team. This should include priority groups highlighted by Tobacco Control JSNA (substance misuse service users, routine and manual workers and people from inclusion health groups) and regions with high smoking prevalence (Tandridge, Reigate and Banstead, Guildford)
	<p>1.1.2. People living in most deprived areas (key neighbourhoods) – highest priority</p>	<ul style="list-style-type: none"> ○ Lung screening trials show uptake is lower in people experiencing higher levels of deprivation compared to more affluent counterparts. Deprivation also correlates with smoking prevalence, lung cancer incidence and lung cancer mortality. ○ Targeted awareness raising should be undertaken within Surrey priority populations (21 key neighbourhoods in Surrey experiencing highest levels of deprivation), guided by community outreach to guide approach, in collaboration with associated PCNs, GP practices and community groups
	<p>1.1.3. People with severe mental illness (Surrey priority population)</p>	<ul style="list-style-type: none"> ○ Cancer is the leading cause of premature mortality among people with SMI. It is estimated that 40% of people with SMI smoke. In Surrey there are worse rates of excess deaths under-75 attributable to respiratory disease for people with SMI compared to England. Cancer screening uptake across all current programmes is lower for people with SMI in Surrey and on a national level ○ NHS guidance on Population screening: access for people with severe mental illness should be followed, including working with commissioners to identify relevant local groups to invite and engage with eligible residents. ○ Relevant local groups to inform targeted outreach include: <ul style="list-style-type: none"> ○ Catalyst Support Surrey
	<p>1.1.4. People with learning disabilities and/or autism, and people with long-term health conditions, disabilities and/or sensory impairments (Surrey priority populations)</p>	<ul style="list-style-type: none"> ○ Cancer screening uptake across all current programmes is lower for people with learning disabilities in Surrey and on a national level. Patients with disabilities are more likely to be diagnosed with lung cancer at a late-stage, and to experience barriers to accessing screening. ○ The national guidance Population screening: supporting people with a learning disability includes examples of best practice in reducing barriers to screening for women with a learning disability, including options for video tours, identifying learning disability champions, easy-read invites and information letters and providing video information. Engagement with local groups like ○ Recommendations from the national guidance on reducing inequalities in breast cancer should be considered, including clearly communicating how accessibility needs can be met (eg, by ensuring there is space for a companion or carer at the screening site, offering extended appointments if needed, prior contact with participant/carers to identify and plan reasonable adjustments) ○ Relevant local groups and services to inform targeted outreach include: <ul style="list-style-type: none"> ○ Surrey Coalition of Disabled People

		<ul style="list-style-type: none"> ○ Active Prospects
	<p>1.1.5. Black and minoritised ethnic communities (Surrey priority population)</p>	<ul style="list-style-type: none"> ○ Low screening uptake across other cancer screening programmes for Black and Minoritised Ethnic groups highlighted in Screening JSNA ○ Mortality rates for lung cancer in England and Wales between 2017 – 2019 are significantly higher in Bangladeshi, mixed and white ethnic groups, compared to all other ethnic groups except Black Caribbean and Black Other (where the difference was not significant) (14). ○ Some trials lung cancer screening trials have reported lower screening uptake among minoritised ethnic groups: the YLST reported low uptake among people of Asian/Asian British and Mixed ethnicity. In SUMMIT low uptake among people of Black and ‘Other White’ ethnicity were reported. However, evidence was mixed between trials (see Section 4.1.1.) ○ Smoking data in Surrey are not currently collected by ethnicity, but Office for National Statistics (2019) data reported in the Surrey Tobacco JSNA show that for both men and women, the highest smoking prevalence was seen in the mixed ethnic group with large differences between sexes particularly in Asian (13.9% in men and 2.9% in women), Chinese (12.6% in men and 4.0% in women) and Black (12.9% in men and 6.9% in women) groups. ○ Cultural adaptation of screening communications, and access to translated materials where needed, can improve access and engagement with cancer screening for this population. ○ Relevant local groups and services to inform targeted outreach include <ul style="list-style-type: none"> ○ Surrey Minority Ethnic Forum (SMEF) will be vital to understanding cultural tailoring of awareness raising, invitation materials and communication approach ○ Cultural competence training is provided by SMEF and should be considered for all screening staff
	<p>1.1.6. People in contact with criminal justice system – (inclusion health group)</p>	<ul style="list-style-type: none"> ○ People in prison are less likely than the general population to be diagnosed with cancer by screening, have a high smoking prevalence (estimated 80% prisoners smoke on arrival to prison), and experience extreme health inequalities. Contact with the criminal justice system is often linked to issues with substance abuse and mental health problems. Transition to prison to probation services and the community are key points to ensure continuity of care. ○ Lung cancer screening providers should engage with NHSE SIT teams, NHSE Health and Justice, and prison healthcare teams in Surrey’s 5 prisons, as well as people with lived experience, to plan initiatives to raise awareness and facilitate uptake of lung cancer screening in alignment with other cancer screening programmes ○ Consider planning onsite LDCT screening day, informed by recommendations from onsite breast cancer screening day hosted at HMP Bronzefield in September 2024.
	<p>1.1.7. People experiencing homelessness – inclusion health group, Surrey priority population</p>	<ul style="list-style-type: none"> ○ Smoking prevalence among people experiencing homelessness is around 76-78%, and almost two thirds have a long-term illness, disability or infirmity. Cancer mortality rates have been estimated to be twice as high in people experiencing homelessness. ○ NICE and the Centre for Homelessness Impact have developed guidelines on Integrated Health and Social Care for People Experiencing Homelessness, which includes the recommendation to “take health services to people experiencing homelessness by providing multidisciplinary

		<p>outreach care in non-traditional settings, such as on the street, hostels or day centres”. Services should therefore actively engage with local homelessness services and groups to deliver targeted outreach (e.g.,</p> <ul style="list-style-type: none"> ○ Groundswell, a homelessness charity, developed cancer screening guides for people experiencing homelessness in London. They are tailored for people experiencing homelessness and those who support them: https://groundswell.org.uk/resources/. ○ Support for people experiencing homelessness to help them register with their local GP practice to gain access to screening should also be considered. ○ Relevant local groups to inform targeted outreach include: <ul style="list-style-type: none"> ○ The Hope Hub
	1.1.8. People with drug and alcohol dependence – inclusion health group, Surrey priority population	<ul style="list-style-type: none"> ○ There is significant overlap with drug and alcohol dependence, deprivation and smoking (two major risk factors for low lung cancer screening uptake, and high lung cancer prevalence). There is also strong evidence for an association between alcohol consumption and lung cancer. People with a substance use disorder are less likely to access cancer screening. ○ Relevant local groups to inform targeted outreach include: <ul style="list-style-type: none"> ○ Changing Futures Lived Experience Recovery Group ○ Surrey Drug and Alcohol Care
	1.1.9. Gypsy Roma Traveller communities – inclusion health group, priority population	<ul style="list-style-type: none"> ○ Prevalence of smoking among GRT communities is more than 40%, and cancer among GRT communities is often referred to as invisible health concern. GRT communities have lower awareness and uncertainty about eligibility to participate in cancer screening, and nomadic people have issues accessing screening when travelling, including difficulties registering with a GP practice ○ Friends Family Travellers have produced resources to support cancer screening uptake, and could be engaged with along with local groups to produce lung cancer specific awareness raising materials. ○ Relevant local groups to inform targeted outreach include: <ul style="list-style-type: none"> ○ Surrey Gypsy Traveller Communities Forum
	1.1.10. LGBTQ+ -	<ul style="list-style-type: none"> ○ Highlighted in the Surrey JSNA as having generally lower screening uptake and high smoking prevalence ○ Engagement with local groups and events such as Surrey Pride to raise awareness with appropriate messaging: <ul style="list-style-type: none"> ○ https://www.prideinsurrey.org/
	1.2. Implement a targeted, low-burden, stepped invitation approach, including a risk-benefits discussion, before undergoing a baseline CT scan	<ul style="list-style-type: none"> ● Evidence suggests this invitation approach reduces the social gradient seen in lung cancer screening uptake ● This should involve sending a notification of a pre-scheduled appointment time for the telephone triage; a telephone triage appointment, with multiple contact attempts and checks for alternative contact details made if not answered; LDCT appointment booking and confirmation, with reminder texts/telephone calls the week and day before the appointment ● All materials should ideally be available in easy-read format to maximise accessibility not only for people with LD, but across multiple groups with limited health/English-language literacy that will not always be identified as a need in the health record ● A low-burden, psychologically targeted, easy-read information leaflet should accompany the invitation to provide information about what lung cancer screening is, who is eligible, and its benefits, as well as support available to help people attend, with supporting infographic ● Direct contact should be made with relevant services for inclusion health groups (eg, temporary accommodation, care

		<p>homes, prison healthcare) via liaison services for individuals who are at high risk of not receiving postal communication due to transient locations (eg, inclusion health groups)</p> <ul style="list-style-type: none"> • Tailored invitation approach for priority groups should be informed by outreach conducted by SSCA and commissioned service provider (see <i>Recommendation 1.1</i>)
1.3.	Ensure accessibility of screening site locations and units	<ul style="list-style-type: none"> • Screening sites must have ample free parking and good public transport links, close to popular community locations (eg, supermarkets) • Sites should be located in areas easy to access for high-risk groups (eg, highest levels of deprivation and smoking prevalence). Sites and screening units should have wheelchair access, and have space for attendees to be accompanied by a carer or family member. • Extra consideration is required to meet the needs of people with physical disabilities and mobility issues, learning disabilities, and/or severe mental illness and other access needs including ensuring: <ul style="list-style-type: none"> ○ A private, quiet welcome area ○ Accessibility of unit and CT scanner for people with mobility issues, or accessible alternatives ○ Space to be accompanied by a family member, carer and/or guide dog ○ Pre-arranged translators and DeafBlind/BSL interpreters • The service should liaise with local transport providers to establish free-transport options for eligible individuals who would not otherwise be able to access screening (eg, via South East Coast Ambulance Service, Dial-a-ride - Surrey County Council, and Surrey Community Action voluntary car schemes) • The options available to meet individual access needs should be communicated to everyone invited to screening to prevent making a misinformed decision not to take part
1.4.	Ensure flexible appointment times are offered, with options for evening and weekend appointments	<ul style="list-style-type: none"> • To accommodate needs of people who work daytime week shifts, and people who rely on care/transport/support to attend appointments from family/friends with that working pattern • The option to book a double appointment should be offered to those with access needs (i.e. people with learning disabilities, people with physical disability/limited mobility) that are identified either by GP from the health record or during telephone triage call
1.5.	Use Pathway Navigation techniques at telephone triage stage to enable shared decision-making, identify barriers to access and engagement and offer solutions to overcome them	<ul style="list-style-type: none"> • Consider training screening staff delivering telephone triage calls in Pathway Navigation techniques in order to work with individuals to proactively identify and address barriers to engaging with the risk assessment (at triage), screening attendance and adherence to multiple rounds of screening (see Figure 10 and Appendix 5 for list of common facilitators and barriers) that should be explored • Techniques include core communication skills (open questions, teach-back, implementation intentions) and motivational interviewing (see YLST Pathway Navigation manual – supplemental file 5) • Access needs identified through Pathway Navigation techniques should be routinely recorded and communicated so that they can be consistently met throughout screening pathway including surveillance scans, incidental finding or diagnostic follow up and beyond.
1.6.	Embed mechanisms for shared communication about reasonable	<ul style="list-style-type: none"> • Reasonable adjustments and/or access requirements should be identified from GP record by primary care staff (see

	adjustments and access needs with all partners throughout screening and diagnostic process	<p>Recommendation 2.1), and communicated to screening service to tailor the invitation strategy.</p> <ul style="list-style-type: none"> • Additional access requirements or support needs should also be identified by screening staff during telephone triage and/or during LDCT appointment attendance. • A clear communications protocol should be established to facilitate information sharing between partners delivering the pathway to ensure all access needs are consistently met in all communications and clinical interactions (including appointment confirmation letters, staff delivering screening on the day, surveillance scans and pulmonary nodule disclosure, diagnostics and treatment and incidental findings follow up).
1.7.	Proactive follow up with Do Not Attends (DNAs) to offer re-invitations with systematic recording of reported barriers to attendance	<ul style="list-style-type: none"> • Proactive telephone, text and postal follow up with people who DNA should aim to understand reason for DNA, using motivational interviewing techniques (eg, non-judgmental, open questions) to identify barriers to attendance and suggest solutions to facilitate future attendance and appointment re-booking.
1.8.	Stop smoking service should be integrated into the screening process, offering co-located opt-out appointments with smoking cessation practitioners to all people who currently smoke when attending their LDCT screening appointment	<ul style="list-style-type: none"> • Lung cancer screening is identified as a teachable moment to support smoking cessation. Evidence suggests co-located, opt-out, high-intensity, multi-modal stop smoking support delivered at the screening point by trained practitioners, with longer-term behavioural and/or pharmacotherapeutic counselling is the most effective smoking cessation approach in the lung cancer screening context. • Provider should collaborate with local authority and local stop smoking service to offer co-located, opt-out access to smoking cessation practitioners at screening sites
1.9.	Optimised communication around pulmonary nodule disclosure and surveillance practices to minimise distress and maximise understanding of risk and future adherence	<ul style="list-style-type: none"> • This should include taking a person-centred communication style (including ensuring accessibility requirements identified during invitation and screening process are consistently addressed); and a mechanism to enhance standard letter-based communication by verbal communication with clinicians for those identified as being at high risk of distress (eg, younger age, female gender, people who currently smoke, or with a higher level of smoking history, lower education, higher socio-economic deprivation, not being married/co-habiting, experience with cancer) • Those undergoing surveillance must have sufficient understanding of what a pulmonary nodule is to understand the importance of engaging with surveillance, without causing undue distress, along with specific information about the meaning of 'being under surveillance'
1.10.	Screening staff should be trained in cultural competence and trauma-informed approaches, ensuring mechanisms are in place to provide psycho-social support to people at high risk of distress	<ul style="list-style-type: none"> • Distress correlates negatively with screening and adherence engagement, therefore those with high risk of distress identified through GP record (eg, people who currently smoke, people experiencing deprivation), telephone triage and at screening appointment should have access to appropriate psycho-social support to help manage any distress and facilitate onward engagement. • At least 2,760 people in Surrey are estimated to be experiencing multiple disadvantage (eg, a combination of issues, such as homelessness, substance misuse, mental illness and contact with the criminal justice system, underlined by poverty as a common factor), many of whom are likely to be eligible for lung cancer screening based on smoking history. As recommended in the Surrey Multiple Disadvantage JSNA, as a minimum, all professionals working with people experiencing multiple disadvantage should undertake the foundation Trauma Informed Approach modules: 'Understanding trauma informed

		care'. This should include staff involved in planning and delivering participant-facing lung cancer screening roles, to facilitate appropriate engagement with priority populations and inclusion health groups outlined below.
	<p>1.11. Data on screening uptake by key demographic (including age, gender, ethnicity, socio-economic data and where possible, priority group/inclusion health status) should be collected and monitored for inequalities, as well as recording reported barriers to screening uptake</p>	<ul style="list-style-type: none"> • Service should undertake health equity audits • Barriers to screening uptake, including reasons given for declines and DNAs should be routinely recorded and strategically addressed through service improvement initiatives • Incidental findings: potential inequalities (i.e. differences between groups) in incidental finding follow up should also be routinely monitored as part of the recommended audits of radiology reporting and incidental finding management findings (as part of the formal screening Quality Assurance) • Adherence: Adherence to multiple screening rounds, including pulmonary nodule surveillance scans, should be monitored and associated factors assessed; if necessary, processes should be modified to address any issues • Projects and interventions to tackle inequalities should be evaluated, both in relation to process and key outcomes
	<p>1.12. Collaborate with partners involved in delivering other cancer screening programmes across Surrey to gain insights into effective inequalities initiatives</p>	<ul style="list-style-type: none"> • Although assured separately, key learnings from the NHSE Section 7a screening programmes initiatives to tackle cancer inequalities will be of relevance to the lung cancer screening programme, and should inform implementation approach
<p>2. Primary care (GPs/PCNs)</p>	<p>2.1. GP practices to check health record for eligible patients to identify any communication needs / access requirements and inform service sending invitation letters to enable tailored approach</p>	<p>This will involve liaising with commissioned screening provider to ensure any known access needs or potential barriers to participation (eg, registered physical, learning or sensory disability, registered SMI, language/interpretation, known access needs) are proactively communicated to screening staff sending out initial invitation and delivering telephone triage calls, in order to tailor the approach.</p>
	<p>2.2. Collaborate with screening service to develop and send GP-endorsed reminder letters and texts to non-responders, ensuring the health record is checked for any potential reason for non-response (eg, language, disabilities) to tailor reminder letter/communication approach accordingly</p>	<p>These should ideally be sent alongside national invitation letters, in line with accessibility requirements.</p> <p>This should include a mechanism for checking address/telephone contact details which may be outdated.</p>

	<p>2.3. To help raise awareness of lung cancer screening within local GP practice populations, particularly among patients who currently smoke, with targeted, tailored initiatives to local communities at high risk of low uptake within the PCN/GP practice area</p>	<p>Patients with smoking history can be primed to expect and look out for invitation to lung cancer screening.</p> <p>Positive messaging should emphasise benefits of lung cancer screening, dispelling myths around eligibility (ever-smokers, not just current-smokers) and fatalistic attitudes (see <i>Recommendation 1.1</i>)</p>
	<p>2.4. Facilitate GP registration for people with no permanent address as per NHS Guidelines to facilitate invitation to the lung cancer screening programme</p>	<p>Being registered with a GP is a key eligibility criteria for lung cancer screening, but a major barrier for many members of health inclusion groups, who are also often at an elevated risk of lung cancer.</p> <p>NHS Guidelines say ‘If a patient cannot produce any supportive documentation but states that they reside within the practice boundary then practices should accept the registration’. There is no regulatory requirement to prove identity, address, immigration status or an NHS number to register as a patient and no contractual requirement for GPs to request this. Those who are homeless, vulnerably housed or ‘of no fixed abode’, asylum seekers, refugees and overseas visitors, whether lawfully in the UK or not, are eligible to register with a GP practice.</p>
	<p>2.5. To train patient-facing primary care staff about lung cancer screening offer to enable competent conversation with patients</p>	<p>Training to cover as a minimum eligibility, what is involved, benefits or screening, and support available to overcome common barrier to attending, how/and when to book an appointment</p>
<p>3. NHS Trusts/IC B</p>	<p>3.1. To work with SSCA, commissioned screening provider and primary care to establish and maintain a communication channel to ensure any individual patient barriers to access/engagement identified during invitation and screening process are addressed during follow-up diagnostic and treatment pathways</p>	<p>This could be in the form of a standardised proforma established for all individuals at invitation stage and updated at each key pathway touchpoint</p> <p>If Pathway Navigators (or staff providing a navigation role) are established on the screening side, the communication channel must enable a clear handover to Pathway Navigators (or staff providing a Navigation role) at Trust level, so any needs identified during screening process are proactively communicated to diagnostic and treatment teams</p>
	<p>3.2. A consistent incidental finding follow up communication protocol should be established, addressing access and reasonable adjustment needs identified during earlier screening stages</p>	<p>Consistent communication protocol should be develop, ensuring accessibility and reasonable adjustment needs detected during earlier screening stages addressed during incidental finding follow up</p>
<p>4. Surrey Stop Smoking Service</p>	<p>4.1. Raise awareness of lung cancer screening among stop smoking service users (current, past and future), emphasising importance/benefits of screening for people who stop smoking and positive</p>	<p>As per communications recommendations, see ‘1. SSCA and commissioned screening provider section’</p>

	outcomes associated with early diagnosis and stopping smoking.	
	4.2. Provide co-located, opt-out stop smoking service offering high-intensity ongoing behavioural smoking cessation support (i.e. not single-touch onward referral) for all lung cancer screening attendees	On-the-day support should be accompanied by multiple sessions of multi-modal counselling (behavioural and/or pharmacotherapy) Consider use of incentives and peer facilitators
	4.3. Ensure smoking cessation support materials are available as easy-read with access to interpreters (eg, Language Line/DeafBlind) and appointments offered with reasonable adjustments to meet access needs	
	4.4. Have access to, and respond appropriately, to access needs identified by primary care and screening team to maximise accessibility of stop smoking service	
	4.5. Smoking cessation practitioners trained in trauma-informed and culturally competent approaches	As per Recommendation 1.9, as a minimum, all staff interacting with those who have experienced one or more disadvantage should undertake the 'Understanding trauma informed care' module.
5. Local authority	5.1. To support SSCA and commissioned screening provider to amplify targeted awareness and invitation campaigns around lung cancer and lung cancer screening among communities at high risk of cancer and those least likely to take part in screening	The local authority should work with SSCA and the screening service provider to help facilitate collaborations between relevant services and community groups to inform development of tailored outreach and invitation strategies, with a particular focus on priority groups identified in Recommendation 1.1.
	5.2. To collaborate with SSCA, commissioned screening provider and commissioned smoking cessation service to plan and facilitate delivery of an integrated smoking cessation as part of the lung screening process	See Recommendation 4, using local insights to inform targeted approaches with communities with high smoking prevalence.
	5.3. To monitor emerging evidence from lung cancer screening implementation sites across England, and published evidence base, to identify newly available insights into evidence-based approaches to optimising equitable lung cancer screening, and feedback to SSCA and screening provider	For example, emerging evidence around pathway navigation via YLST, and future trials of lung cancer screening uptake interventions within national programme.

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9 Appendices

Appendix 1. Characteristics and differences in uptake identified through UK-based lung screening studies

Study	Study characteristics	Overall uptake	Disparities summary	Suggestions made in papers to address disparities
UKLS (79,80)	<p><i>A pilot randomised controlled trial, comparing LDCT screening with usual care using the “Wald Single-Screen” design (non-blinded)</i></p> <p><i>An initial invitation letter, UKLS participant information sheet and questionnaire were sent to individuals aged 50-75 living in specific primary care trusts (PCTs) in the vicinity of two thoracic hospitals in the United Kingdom, the Liverpool Heart and Chest Hospital, on Merseyside, and Royal Papworth Hospital, in Cambridgeshire. Responses to the questionnaire were analysed to identify those at high risk of developing lung cancer over the next five year (LLP risk score). A second questionnaire was sent to these individuals and the following exclusion criteria applied: inability to give consent, or any condition precluding written informed consent; any comorbidity which would unequivocally contraindicate either screening or treatment if lung cancer were to be detected; a chest CT performed within the preceding year; inability to lie flat. Those remaining eligible were invited to attend a clinic at one of the recruitment centres, where written informed consent was obtained, and randomised 1:1 to LDCT or no screening (usual care). LDCT subjects received a baseline scan.</i></p>	<p>5,697 / 8 729 (65.3%) individuals deemed high-risk from the first questionnaire responded positively to the second questionnaire.</p> <p>4152 / 4868 (85.3%) of those invited following the second questionnaire attended a clinic recruitment centre</p> <p>4061 consented, 4055 were randomised</p> <p>1994/2028 (98.3%) assigned the baseline CT scan underwent the scan</p>	<p>An analysis of barriers to participation among high-risk individuals in the UKLS examining statistical associations between individual characteristics and UKLS uptake using multivariable regression modelling and thematic analysis of free-text data provided in a non-participation questionnaire. Comparative data were available from 4061 high-risk individuals who consented to participate in the trial and 2756 who declined participation. Of those declining participation, 748 (27.1%) completed a NPQ.</p> <p>Sex: Women were less likely to take part in screening compared with men (adjusted OR=0.64; p<0.001). Associations between sex and self-reported barriers were not statistically significant.</p> <p>Age: Older individuals were less likely to participate in screening compared with younger individuals aged ≤65 years (adjusted OR=0.73, p<0.001). Analysis of questionnaires completed by non-responders found emotional barriers were also more likely to be reported by older individuals (OR=2.94, p=0.036).</p> <p>Smoking status: current smokers were less likely to take part than ex-smokers (adjusted OR=0.70, p<0.001). Analysis of questionnaires completed by non-responders found smokers were less likely to report practical barriers such as already receiving scans, work/ other commitments and not being in the area (OR=0.48, p=0.002), and more likely to report emotional barriers as reasons for non-participation (OR=2.02, p=0.013)</p> <p>Deprivation: Individuals in the highest socioeconomic group (quintile 5) were most likely to participate in screening. Individuals in the lowest quintile were almost twice as likely to decline screening compared with those in the highest quintile (adjusted OR=0.56, p<0.001). Analysis of questionnaires completed by non-responders found, among those declining to participate, the odds of reporting travel as a barrier were more than double in quintiles 3–5 (less deprived) when compared with quintile 1 (most deprived) (OR=2.37, p=0.005; OR=2.91, p<0.001; OR=2.25, p=0.009 respectively)</p> <p>Risk perception: Individuals with a higher affective risk perception were less likely to take part in lung cancer screening, when compared with individuals reporting no or</p>	<p><i>“Strategies to improve equitable uptake are critical to the successful implementation of new cancer screening programmes. A national programme should make efforts to engaging women and those most at risk, including adults over 70 years, smokers, and those from deprived areas. Practical barriers relating to access should be addressed, with behavioural interventions designed to minimise emotional barriers, especially among current smokers.”</i></p> <p><i>The study draws on previous literature:</i></p> <ul style="list-style-type: none"> <i>“Silvestri et al¹¹ found that when compared with never-smokers, current smokers reported more fatalistic attitudes and were less likely to believe that early detection and intervention would result in a good chance of survival”</i> <i>“The effect of socioeconomic deprivation on screening uptake has been attributed in part to fearful and fatalistic beliefs among more deprived populations.^{30 31} Such beliefs may partly stem from, and be reinforced by, greater exposure to lung cancer and other prevalent respiratory diseases in deprived communities as a consequence of socioeconomic differences in tobacco use.^{32 33}”</i>

			<p>lower levels of affective risk perception (OR=0.52, p<0.001)</p> <p>Thematic analysis: Among non-participants who provided a reason, two main themes emerged reflecting practical and emotional barriers. Smokers were more likely to report emotional barriers to participation</p>	
LSUT (70)	<p>A two-arm, blinded, between-subjects, randomised controlled trial.</p> <p>2,012 participants aged 60-75 who were recorded as a current smoker within the past 7 years with no prespecified exclusion criteria contraindicating LDCT screening were selected from 16 primary care practices. Both groups received a stepped sequence of pre-invitation, invitation, and reminder letters from their primary care practitioner offering prescheduled appointments. The key manipulation was the accompanying leaflet. The intervention group's leaflet targeted psychological barriers and provided low-burden information, mimicking the concept of the U.K. Ministry of Transport's annual vehicle test ("M.O.T. For Your Lungs").</p> <p>The primary outcome was attendance of the Lung Health Check appointment where risk-based eligibility for a LDCT was calculated at two London hospital outpatient clinics.</p>	<p>1,058/2012 (52.6%) attended their lung health check appointment.</p> <p>There was no difference between intervention (52.3%) and control (52.9%) groups in unadjusted (odds ratio [OR], 0.98; 95% confidence interval [CI], 0.82–1.16) or adjusted (OR, 0.98; 95% CI, 0.82–1.17) analyses.</p> <p>777 / 845 (91.2%) of those eligible chose to have their scan</p>	<p>Defining uptake as attendance to lung health check appointment: Invitation group did not affect attendance of lung health check appointment</p> <p>Sex: Sex was not associated with uptake. When stratified by invitation group there was still no association.</p> <p>Age: Age was not associated with uptake. When stratified by invitation group there was still no association.</p> <p>Smoking status: Current smokers were significantly less likely to attend than former smokers (adjusted OR, 0.70; 95% CI, 0.56–0.86). The intervention has no effect on smoking-related inequalities.</p> <p>Ethnicity: Compared with those of a white ethnic background, individuals of other ethnic background were more likely to attend (adjusted OR, 2.34; 95% CI, 1.30–4.20) and those with no recorded ethnic group were less likely to attend (adjusted OR, 0.09; 95% CI, 0.04–0.19). When stratified by invitation group, ethnicity was associated with uptake for the intervention group (p<0.001), with lower odds of uptake for those with no stated ethnic group (aOR, 0.15; 95% CI, 0.06–0.35).</p> <p>Deprivation: Higher deprivation was associated with lower uptake across study-specific IMD quintiles (P < 0.01). Individuals categorized within the three least deprived study-specific quintiles had higher odds of attendance compared with those in the most deprived quintile (adjusted OR, 1.62; 95% CI, 1.21–2.15 and adjusted OR, 1.68; 95% CI, 1.26–2.25, respectively). When stratified by intervention group, deprivation did not significantly differentiate uptake in the intervention invitation group. However, in the control group, deprivation was significantly associated with increasingly lower odds of attendance across quintiles (p<0.05)</p> <p>Uptake of the LDCT scan: Invitation group did not affect the likelihood of LDCT uptake.</p> <p>Sex: Sex was not associated with uptake.</p> <p>Age: Age was not associated with uptake.</p> <p>Marital status: Marital status was not associated with uptake.</p> <p>Ethnicity: Asian ethnicity predicted lower odds of uptake compared with white ethnicity (aOR, 0.09; 95% CI, 0.02–0.31), but there were few Asian participants (n = 13). There was no association with black ethnicity and too few noncases within the other ethnic groups.</p> <p>Deprivation: Deprivation was not associated with LDCT uptake.</p> <p>Smoking status: In unadjusted analyses, current smokers were less likely to opt for the LDCT scan than former smokers, but the association was not statistically</p>	<p>"This trial is the first to use behavioral science to design and test a low-cost, primary care practice-based, postal invitation strategy in a real-world demonstration setting. Across both trial arms, uptake was higher than has ever been observed previously at 53%, suggesting the behavioral science strategies common to both trial arms together optimize uptake. These strategies included a "Lung Health Check/M.O.T. For Your Lungs" approach to the screening offer (the latter mimicking the concept of the UK Ministry of Transport annual vehicle test), primary care practitioner endorsement, pre-invitations, postal reminders, and scheduled appointments. The targeted, stepped, and low-burden intervention invitation approach did not improve uptake overall but importantly was the more equitable, reducing the social gradient by better engaging those living in areas of highest deprivation and lung cancer incidence."</p>

			significant in adjusted analyses (aOR, 0.52; 95% CI, 0.27–1.01).	
YLST (52,81)	<p><i>Randomised controlled trial.</i></p> <p><i>Using a single-consent Zelen's design, ever-smokers aged 55–80 years registered with a general practice in Leeds were randomised (1:1) to invitation to a telephone-based risk-assessment for a Lung Health Check or to usual care. Responders at high risk were invited for LDCT scanning for lung cancer on a mobile van in the community between November 2018 and February 2021. A general practice-endorsed pre-invitation and invitation letter, alongside a low-burden information leaflet (adapted from the LSUT) [15], was sent to the intervention arm. For the first 2 months of the study, people who had not responded within 2 weeks were sent a reminder letter; from January 2019 onwards two reminder letters were sent to nonresponders.</i></p> <p><i>Primary outcome measure was the proportion posted an invitation who contacted the telephone triage line. Secondary outcome was the proportion offered a LHC appointment who attended.</i></p>	<p>22 815 / 44 943 (51.2%) eligible for invitation responded.</p> <p>6 819 / 7 853 (86.8%) attended their lung health check appointment having been offered the appointment t telephone triage</p>	<p>Response to postal invitation:</p> <p>Sex: After adjustment, the odds of responding were 19% lower in men compared to women (adjusted OR 0.81, 95% CI 0.78–0.84),</p> <p>Age: Response increased with age; those aged ≥ 75 years were twice as likely to respond compared with those aged <60 years (adjusted OR 1.99, 95% CI 1.87 – 2.12)</p> <p>Deprivation: After adjustment, the odds of responding were 42% lower in the most deprived IMD quintile compared with the least deprived (adjusted OR 0.58, 95% CI 0.54–0.62)</p> <p>Ethnicity: After adjustment, Asian/Asian British and Mixed ethnicity were associated with lower response compared with White (adjusted OR 0.79, 95% CI 0.68–0.90 and 0.93, 95% CI 0.89–0.97, respectively).</p> <p>Smoking status: After adjustment, the odds of responding were 56% lower in people categorised as currently smoking (adjusted OR 0.44, 95% CI 0.42–0.46) compared to those who used to smoke.</p> <p>Other factors:</p> <p>Single-person households: Response rate was marginally higher in one-participant households (51.2% (n=15 962/31 157)) compared with households with two or more participants (49.7% (n=6853/13 786)).</p> <p>Attendance to in-person lung health check: Adjusted analyses showed that:</p> <p>Sex: Attendance was higher in men compared to women (adjusted OR 1.33, 95% CI 1.16–1)</p> <p>Age: Non-attendance increased with age (adjusted OR 0.38, 95% CI 0.29–0.48 for those aged ≥ 75 years compared with <60 years)</p> <p>Deprivation: Non-attendance increased with deprivation (adjusted OR 0.78, 95% CI 0.62–0.98 for the most deprived IMD quintile compared with the least deprived)</p> <p>Ethnicity: No significant differences in attendance by ethnicity</p> <p>Smoking status: Non-attendance was higher for people who currently smoke compared to those who used to smoke (adjusted OR 0.73 (0.62–0.87))</p>	<p><i>“The overall proportion of people responding to the invitation process (50.8%) was similar to that seen in the LSUT (52.6%). This may reflect the similar invitation strategy used in the two studies (pre-warning letter, general practice endorsement of invitation, use of a low-burden leaflet and a reminder letter for nonresponders). YLST was the first study to use a second reminder letter and this appeared to augment the overall response rate by 7%.</i></p> <p><i>One possible downside of telephone triage and subsequent attendance for a face-to-face LHC with LDCT screening is the potential for people to disengage between the telephone call and appointment at the mobile unit. Those people opting not to take up the offer of a face-to-face LHC were more likely to be from deprived populations and currently smoking. Despite a higher rate of response to the telephone triage invitation, women and older people were less likely to attend or take up the offer of a LHC appointment or screening, and further research is needed to investigate underlying reasons.</i></p> <p><i>Despite the overall encouraging response to invitation, very significant disparities remain, with people who currently smoke and those from more deprived populations much less likely to respond. Thus, people at higher risk of lung cancer appear less inclined to participate in screening. There is therefore an urgent need to address barriers to participation in these populations in order to maximise the lives saved by lung cancer screening and ensure equitable access to services in those most at risk of lung cancer.”</i></p>
SUMMIT(82)	<p>Multicentre, prospective, longitudinal cohort study.</p> <p>Individuals aged 55–77 years with a history of smoking in the past 20 years identified via primary care records at 251 practices in northeast and north-central London, UK searched between March and December 2019 were invited by letter to a lung health check offering lung cancer screening at one of four hospital sites. Non-responders were re-invited after 4 months. Uptake was</p>	<p>29 545 / 95 297 (31.0%) eligible for invitation responded.</p> <p>Due to the COVID-19 pandemic, re-invitation letters were sent to only a subsample of 4594 non-responders, of whom 642 (14.0%) responded.</p>	<p>Sex: Uptake was significantly lower among men than among women (odds ratio [OR] 0.91 [95% CI 0.88–0.94]; $p < 0.0001$)</p> <p>Age: Uptake was significantly higher among older age groups (1.48 [1.42–1.54] among those aged 65–69 years vs those aged 55–59 years; $p < 0.0001$),</p> <p>Deprivation: Uptake was significantly higher among groups with less deprivation (1.89 [1.76–2.04] for the most vs the least deprived areas; $p < 0.0001$),</p> <p>Ethnicity: When adjusting for gender, age, IMD quintile and smoking status, uptake was significantly higher for individuals of Asian ethnicity (1.14 [1.09–1.20] vs White ethnicity; $p < 0.0001$). Uptake was lower among individuals with Black ethnicity</p>	<p><i>“The response to the lung health check invitation was similar to that in other UK-based lung cancer studies and programmes (range 17.9–52.6%).^{15–17} The response rate was improved by re-invitation of non-responders 4 months or more after their first invitation. Uptake was lower than in the Lung Screen Uptake Trial (52.6%)—the study on which the invitation materials were based...potential reasons for these differences include this being a first-time screening offer, the positioning of lung cancer screening as a research study rather than as a service, and an</i></p>

	<p>defined as the proportion of individuals invited who responded to the lung health check invitation by telephone.</p> <p>Associations between uptake of a lung health check invitation and re-invitation of non-responders, adjusted for sex, age, ethnicity, smoking, and deprivation score were estimated using univariable and multivariable logistic regression analyses.</p>		<p>than among those with White ethnicity (OR 0.97 [0.93–1.03]) When ethnicity was subdivided into 16 groups, uptake was lower among individuals of other White ethnicity than among those with White British ethnicity (0.86 [0.83–0.90]), whereas uptake was higher among Chinese (1.33 [1.13–1.56]), Indian (1.29 [1.19–1.40]), and other Asian (1.19 [1.08–1.31]) ethnicities than among those with White British ethnicity. The higher response rates from individuals of Asian ethnic backgrounds were driven by uptake from Indian and other Asian backgrounds, whereas uptake from Bangladeshi and Pakistani backgrounds was lower in absolute terms.</p> <p>Smoking status: Uptake was significantly higher individuals who were former smokers (1.89 [1.83–1.95] vs current smokers; $p < 0.0001$).</p>	<p><i>open booking rather than pre-allocated appointment strategy, which has been shown to increase uptake in other cancer screening programmes, particularly among individuals who did not respond to the initial invitation.</i>^{28,29}</p> <p><i>Although the broad eligibility criteria for invitation via primary care were intended to ensure invitation of all potentially eligible individuals, those deeming themselves ineligible (ie, occasional smoking history) might have chosen to opt out.</i></p> <p><i>Findings identify target areas for further research to understand the determinants of ethnic disparities in uptake and highlight the importance of targeted and tailored campaigns to achieve equitable uptake. Inequalities in uptake by ethnicity also exist in UK colorectal and breast cancer screening programmes^{18,19} and targeted interventions will be crucial to pre-empt and mitigate their effects in lung cancer screening programmes.</i></p> <p><i>This study provides strong evidence for implementation of reminder and re-invitation strategies to improve equitable uptake of lung cancer screening. Response was highest for the reminder letter across all recipients, but particularly high among current smokers, people experiencing higher deprivation, and Black and Asian ethnic groups. Repeat invitation of non-responders has been successful in UK breast, cervical, and bowel cancer screening programmes,³³⁻³⁵ with postal repeat invitation found to be most effective (effect size of approximately 10%).³³</i></p>
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Appendix 2. Characteristics of key neighbourhoods identified in Surrey Health and Wellbeing Strategy (updated 2022)

Lower Super Output Area (LSOA)	IMD Decile	Electoral Ward/Key Neighbourhoods	District / Borough	Primary Care Network	Health Areas
1. Reigate / Banstead 008A	2	Hooley, Merstham and Netherne	Reigate & Banstead	Horley	East Surrey (SH)
2. Woking 004F Note: LSOA boundary change; now within 004G	2	Canalside	Woking	WISE 3	NW Surrey (SH)
3. Guildford 012D	2	Westborough	Guildford	GRIPC	Guildford and Waverley (SH)
4. Guildford 007C	2	Bellfields and Slyfield. Note: Ward name change only, previously known as Stoke	Guildford	GRIPC	Guildford and Waverley (SH)
5. Spelthorne 001B	3	Stanwell North	Spelthorne	SASSE 3	NW Surrey (SH)
6. Mole Valley 011D	3	Dorking South. Note: Ward boundary change, LSOA in ward previously known as Holmwoods	Mole Valley	Dorking	Surrey Downs (SH)
7. Reigate / Banstead 005A	3	Tattenham Corner & Preston	Reigate & Banstead	Banstead Healthcare	Surrey Downs (SH)
8. Epsom and Ewell 007A	3	Court	Epsom & Ewell	Epsom	Surrey Downs (SH)
9. Spelthorne 002C	3	Ashford North and Stanwell South	Spelthorne	SASSE 3	NW Surrey (SH)
10. Woking 005B	3	Goldsworth Park	Woking	WISE 3	NW Surrey (SH)
11. Runnymede 002F	3	Englefield Green West	Runnymede	Windsor	Windsor and Maidenhead (Frimley)
12. Elmbridge 004B	3	Walton South	Elmbridge	Walton	NW Surrey (SH)
13. Reigate and Banstead 018D	3	Horley Central & South	Reigate and Banstead	Care Collaborative	East Surrey (SH)
14. Waverley 002E	3	Farnham Heath End. Note: Ward boundary change, LSOA in ward previously known as Farnham Upper Hale	Waverley	Farnham	North East Hampshire and Farnham (Frimley)
- Spelthorne 001C	3	Stanwell North (already included above)	Spelthorne	SASSE 3	NW Surrey (SH)
15. Waverley 010A	3	Godalming Central and Ockford	Waverley	East Waverley	Guildford & Waverley (SH)
16. Runnymede 006D	3	Chertsey St. Ann's	Runnymede	COCO	NW Surrey (SH)
17. Reigate and Banstead 010E	3	Redhill West & Wray Common	Reigate & Banstead	Care Collaborative	East Surrey (SH)
18. Guildford 010C	3	Ash Wharf	Guildford	Surrey Heath	Surrey Heath (Frimley)
19. Elmbridge 008A	4*	Walton North	Elmbridge	Walton	NW Surrey (SH)
20. Elmbridge 017D	4**	Cobham and Downside	Elmbridge	Leatherhead	Surrey Downs (SH)
21. Surrey Heath 004C	4**	Old Dean	Surrey Heath	Surrey Heath	Surrey Heath (Frimley)

Appendix 3. Summary of key data, including deprivation score, smoking prevalence, screening coverage, lung cancer registrations and mortality, for Surrey districts and boroughs, mapped to key neighbourhoods.

District/Borough	21 key neighbourhoods within District/Borough (IMD decile, 2019)	Deprivation score (IMD 2019) – 2019 (Surrey rank 1 most deprived)	Current smoking prevalence in adults (aged 18 and over) – current smokers (APS 3 year range 2021-2023 proportion %)	Smoking prevalence in adults (aged 18 and over) – ex smoker (GPPS) 2022/2023 proportion %	Lung cancer registrations (Persons) Directly standardised rate per 100,000 (2017 – 2019)	Under 75 Mortality rate from lung cancer, all ages (Males), directly standardised rate per 100,000 (2021-2023)	Under 75 Mortality rate from lung cancer, all ages (Females), directly standardised rate per 100,000 (2021-2023)	Mortality rate from lung cancer, all ages (Males), directly standardised rate per 100,000 (2021-2023)	Mortality rate from lung cancer, all ages (Females), directly standardised rate per 100,000 (2021-2023)	Breast screening coverage (50-70) proportion % (2023)	Cervical screening coverage (50-64) proportion % (2023)	Bowel screening coverage (60-74) proportion % (2023)
Elmbridge	Walton South (3) Walton North (4) Cobham and Downside (4)	7.9 (10)	8.5	27.4	54.9	11.3	15.3	31.5	31.5	64.5*	71.9*	71.6
Epsom and Ewell	Court (3)	8.8 (8)	6.1	23.8	54.4	14.8	13.1	41.0	27.7	65.0*	73.1*	74.2
Guildford	Westborough (2) Bellfields and Slyfield (2) Ash Wharf (3)	9.4 (7)	10.6	25.4	49.9	21.7	15.0	42.1	28.4	69.6	75.8	75.9
Mole Valley	Dorking South (3)	9.5 (6)	9.9	27.6	57.9	17.0	8.7	31.5	20.6	69.6	75.3	75.4
Reigate and Banstead	Hooley, Merstham and Netherne (2) Tattenham, Corner and Preston (3) Horley Central & South (3) Redhill West and Wray Common (3)	11.3^ (4)	10.8	26.9	59.1	28.5	14.9	45.6	24.9	68.5	75.6	74.3
Runnymede	Englefield Green West (3) Chertsey St Anns (3)	12.0^ (2)	10.3	27.0	69.9	24.0	16.7	45.4	33.5	65.1*	74.3	71.8
Surrey Heath	Old Dean (4)	8.1 (9)	5.6	28.1	49.8	18.7	11.3	34.8	26.5	70.6	76.5	76.1
Spelthorne	Stanwell North (3) Ashford North and Stanwell South (3)	14.9^ (1)	9.8	24.7	70.7	23.4	12.3	45.7	26.4	66.4	73.6*	71.6
Tandridge		11.9 (3)	12.3	30.7	48.7	14.7	10.1	42.3	20.8	68.3	77.2	75.5
Waverley	Godalming Central and Ockford (3)	7.5 (11)	8.6	30.1	48.6	17.9	17.0	37.0	28.7	72.5	77.0	76.9

	Farnham Heath End (3)											
Woking	Canalside (2) Goldsworth Park (3)	10.8 (5)	4.0	23.3	49.9	16.3	8.4	37.3	20.8	65.7	73.8	71.8

Source: [OHID Fingertips](#)

Key – based on 95% Confidence Intervals:

- **Bold*** = significantly worse than England value;
- **Bold** = similar to England value;
- Not-bold = significantly better than England value
- ^ 3 districts and boroughs with the highest deprivation score (i.e. highest levels of deprivation as measured by IMD 2019)

Appendix 4. Inequalities related to lung cancer screening for Surrey Priority Populations and OHID Inclusion groups, including recommendations from literature to support uptake and participation

Population	Surrey context , smoking prevalence and cancer	Inequalities related to cancer screening	Recommendations from literature to support cancer screening uptake/participation
Surrey Priority Populations			
Carers	<p>Context</p> <p>The Surrey Context JSNA reports that, according to the 2011 Census:</p> <ul style="list-style-type: none"> 18,400 (9.6%) Surrey residents reported that they provide unpaid care. The proportion has changed little since 2001 when 9.4% were providing care. Most carers are providing less than 20 hours per week, but 11,000 are providing 20 to 49 hours per week and 18,474 (1.63%) are providing more than 50 hours per week. The 2011 Census asked people to rate their general health as either 'very good', 'good', 'fair', 'bad' or 'very bad'. Generally, the self-rated health of unpaid carers deteriorated with the amount of unpaid care that they provided. Compared with people providing no unpaid care, those providing 50 hours or more of unpaid care a week were two to three times more likely to report their general health as not good (i.e. fair, bad or very bad). This trend is broadly seen in Surrey, however the difference in reported bad or very bad health in those who provide unpaid care and those who don't reduces in the older age groups. In Surrey, 1.63% of the population provide more than 50 hours unpaid care. Spelthorne has the highest proportion of the population providing this much care (2.08%), and Elmbridge has the lowest (1.43%). <p>Most unpaid carers are aged 55-59, which falls within the age-range eligible for lung cancer screening, and in some pilots, are the age-range least likely to take part.</p> <p>Smoking and cancer</p>	<p>There is little evidence examining the uptake of cancer screening among carers. However, systematic reviews identify barriers to engaging with healthcare services, and prioritising well-being, for carers. For example, a review of full-time stroke caregivers wellbeing identified 'caregiving is a full-time job' as an overarching theme, encompassing four sub-themes: (a) restructured life, (b) altered relationships, (c) physical challenges, and (d) psychosocial challenges. Evidence also suggests caregivers may experience a decline in both their physical and mental health status, social life and general well-being (Bakas et al., 2014; Heugten et al., 2006; Low, Payne, & Roderick, 1999).</p> <p>Unpaid carers are likely to face barriers around providing alternative care arrangements during appointment times, and de-prioritisation of their own care needs. 50% respondents to Carers UK 2023 survey said they are too busy caring to seek help for their mental health.</p> <p>According to the GP Patient Survey 2021, 60% of carers report a long-term health condition or disability compared to 50% non-carers, and of those carers who completed Carers UK's State of Caring 2023 survey, 29% said they had a disability. 44% said they had put off a health treatment because of a caring role (rising to 51% for those who have a caring role of over 50 hours per week) and 27% said their mental health was bad or very bad (83).</p>	<p>Whilst evidence around supporting carers specifically to attend cancer screening is lacking, offering flexible appointments, and ensuring it is possible and clearly communicated to participants that they are able to bring a family or friend who can accompany them during the appointment were offered as facilitators as part of the Pathway Navigation intervention in the Yorkshire Lung Screening Trial (65).</p> <p>Carers may also experience issues relating to ongoing fears about not being able to engage with or deal with treatment if the cancer screening detected cancer (65,83), for which motivational interviewing techniques can help individuals overcome to facilitate screening uptake, with evidence of effectiveness of this methods for breast and cervical cancer screening (84).</p>
Adults with care experience	<p>Context</p> <p>The Children (Leaving Care) Act 2000 which amended the Children Act 1989 defines a care leaver as a person who has been in the care of the Local Authority for a period of 13 weeks or more spanning their 16th birthday.</p> <p>Smoking and cancer</p> <p>Research by Public Health Wales has made the link between trauma experienced as Adverse Childhood Experiences (ACEs), common in care-experienced adults, found that adults with four or more ACEs are more likely to adopt health-harming behaviours (including smoking) during adolescence, that can lead to diseases including cancer later in life. Indeed, some mixed research suggests childhood adversity may</p>	<p>There is limited research investigating cancer screening uptake among care leavers. However, estimates suggest that 26% of the homeless population have care experience, and 24% of the prison population in England have spent time in care (two groups known to have lower uptake of cancer screening) (87).</p> <p>As highlighted in the Surrey Multiple Disadvantage JSNA, The Care Leavers' Association identified that research and policy on adults who have been in care as children typically focuses on 16–25-year-olds (who are not eligible for cancer screening) and related challenges such as homelessness, unemployment, and lack of educational qualifications. However, some issues affecting care leavers can apply across the life course (88).</p>	<p>There is a paucity of evidence proposing approaches to facilitate cancer screening uptake for adults with care experience. Care experience often co-occurs with other priority populations known to experience inequalities in relation to cancer screening, including deprivation, homelessness, substance use and contact with the criminal justice system, and therefore, for these individuals, it is likely there too will be co-occurring barriers and facilitators to cancer screening (88). However, there is at present no clear evidence base to describe the impact of these intersections in relation to screening uptake, nor approaches to improve it.</p>

	<p>increase a persons cancer risk (85). Smoking prevalence is also higher among care leavers.</p> <p>The risk of premature mortality for the population of children in the 1971-2001 censuses was found to be 43% higher for the non-parental care group than the parental care group with socially disadvantaged backgrounds, however, people who had been in parental care were more likely to die prematurely from cancer than those who had been in non-parental care (86).</p>		
<p>Adults with learning disabilities and/or autism</p>	<p>Context</p> <p>A learning disability is a reduced intellectual ability and difficulty with everyday activities – for example household tasks, socialising or managing money – which affects someone for their whole life. As described on the Surrey Heartlands ICS website, someone must meet all 3 of these criteria for a learning disability diagnosis (89):</p> <ul style="list-style-type: none"> • Significant impairments in intellectual functioning (IQ below 70) • Significant impairment of social or adaptive reasoning. The person requires support to achieve their survival needs i.e. eating, drinking, planning, appropriate clothing for weather etc. and with social problem solving and reasoning • Impairment of onset before 14 years old. <p>Intellectual disabilities are a group of conditions resulting in significant limitations in intellectual functioning and adaptive behaviour, with onset in childhood, that are estimated to affect 1.4% of the world population (90,91).</p> <p>The Surrey JSNA Chapter on People with Learning Disabilities projects that the estimated number of adults in Surrey aged 18+ with a learning disability is expected to increase by around 4.5% over time from 21,980 in 2023 to 22,971 in 2040. The JSNA also states that around 40% of autistic people have a learning disability, compared with just 1% of people without autism. Around 1 in 10 people with a learning disability are autistic so the two significantly co-occur. Delays in language development are common in autism, and up to 30% of autistic people are non-speaking (completely, temporarily, or in certain contexts). Using an adjusted model to predict population which takes into account local ethnicity and mortality rates, it is estimated that in 2023 approximately 9,183 adults (aged 18+) in Surrey are Autistic. The estimated number of Autistic people in Surrey aged 18+ is expected to increase by 5.2% from 2023 to 2040 (9,661) (92).</p> <p>Smoking and cancer</p> <p>People with intellectual disabilities continue face health inequalities reflected in a 20 year premature mortality gap, and a higher proportion of avoidable deaths compared with the general population, including cancer (as many cancers are considered either preventable or treatable) (93,94).</p>	<ul style="list-style-type: none"> • Nationally, people with disabilities are less likely to participate in breast, bowel and cervical cancer screening compared to those without disabilities (59). • The 2022/23 Surrey Learning Disabilities Mortality Review (LeDeR) programme annual report found that there has been a very low uptake of cancer screening across the breast, bowel and cervical cancer screening programmes. The report stated that none of the 9 women eligible for breast screening had it carried out; only 8 out of 31 people eligible were screened for bowel cancer; and only 2 out of the 25 eligible women were screened for cervical cancer (95). 	<p>The national guidance Population screening: supporting people with a learning disability includes examples of best practice in reducing barriers to screening for women with a learning disability. NHS England guidance on ensuring accessibility of breast screening for people with learning disability includes the following (96):</p> <ul style="list-style-type: none"> • the possibility of providing a video tour of the unit • having an identified learning disabilities champion within the team, or liaising with the learning disability team within the host organisation • Services can obtain uptake data for women recorded on NBSS as requiring a special appointment by running the special appointments audit crystal report (SR053). • The PHE Screening blog included examples of local initiatives that breast screening services have implemented to support women with a learning disability. • To help explain breast screening to women with a learning disability, providers can download and print copies of: Breast screening: easy guide and Breast screening: easy read letter templates • Short videos about breast screening can be used alongside easy guides and easy read letters to help understanding. They can be useful for health professionals to watch with women during discussions about screening. One example is the Do The Test – Go For It! film that features women with learning disabilities encouraging others not to be scared of screening and to have the test if they want to. • In future, screening providers may also be able to access the reasonable adjustment flag which is being developed by NHS Digital and NHS England to enable services to record, share and view details of reasonable adjustments across the NHS. • GPs are asked to provide information about women with a known learning disability to breast

			<p>screening services in advance of breast screening invitations being sent out. This request is made via the information packs sent by breast screening services to GP practices. Breast screening services must make sure all women with a known learning disability, who require additional support for screening, are marked as requiring a special appointment on NBSS. Suitable comments should also be added to explain the adjustments required.</p> <ul style="list-style-type: none"> • Opting out of breast screening guidance explains how, and in what circumstances, women can opt-out temporarily or permanently from breast screening.
<p>People with long term health conditions, disabilities or sensory impairments</p>	<ul style="list-style-type: none"> • Comorbidity is the presence of one, and multimorbidity is the presence of two or more concurrent health conditions. • The global burden of chronic diseases and multimorbidity has increased over the last decades, possibly due to lifestyle factors and improved life expectancy. Over half of the population aged 60+ years in high income countries have a chronic condition, and a quarter have multimorbidity (97). • The Royal National Institute of Blindness (RNIB) estimates that currently across Surrey 42,300 people are living with slight loss, this figure is made up of 36,630 people living with partial sight and 5,720 living with blindness[7]. This equates to 3.5% of the Surrey population living with sight loss compared to a national value of 3.2%. By 2030 it is predicted that 51,600 people across Surrey will be living with sight loss. • In 2020/21, QOF prevalence was reported for the following long term health conditions in Surrey as: <ul style="list-style-type: none"> ○ Hypertension: 13.1% ○ Stroke: 1.6% ○ Diabetes: 5.7% ○ Coronary Heart Disease: 2.6% ○ Osteoporosis: 0.9% ○ Rheumatoid Arthritis: 0.7% • Prevalence had increased for all conditions from 2012/13, except coronary heart disease. <p>Smoking and cancer</p> <ul style="list-style-type: none"> • Evidence suggests that neurological, pulmonary, cardiac and psychiatric disorders are associated with longer intervals before cancer diagnosis and more advanced stage at diagnosis (97). • Patients with disabilities tend to be diagnosed at later stages for lung cancer (98). • 	<p>Long-term conditions:</p> <ul style="list-style-type: none"> • A 2019 review of comorbid chronic diseases and cancer diagnosis found that individuals with a chronic disease are more likely to participate in breast and cervical cancer screening, but only if there is no associated disability. They reported that heterogeneous effects have been found in relation to specific conditions, with diabetes, HIV infection, depression and obesity associated with a lower probability of cancer screening and musculoskeletal conditions with higher probability (97). • The review suggests competing demands may influence participation in cancer screening; patients with complex needs and their healthcare providers “have to deal with competing demands and fragmentation of care involving multiple specialist services, possibly interfering with access to preventive services”. • Other mechanisms highlighted by the review as driving low uptake included: Fatalism (poor health status leading to reluctance to undergo invasive investigations; lack of motivation or feeling overwhelmed); Communication problems associated with chronic diseases like dementia, mental health, and hearing problems • However, chronic conditions can also offer opportunities for accessing screening. • These driving factors are summarised in a framework developed by authors (see Appendix X). • Based on age, estimates suggest multimorbidity rates of 40%–60% among people eligible for lung cancer screening (99). For screening participants, co- or multimorbidity may influence perceived and actual ability to complete screening follow-up, diagnostic and surgical procedures and treatment, as well as the perceived risk of developing cancer. People may also choose or have capacity to focus on one health condition at a time. For screening to be appropriately delivered and cost-effective, participants must adhere to follow-up and 	<p>Long-term conditions</p> <p>The 2019 review suggested the following multi-faceted, targeted strategies for facilitating screening access for people with chronic diseases and multi-morbidity:</p> <ul style="list-style-type: none"> • Developing guidelines that take multi-morbidity into account • Allowing sufficient time during primary care encounters to balance management of pre-existing diseases against investigating new and possibly vague symptoms • Using IT and electronic health records to identify complex patients to allow planning of time allocation to optimise care provision (eg., by involving specialist nurses before and/or after a visit dedicated to multi-morbid patients). • Explicitly building in a cancer symptom enquiry/screening awareness to routine surveillance of chronic diseases, and wider use of disease management programs coordinated by specialist nurses as an access point to healthcare providers (for example, for patients with diabetes or mental health problems). • Effort to raise both patient and healthcare provider awareness on the benefits of cancer screening in patients with multi-morbidity, with information material specifically targeted at higher risk groups, addressing possible difficulties or concerns . • Integrating the management of chronic conditions and cancer screening protocols • Care coordination, including follow-up after investigations and safety-netting are crucial for multimorbid patients, considering the risk of false reassurance after investigations for a chronic disease possibly leading to later cancer diagnosis

		<p>diagnostic procedures. Therefore ensuring screening-eligible individuals are aware of risks/benefits, considering the potential implications of multimorbidity) is important from an informed decision-making perspective.</p> <p>Disabilities:</p> <ul style="list-style-type: none"> • People with disabilities are less likely to participate in breast, bowel and cervical cancer screening compared to those without disabilities. This is particularly the case for those with disabilities relating to self-care or vision, or for those with three or more disabilities (59,100) • A systematic review of 29 global studies published in 2022 found that women with disabilities have 0.78 (95% CI: 0.72–0.84) lower odds of attending breast cancer screening and have 0.63 (95% CI: 0.45–0.88) lower odds of attending cervical cancer screening, compared to women without disabilities (101). 	<p>NHS England guidance on ensuring accessibility of breast screening for people with physical disability includes the following (96):</p> <ul style="list-style-type: none"> • Screening services nor GPs can withdraw women from the screening programme on the basis of a physical disability. Even if previous screening attempts have been unsuccessful, offering a further screening appointment may be advisable if a woman’s condition means her physical disability is variable and a further attempt at screening may be successful. • GPs are asked to provide information about women with a known physical disability to breast screening services in advance of breast screening invitations being sent out. This request is made via the information packs sent to GP practices by breast screening services. Services must make sure all women with a known physical disability, who require additional support for screening, are marked as requiring a special appointment. Suitable comments should also be added to explain the adjustments required. • Breast screening services should consider: <ul style="list-style-type: none"> • offering an appointment at a static site to allow more space for a companion or carer • offering an extended appointment clinic slot if required • contacting the woman beforehand to discuss any adjustments she may require if details of reasonable adjustments are not available • specific training for mammographers • that only a partial mammography may be possible • Despite best efforts, it may not be possible for services to achieve a successful set of mammograms for women who are unable to hold the required position for sufficient time. In these circumstances, it will be necessary to have a conversation with the woman explaining the limitations. The breast screening programme offers all eligible women screening with mammography which is the evidence-based method of detecting cancer. On this basis, it is not possible to offer an alternative, such as ultrasound. • Screen reader technology can enable women with visual disabilities to read the digital Breast screening: helping you decide and it is also
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			<p>available in Braille format on request by emailing england.contactus@nhs.net</p> <ul style="list-style-type: none"> • Women with a visual disability may ask to receive their letters in a larger than standard font size. This should be actioned as a reasonable adjustment request. The standard template letters used within the programme are available to download as Microsoft Word files. The font size can be adjusted to meet the specific individuals' requirements. Women who have made this specific request can be recorded on NBSS as requiring special correspondence, with the specific requirements recorded in the notepad. This will make sure that this request is noted for future correspondence. Further guidance on using special correspondence field is available. <p>NHS population screening: support for carers has guidance on assessing capacity, the principles of the Mental Capacity Act and making a best-interest decision. Opting out of breast screening guidance explains how, and in what circumstances, women can opt-out temporarily or permanently from breast screening.</p>
<p>People in care homes</p>	<p>Context</p> <ul style="list-style-type: none"> • The Surrey Context JSNA reports that, in 2020/21, there were 1,067 admissions to care homes, a rate of 464 per 100,000 of the population aged 65 years and older. Of Surrey's population, 19.2% (229,900) are 65 years and over, ranging from 16.7% in Guildford to 23.9% in Mole Valley. Surrey's population is broadly similar to England. <p>Smoking and cancer</p> <ul style="list-style-type: none"> • Older adults face a significantly higher risk of developing cancer than younger individuals. Adults over 65 have an estimated 11-fold increase in risk. 56% of people who die of cancer are >75 years (compared to 67% of all deaths). • Up to 26% care home residents are affected by cancer, with care homes for older adults often providing care individuals with co-morbid conditions, including dementia, chronic obstructive pulmonary disease, and cardiovascular disease. • Early diagnosis is a challenge, in part because in England, most older adult care home residents fall outside the populations routinely invited for cancer screening due to the age restrictions (in 2021, almost three-quarters of the older care home population (74.0%) were aged 80 years and over and more than half (56.4%) were aged 85 years and over.) However, in 2021, 10% of female care home residents, and 23% of male care home residents in England and Wales were in the eligible age range for lung cancer screening aged 65-74. • Symptoms may be masked by co-occurring conditions. For instance, an estimated 70% of people in care homes have 	<p>There is limited evidence exploring the uptake of cancer screening for people in care homes. However, analysis of cross-sectional data from Bristol, North Somerset and South Gloucestershire published in 2023 showed care home residents were more likely to decline colorectal screening. The authors suggested this may be because of chance, because the numbers are small or may reflect a need for assistance in completing screening, differences in values and preferences based on the likelihood of net benefit, contraindications or direct responses by carers rather than participants.</p> <p>The authors note that approximately 80% of UK care home residents have dementia which for some, may make diagnostic tests or treatments for cancer challenging or inappropriate. But people in care homes should not be systematically excluded from screening if they have capacity and would be able to benefit.</p>	<p>There is a lack of evidence exploring how cancer screening uptake can be facilitated for this population, given the majority are not eligible. However, guidance around recommendations for those with long-term health conditions is likely to be relevant for many residents, and there is a requirement to ensure efforts are made to engage with those within this population who are eligible and may face barriers to engagement around transport, communication and gatekeeping.</p>

	<p>dementia or severe memory problems. Evidence suggests PLWD are more likely to have cancer diagnosed at an advanced stage, receive no or less extensive cancer treatment, and have poorer survival after a cancer diagnosis, an increased risk of cancer-related emergency presentations, lower quality processes of cancer-related decision making, accessibility-related barriers to cancer investigations and treatment, higher experienced treatment burden and higher caregiver burden for families, and undertreated cancer-related pain.</p>		
<p>Black and Minority Ethnic groups</p>	<p>Context The Surrey Context JSNA chapter reports the most recent data on ethnicity, using 2011 Census data applied to the mid-year 2020 population to estimate ethnicity by area. The chapter reports:</p> <ul style="list-style-type: none"> Surrey is less diverse than England as a whole with 83.5% of the population reporting their ethnic group as white British compared with 79.8% in England. In the South East, 85.2% were recorded as white British. 115,118 (9.6%) of people in Surrey are from a minority ethnicity group that is not white. A further 78,000 (6.9%) of the population belonged to other white ethnic groups; 'Irish', 'Gypsy or Irish Traveller' and 'other white'. A higher proportion of people in Surrey (6.9%) were recorded in other white ethnic groups than in England (5.7%) with fewer in all other ethnic groups (9.6% compared with 14.6%). The next highest reported ethnicity group was Asian; 5.6% of the population reported their ethnicity as Asian, within which more detailed ethnicity was reported as 'Indian' (1.8%) followed by 'Pakistani' (1.0%). Two percent (2.1%) of the population reported mixed ethnicity and 1.1% reported their ethnicity as black. Surrey has the lowest proportion of black residents compared to the South East region and England. Woking is the most ethnically diverse area in Surrey with 16.4% of its population from minority ethnic groups. Waverley is the least diverse with 90.6% reporting their ethnicity as white British. Spelthorne has the highest proportion of people from Indian ethnic groups (4.2%) and Woking has the highest proportion of people from Pakistani ethnic groups (5.7%). <p>Smoking and cancer Cancer incidence rates and mortality rates vary by ethnicity; some (but not all) of this variation can be accounted for by inequalities in cancer risk factor exposure, delays in diagnosis and treatment access and engagement.</p> <p>Incidence rates for lung cancer are lower in the Asian and Black ethnic groups, and in people of mixed or multiple ethnicity, compared with the White ethnic group, in England (2013-2017), and mortality rates are</p>	<p>A study analysing data of 243,825 patients from 890 English GP practices, linked to Hospital Episode Statistics and the NCRAS cancer registry found that (104):</p> <ul style="list-style-type: none"> Fewer patients of Other [4.98% (n = 197)] and Black [5.11% (n = 235)] groups were diagnosed via screening compared to White [8.27% (n = 12,500)], Asian [10.9% (n = 487)], or Mixed [9.49% (n = 7551)] patients. The proportion of Black and Other groups diagnosed via screening was lower, particularly for breast, and for colorectal cancer in the Other group (Supplementary File 3d and Fig. 1d). For colorectal and breast cancers, Asian and Mixed groups, respectively, had greater odds of diagnosis via screening than other ethnicities. There was no evidence of ethnic differences in screen-detected cervical cancer (Fig. 1d). Adjusted proportions showed that the Other and Black groups were, on the whole, less likely than the Mixed, Asian, and White groups to be diagnosed via screening. <p>A mixed-methods systematic review of barriers to breast and cervical cancer screening uptake among Black, Asian, and Minority Ethnic women in the United Kingdom synthesising evidence from 13 studies identified 5 themes and 24 sub-themes covering (105): socio-demographic characteristics; health service delivery; cultural, religious & language; the gap in knowledge & awareness, and emotional, sexual & family support.</p> <p>A review published in the British Journal of Nursing identified screening-programme specific barriers experienced by people from BAME communities including (106) :</p> <ul style="list-style-type: none"> Cervical screening: "poor knowledge of cervical cancer and associated risk factors are prevalent, which in turn impacts significantly on the perceived relevance of screening and consequent screening uptake; and specific cultural beliefs that play a role in decision making following a screening invitation, compounded by a lack of recognition of specific screening terminology, low perceived risk due to sexual inactivity and the perception that a test is not required if asymptomatic (Marlow et al, 2015a; 2015b). In the context of cervical 	<p>A review of UK-specific interventions to improve screening uptake, cancer education and awareness in BAME communities identified the following successful interventions (106):</p> <ul style="list-style-type: none"> GP reception staff training to encourage screening in previous non-attendees Identifying ethnic language groups, GP endorsement letters, translation of literature, transport to screening centre and language support Targeted outreach work through respected community organisations, including phone calls, rebooking appointments, providing transport Language and culture-sensitive reminder calls Text-message reminders Face-to-face and telephone health promotion Preference for strong recommendations for screening among ethnic minority women considering cervical screening Training workshops for community based health worker <p>A systematic review of 26 studies evaluating cancer screening interventions among minority ethnic groups found thirteen (50%) of the studies used lay community health workers to increase cancer awareness and knowledge and to encourage screening, delivered variably over the telephone, at community education sessions, or within the context of personalized patient navigation support (107). Interventions included culturally relevant materials and providing spoken and written information in the targeted population's first language. The review found that whilst different intervention designs resulted in statistically significant increases in cancer screening adherence, there was no single intervention that consistently elevated cancer screening rates across all racial/ethnic minority adults. The authors concluded that highly segmented (i.e. personalised) interventions are needed in order to improve cancer screening among various racial/ethnic minority adults.</p>

	<p>generally lower in people of non-White minority ethnicity, compared with the White ethnic group, in England and Wales (2017-2019) (102).</p> <p>Smoking prevalence varies by ethnicity in England, although has declined in all groups since 2011. In 2022 (103):</p> <ul style="list-style-type: none"> • 12.7% of adults in England were cigarette smokers • 17.0% of adults in the mixed ethnic groups were smokers – higher than the national average • the percentage of adults who smoked was lower than average in the Chinese (8.4%), Asian (7.4%) and black (4.7%) ethnic groups 	<p>cancer screening, for London-based Somali women, further determinants of non-screening attendance were fatalistic attitudes expressed as ‘God’s will’, and embarrassment associated with the presence of female genital mutilation (Abdullahi et al, 2009).”</p> <ul style="list-style-type: none"> • Bowel screening: “Lack of bowel screening awareness has been shown to be a barrier across all communities (Dharni et al, 2017). A study by Kobayashi (2016), revealed that in ‘never-screeners’, up to two-thirds of people had never read any of the screening literature, with this significantly more common in non-white participants. In South Asian groups, lack of engagement with literature was not just because of its presentation in English, but was similar for any written language, suggesting that verbal communications within faith communities may be a better way of delivering information (Palmer et al, 2015). For bowel screening, one of the main barriers to uptake in ethnic communities is centred around knowledge of screening and cancer (Robb et al, 2008a; Lo et al, 2015), with non-symptomatic South Asian groups having a more negative attitude towards bowel screening than those with African and Caribbean backgrounds (Taskila et al, 2009). Screening-related embarrassment and anxiety (Robb et al, 2008b), cancer fear, and culturally influenced health beliefs are also factors identified with poor bowel screening uptake (Austin et al, 2009).” 	
<p>People experiencing domestic abuse</p>	<p>Context</p> <ul style="list-style-type: none"> • Domestic abuse (DA) includes violent, threatening, controlling, coercive, and/or physically, sexually, economically, psychologically, or emotionally abusive behaviour, where those who have experienced abuse, and abusers, are each aged 16+ and are (ex)partners or family members. DA has multiple enduring consequences for mental and physical health (108). Statistics from ONS show more than 20% of people in England and Wales have lifetime DA experience (ONS, 2023). Research also suggests “people are more likely to disclose DA to healthcare professionals (HCPs) than other professionals, as the healthcare setting is seen as safe, confidential, and trustworthy”(108) • The Surrey Domestic Abuse Needs Assessment reports that there are an average of 4,750 contacts to the Surrey Domestic Abuse Helpline each year. There were 11,102 referrals to Domestic Abuse (DA) outreach providers in Surrey between 1st April 2021 to 30th September 2022, averaging 617 referrals a month. Some individuals were referred multiple times and so this represents 7729 individuals (109). <p>Smoking and cancer</p> <p>Little research explores the interaction between cancer and DA. The studies that have focus on intimate partner violence directed towards</p>	<p>There is limited evidence exploring cancer screening uptake and DA. A study published in 2018 which analysed routinely collected data from 2006 in the US found Behavioral Risk Factor Surveillance System data from the eight states to investigate cancer screening in victim-survivors of IPV found (112):</p> <ul style="list-style-type: none"> • More male and female IPV victims were current tobacco users and engaged in binge drinking in the past month. • IPV victimization was associated with lower rates of mammography and colorectal cancer screening but not cervical cancer screening in women, and was not associated with colorectal cancer screening in men. • Multivariable logistic regression results presented as adjusted proportions controlling for demographics, health status, and healthcare access, only the association with mammography screening remained significant, and the magnitude of this association was modest. <p>Another study using US data from 2014 found (113):</p> <ul style="list-style-type: none"> • Current sexual assault was associated with lower odds of current compliance with breast exam, mammogram, Pap test, and prostate specific antigen test screening recommendations. 	<p>Trauma-informed care (TIC) is identified as one approach to optimising healthcare delivering, including cancer screening and care, for people with DA/IPV experience (114).</p> <p>TIC is designed to avoiding retraumatisation and identify trauma-related needs of patients, thus, improving health outcomes by integrating trauma knowledge and sensitivity into existing models of care (115). Examples of TIC approaches include offering a choice of provider gender to conduct a screening examination and “promoting a sense of safety, trust, and dignity” (116).</p>

	<p>the person with cancer, and find that experiencing IPV is linked to a higher likelihood of receiving a cancer diagnosis (110), with some evidence suggesting that it is associated with later cancer stage at diagnosis (111). There is also evidence that abusers, who are sometimes patient's main informal carers, use cancer diagnoses to further their abuse (eg, by downplaying the diagnosis, physically assaulting treatment sites, humiliating patients about treatment-related appearance effects, and sabotaging treatment and recovery, neglecting to provide basic support and isolating patients (108).</p>	<ul style="list-style-type: none"> A history of sexual assault was associated with lower odds of current compliance with cancer screening procedures (but not colorectal cancer screening). <p>Healthcare settings are identified in the literature as an opportunity for DA disclosure to healthcare providers, however, evidence suggests victim-survivors rarely disclose DA to cancer HCPs because they were not asked questions that could elicit a disclosure (108). Jetelina and colleagues (2020) suggest there is a need for increased awareness and enquiry among cancer HCPs (114).</p>	
<p>People with serious mental illness</p>	<p>Context</p> <ul style="list-style-type: none"> SMI refers to mental health problems so significant, they impact a person's functional ability as well as their ability to work, attend education or in other ways achieve their potential. The SMI register includes patients with a diagnosis of schizophrenia, bipolar affective disorder and other psychoses, and other people on lithium therapy. Within this group, there is a high prevalence of people who have experienced victimisation or trauma such as sexual and/or domestic violence (117). In 2020/21, 9,343 (0.73%) people in Surrey had been diagnosed with Serious Mental Illness (SMI). In Surrey, the under 75 excess death rate in adults with an SMI is 523.7%. Similarly, there are worse rates in Surrey (compared to England) for under 75 excess death rates attributable to cancer (143%), CVD (410%), liver disease (677%) and respiratory disease (998%). <p>Smoking and cancer</p> <ul style="list-style-type: none"> People with severe mental illness (SMI) are 2.5 times more likely to die prematurely from cancer in England. PHE analysis suggests that between 2016 and 2018, cancer was the leading cause of premature mortality among people with SMI, above cardiovascular, respiratory and liver diseases. It has been suggested that this is contributed to by reduced uptake of cancer screening services, delayed cancer diagnosis, treatment choices and adherence to treatment plans. 	<p>PHE analysed inequalities in the uptake of bowel, breast and cervical screening by people with and without SMI and found:</p> <ul style="list-style-type: none"> Among people who were registered with a GP in England on 25 September 2018, people with SMI were 18% more likely not to have participated in breast screening; 20% more likely not to have participated in cervical screening; and 31% more likely not to have participated in bowel screening, within the recommended time period than people without SMI. Analysis of CPRD data by Kerrison and colleagues found that in the UK, participation by adults of an ethnic minority background was notably lower for all three screening programmes and was particularly low for those of an ethnic minority group who had SMI, and that for all three screening programmes, participation was lowest among people living in the most deprived quintile of areas, both for the SMI and non-SMI populations (Bowel: 36.17% and 47.86%, respectively; Breast: 40.23% vs. 50.36%; Cervical: 61.47% vs. 64.59%). Participation in bowel, breast and cervical screening was also lower among smokers than non-smokers, both for adults with and without SMI. Surrey-specific data also indicates very low cancer screening uptake rates for people with SMI. 	<p>The University of Surrey have compiled a series of resources aiming to facilitate mental-health friendly screening: https://www.surrey.ac.uk/research-projects/mental-health-friendly-health-check-resources-health-and-social-care-professionals</p> <p>This includes informed choice leaflets and an animated video for cervical cancer screening, which could be adapted.</p> <p>Other recommendations to facilitate cancer screening for people with SMI are identified by systematic reviews and include (118,119):</p> <ul style="list-style-type: none"> social support from friends, family, and healthcare providers being offered longer appointments screening being at a familiar location. clearer explanations of the process and more promotion of cancer screening were needed to raise awareness more education surrounding mental illness for cancer screening staff transport offers and flexible appointment times <p>However, the reviewers note the lack of randomised control trial evidence to assess the effectiveness of these interventions.</p> <p>As highlighted by the NHSE breast screening guidance, the national guidance Population screening: access for people with severe mental illness has information for commissioners and providers, to help improve access to screening for people with severe mental illness in mental healthcare settings. The guidance highlights that "Services should work with their commissioners to identify establishments within their area and agree on a system to invite all eligible women. It is important services have good communication routes with all relevant facilities. This increases the chance of successful screening for eligible</p>

			women. Services should make sure they have completed any required risk assessments before screening to ensure the safety of women attending for screening and staff.” The guidance also highlights the guidance in NHS population screening: support for carers on assessing capacity, the principles of the Mental Capacity Act and making a best interests decision.
Priority population and OHID Inclusion Health Group			
People with drug and alcohol problems	<p>Context</p> <p>In 2021/22 there were 3,842 adults and 209 young people in treatment for drugs and/or alcohol misuse in Surrey. Most adults in treatment were for alcohol or opiate dependency (1352 people (18+) in treatment at specialist alcohol misuse services), It is estimated that 78% of dependent drinkers in Surrey are not in treatment . The South East has seen a statistically significant increase of 26.1% alcohol-specific deaths from 2001 to 2021</p> <p>The Surrey JSNA highlighted that the estimated prevalence rate of opiate and /or crack-cocaine use in Surrey was lower than England and the South East, but estimated that levels of unmet need (the number of people in treatment divided by the estimated prevalence of people using opiates and/or crack cocaine) are higher – Surrey 67.5% and England 57.9%.</p> <p>Smoking and cancer</p> <p>There is strong evidence for an association between alcohol consumption and cancer, including lung cancer. Considerable research has found a synergistic effect of tobacco use and alcohol consumption some cancers⁸ (i.e. while alcohol consumption and smoking as isolated behaviours both increase the risk of getting cancer, simultaneous smoking and alcohol consumption increases the risk to a greater extent than either behaviour alone).</p>	<p>Studies have shown people with an SUD diagnosis are less likely to receive preventive medical services, including cancer screening (120)– for example:</p> <ul style="list-style-type: none"> A retrospective cohort study analysed 176,300 patients electronic health record data (January 1, 2008–December 31, 2022) in the US over a 10 year follow up from 2013 to 2022 and found 40.3% of eligible patients completed a colorectal cancer colonoscopy screening test, and individuals with a substance use disorder diagnosis were significantly less likely to receive a colorectal cancer colonoscopy screening test both prior to and after controlling for confounding (RR=0.73; 95% CI=0.70, 0.77 and RR=0.81; 95% CI=0.74, 0.89, respectively). A survey study in Sweden assessing self-reported cervical and breast cancer screening compliance among people with current or previous drug use found self-reported compliance was “notably lower” for this population compared to the general Swedish population, and that poorer compliance was also associated with unstable housing, increasing age and not having Swedish as a native language (120). <p>Studies have suggested the association between SUD and colorectal screening may be partly explained by socioeconomic position, psychiatric comorbidity, lack of transportation, homelessness and stigma. For example, a 2017 study showed that barriers to colonoscopy completion for CRC screening included low socioeconomic position, homelessness, and lack of transportation (121).</p>	<p>There is limited research identifying evidence-based interventions known to effectively support cancer screening for people with substance use disorders.</p> <p>Individual, social and systemic barriers to uptake need to be addressed; evidence-based recommendations from the literature include (120):</p> <ul style="list-style-type: none"> Multidisciplinary approach to meet the complex needs of patients with SUDs Peer-recovery support services and non-clinical assistance by individuals with lived experience <p>A systematic review of cervical cancer screening uptake for people with substance abuse disorders identified the need for targeted interventions to address “the unique needs”, including “cost, access to care, stigma, and fear of mistreatment by providers...[and] better integration of mental health services within primary care settings may improve screening rates for women with mental health conditions who are already in contact with the health system” (122).</p>
People experiencing homelessness	<p>Context</p> <p>The Surrey Housing and Related Support JSNA chapter identifies that, as of January 2024, both statutory homelessness and rough-sleeping are growing problems nationally and across Surrey. It states that, “while numbers of homeless people vary across Districts & Boroughs, there are several thousand individuals and families waiting on housing registers across Surrey, while only a few hundred are being housed in temporary accommodation”. Indeed, in the year 2021/22, more than 3000 households in Surrey were assessed as homeless, or threatened with homelessness, by the local authority (123).</p> <p>The highest rate of households in temporary accommodation (crude rate, per 100,000) as of June 2022 (ONS Statutory Homelessness in</p>	<p>Despite having an elevated risk of cancer, people experiencing homelessness are largely invisible in cancer research, with a paucity of evidence on cancer screening rates (126)</p> <p>A review published in Lancet Public Health (2024) points to studies addressing access to preventive services for people experiencing homelessness that identify a mix of structural and individual factors that influence the uptake of cancer screenings, including:</p> <ul style="list-style-type: none"> Prioritising food, shelter, and safety Poor health literacy on prevention Difficulty accessing health services; and having previous negative experiences with the health-care system. Stigma and health care provider’s bias, 	<p>A review of access to cancer prevention services for people experiencing homelessness published in The Lancet Public Health (2004) identified the following evidence-based recommendations to facilitate cancer screening uptake (126):</p> <ul style="list-style-type: none"> Training for health-care providers and staff was recommended for several features: (1) provider counselling; (2) thorough explanation of the screening procedure to minimise stress, discomfort, and anxiety and to promote a positive screening experience; (3) trauma-informed care; and (4) strengthening interpersonal competencies, such as empathy,

	<p>England: April to June 2022) is in Epsom & Ewell (7.4) followed by Reigate and Banstead (2.7) and Spelthorne (2.5).</p> <p>Intersection of poor physical health with mental health issues and substance misuse, poor quality of life due to rough living circumstances, and associated psychological implications are raised throughout the literature.</p> <p>Smoking and cancer People experiencing homelessness are particularly affected by cancer, and the incidence and mortality rate is higher than in the housed population: people experiencing homelessness have a prevalence of cancer up to four-times higher and mortality rate twice as large as that of the general population (124,125).</p> <p>People experiencing homelessness are significantly more likely to be smokers than the general population. Local Surrey data from 2016 audit shows the prevalence of smoking amongst those who are homeless at 78.72%. A similar figure was reported by Homeless Link's report 'The Unhealthy State of Homelessness' reported 76% of respondents smoke cigarettes, cigars or a pipe.</p>	<ul style="list-style-type: none"> • Absence of primary care • Pre-existing mental and substance use disorders. 	<p>communication, respectful encounters, and creating a supportive environment.</p> <ul style="list-style-type: none"> • Patient or peer educators who facilitate health education, schedule appointments, send reminders to patients to keep appointments, help obtain screening results, and accompany patients to screenings • Health-navigation programmes or programmes tailored to the specific needs of people experiencing homelessness resulted in a higher likelihood of screening uptake, as well as more returns to follow-up care, and continuity of care. <p>The four NHS Cancer Alliances in London commissioned Groundswell, a homelessness charity, to develop cancer screening guides for people experiencing homelessness in the capital. They are tailored for people experiencing homelessness and those who support them: https://groundswell.org.uk/resources/</p> <p>PHE guidance on breast screening accessibility for people experiencing homelessness suggests (96):</p> <ul style="list-style-type: none"> • Screening services can work with public health teams in local authorities who may have experience in engaging with homeless people; and with local shelters, charities or outreach groups to promote screening awareness • Ensuring guidance is available to aid those who are not registered with a GP practice, and who experience complications receiving postal communication. Homeless women may have specific complications in accessing postal communication. • Provision of information in formats for those who cannot access information online.
Gypsy Roma Traveller community	<p>Context</p> <ul style="list-style-type: none"> • It is estimated that in Surrey there are ~ 10-12,000 GRT residents, which would mean that Surrey has the fourth largest GRT population of any local authority (https://www.surreyi.gov.uk/download/2op1d/s7q/Gypsy%20Roma%20Traveller%20RNA.pdf) • The districts and boroughs with the highest counts of traveller caravans on authorised and unauthorised sites (July 2022) are Guildford (n=177) and Reigate and Banstead (n=154). Data were not submitted by Runnymede and Spelthorne. <p>Smoking and cancer</p> <ul style="list-style-type: none"> • Cancer among GRT communities is often referred to as an 'invisible' health concern due to lack of data. In a self-reported survey, Parry et al., (2007) found low rates of cancer among 	<ul style="list-style-type: none"> • Studies have shown low awareness of and uncertainty about eligibility to participate in cancer screening programmes, including cervical and colorectal screening. • Despite high levels of ill health and low life expectancy, there is little in-depth exploration of Gypsies, Roma and Travellers' knowledge and experience of cancer prevention and screening. There is a lack of knowledge about their experiences of cancer prevention, but current research has identified cultural beliefs about cancer as a taboo subject, and fatalistic beliefs, allied to stoicism and lack of trust in health professionals. 	<p>NHS Guidance on reducing breast screening inequalities for this population include (96):</p> <ul style="list-style-type: none"> • Nomadic people may have complications in accessing screening when travelling (i.e. no regular access postal letters, not being near to their local screening service when invited). There is a need for simple processes for people to make or change appointments, or ask to be screened at an alternative service. • FFT have highlighted difficulties people without a fixed address can have in registering with a GP practice. Services should be equipped to manage queries from people not registered with a GP, including providing clear guidance on how to register and access screening.

	<p>Gypsy/Travellers compared with age-sex matched comparators, but van Cleemput (2018) suggests that late presentation and/or non-survival may contribute to this apparent low incidence.</p> <ul style="list-style-type: none"> • Cancer risk factors prevalent among GRT include smoking, alcohol use among young men, poor diet, poor oral care and obesity: <ul style="list-style-type: none"> • Prevalence of smoking among people of white gypsy or Irish traveller communities is 45% and 42.4% among people of white roma ethnicity (GPPS 2022/23). This is the highest prevalence compared to any other ethnicity. 		<ul style="list-style-type: none"> • FFT reports that around 40% of its service users have low levels of literacy and digital literacy. Audio and visual forms can increase information accessibility, but this should not solely rely on digital/online communication platforms. <p>FFT have produced the below resources to support cancer screening uptake and healthy lifestyles:</p> <ul style="list-style-type: none"> • Healthy Lifestyles: How to reduce the risk of cancer for Gypsies and Travellers • Men's Health: FFT Gypsy and Traveller Health Leaflet • Cervical screening: FFT Screening resources for Gypsies and Travellers • Breast screening: FFT: Breast Cancer Information for Gypsies and Travellers • Cancer Awareness videos on the Friends, Families and Travellers YouTube Channel: HERE.
OHID Inclusion Health Groups			
<p>Vulnerable migrants and refugees</p>	<p>Context</p> <p>Migrant people are defined by the International Organisation for Migration as people 'who [move] away from [their] place of usual residence, whether within a country or across an international border, temporarily or permanently, and for a variety of reasons.'</p> <p>According to the 2021 census, 17.9 per cent of Surrey residents were born outside of the UK (6.2% were residents born in Europe, 5.4% Middle East and Asia, and 3.2% in Africa), which is a slightly higher proportion than the South East average (58).</p> <p>In 2023, on a national level, 7% asylum seekers accounted for 7% immigration to the UK, with Afghanistan, Iran, Pakistan, India and Bangladesh the most common countries of nationality (127).</p> <p>As of March 2024, the highest proportion of Afghans (via ARAP and ARCS) live in the South East (3,565 people) compared to other regions in the UK, and the second highest proportion of Ukrainians (via Homes for Ukraine visa schemes, 24,435 people) after Scotland. 2,372 Resettled Refugees and 6,434 Asylum Seekers are also based in South East (127).</p> <p>In Surrey, the number of asylum seekers in receipt of support by Local Authority under section 95, section 98 and Section 4 regulations in Q1 2023 was 1,242 (n= 20 section 4; n=247 section 95; n=975 section 98) (128).</p> <p>In England, refugees and asylum seekers with an active application or appeal are fully entitled to free NHS care, including secondary NHS</p>	<p>Attendance for cancer screening tends to be higher among people born in high income countries with screening programmes, than people who migrate to and settle in these countries. Studies have found that language is a common barrier, but a large Norwegian RCT testing uptake of breast cancer screening when women are invited used a letter translated to their language of origin found no difference in uptake compared to those receiving the letter written in Norwegian alone, which underlies the multiple complex barriers to uptake experienced in this group, with huge variation and interaction of complex socio-cultural depending on individual circumstances (132).</p> <p>There is low uptake of cancer screening up minority ethnic groups in England (see section above).</p> <p>Vulnerable migrants and refugees are also vulnerable to mental health conditions, including post-traumatic stress and depression (133), which are also risk-factors for low cancer screening uptake.</p>	<p>There is a lack of specific guidance available in relation to enabling cancer screening uptake for vulnerable migrants and refugees. In the wider healthcare context, trauma-informed approaches are recommended for refugees and asylum seekers (134).</p> <p>Considering the barriers migrants and refugees may face, many are likely to require help to registrater with a GP, understand the invitation and educational materials (both through cultural and linguistic translation, as well as the concept and benefits of cancer screening programmes, which are not as widely implemented or understood in many countries), and help navigating travel options to the screening sites.</p> <p>Cultural competence training of individual practitioners and patient navigation with navigators (lay person or nurse) matched by culture and language background are recommended by the Health Equity Evidence Centre (135).</p> <p>The Office for Health Improvement and Disparities have published a Migrant Health Guide collection, with guidance on NHS entitlements; language interpretation and translation; and culture, spirituality and religion (136).</p> <p>The Surrey JSNA chapter on Migrant Health highlights 12 recommendations, including (but not limited to) (137):</p>

	<p>care (129). Refused asylum seekers are not necessarily entitled to secondary NHS care free of charge; this access depends of immediate necessity/urgency, and application of specific exemptions.</p> <p>Smoking and cancer An editorial in British Journal of Cancer explains that, often, migrant people face barriers to accessing care as a “function of intersecting factors including but not limited to language, law, and sociocultural forces, that can influence every step of a patient’s cancer journey (130)</p> <p>A meta-analysis of 34 studies published between 2000 and 2023 found that migrant people were more likely to be diagnosed at a late stage of cancer, although this varied by country of origin and cancer type, and the study did not disaggregate by different types of migrant, including refugees (131).</p>		<ul style="list-style-type: none"> ensuring service users have adequate means of understanding and communicating with the system and their community raising service user and service provider awareness understanding of public services, including how to access them and what they are entitled to strengthening data insights and intelligence around migrant health upskill staff engaging with this population group to improve awareness and recognition or factors specific to this population raise awareness and understanding of cultural differences between service users, providers, commissioners, and communities identifying strategic solutions to transport challenges experienced by all service users
<p>People in contact with the justice system</p>	<p>Context In Surrey, in 2018, there were 2,592 people in the 5 in the county prisons (58):</p> <ul style="list-style-type: none"> HMP & YOI Bronzefield: a privately run female prison in Ashford. HMP Coldingley: a prison for adult men in Woking. HMP & YOI Downview: a prison and young offender institution (YOI) in Sutton, for women aged 18 and over. HMP High Down: a men’s prison and young offender institution (YOI) near Sutton. HMP Send: a women’s prison in Woking. <p>Government projections are that the prison population will increase. Although the age of prison populations tend to be in the 25-49 age range, as of December 2024, almost one fifth (18%) of the prison population in England and Wales are aged over 50, and given the high smoking prevalence in this population, a significant proportion are therefore likely to be eligible for lung cancer screening.</p> <p>Smoking and cancer People who are incarcerated, and formerly incarcerated, are likely to have higher risk of deaths from cancer than the general population. This is due to multiple risk factors including delayed access to cancer screening programmes.</p> <p>A population based matched cohort study analysing data from the National Cancer Registration and Analysis Service in England from between 1998 and 2017 found cancer incidence increased in people in prisons in England between 1998 and 2017; patients in prison were less likely to receive curative treatments and had lower overall survival than the general population. The study found the difference in survival could be partly accounted for due to the differences in receipt of curative</p>	<p>A scoping review of cancer screening rates and outcomes for justice-involved individuals in the US analysed 16 studies and found that incarcerated women are ‘up to date’ with cervical screening, but only about half had recent mammograms and 20% of males were up to date with colorectal cancer screening (139).</p> <p>The NCRAS data analysis published in 2024 found people in prison were less likely to be diagnosed with cancer by screening (0.5%) than the general population (1.5%). The paper authors highlighted that effective implementation of screening within prisons should be a priority.</p>	<p>The NHS England Health and justice framework for integration 2022-2025 (Improving lives – reducing inequality) include programmes of work including a ‘whole prison approach to health and wellbeing to support equitable access to care for all’, and improving access to preventive, diagnostic and screening programmes, by ‘embedding learning for Section 7a Public Health Screening programme’ and working with local authorities to ‘ensure effective plans are in place to improve health screening services for people with no access to public funds.’(140)</p> <p>The Section 7a guidance states “people in secure and detained settings are entitled to access appropriate cancer and non-cancer screening programmes for their age and sex, taking into account other risk factors. Early detection and treatment remains the priority.” (141)</p> <p>A programme of work is being led by Chandraa Bhattacharya as national lead for Core20Plus5 for those in contact with the criminal justice system that includes “:</p> <ul style="list-style-type: none"> A suite of evidence reports based on surveys conducted with adults in the criminal justice system A national prison radio campaign in adult male and female prisons to raise awareness of health risks and encourage healthy behaviours An interactive poster campaign for adults under supervision of probation services with information on common health issues for the population (see the animation that is accessible via a QR code on the posters below)

	<p>treatment and diagnosis route (the prison population are less likely to have been diagnosed by two-week-wait referral, screening or outpatient referral compared to the general population). The study recommended improved routine cancer surveillance is needed to decrease inequalities for this under-researched population (138).</p> <p>Key cancer risk factors (e.g., smoking, drug and alcohol use, obesity) are more prevalent in prison populations than in the general population. And although prisons have been smoke-free since 2018, lung cancer caused by previous smoking is a substantial burden for this population (138).</p> <p>This population is also more likely to experience poor mental health, often co-occurring alongside drug or alcohol dependence.</p>		<ul style="list-style-type: none"> ● A report based on a survey of prison officers which will provide useful data on how best to engage people in prisons” <p>In Surrey, a project was run to offer onsite breast cancer screening to women in prison at HMP Bronzefield. An evaluation report highlighted opportunities for learning from this project to improve uptake and experience of cancer screening.</p>
Victims of modern slavery	<p>Context</p> <p>Globally, over 50 million people are subjected to modern slavery and human trafficking (142). Modern slavery is a crime in violation of human rights. The broad categories of Modern Slavery include Forced labour; Debt bondage; Sexual exploitation; Forced criminality; Domestic servitude. As described on Healthy Surrey, “victims are often trafficked to a foreign country where they cannot speak the language, have their travel and identity documents removed, and are told that if they try to attempt an escape, they or their families will be harmed”.</p> <p>A rapid evidence assessment by Public Health England in 2017 stated that modern slavery has a range of serious health consequences at an individual and population level, with an often ‘catastrophic effect...on individual health, both physical and mental’. The overarching focus has been on applying the preventative focus of public health to combating modern slavery (143), rather than on ensuring access to preventive public health interventions (eg, cancer screening) for this population.</p> <p>Smoking and cancer</p> <p>Evidence relating specifically to cancer incidence and outcomes in this population is limited.</p>	<p>No evidence relating specifically to cancer screening uptake among victims of modern slavery was identified through this review.</p> <p>In line with the home office statutory guidance on modern slavery for England and Wales (under s49 of the Modern Slavery Act 2015): “Regardless of immigration status, all adults and children can register with an NHS registered GP. The Guidance for vulnerable patients and those detained (available here) makes provision for situations where patients are unable to provide the relevant documentation....Victims living or staying temporarily in the vicinity of a GP practice, including those in safehouse or other MSVCC accommodation, are able to register without ‘proof of address’ providing the GP practice has space for new patients”.</p> <p>However, barriers to accessing and engaging with health care services were identified, including: “Socioeconomic isolation, stigma, shame, guilt, fear of judgment, fear of retribution by traffickers, fear of law enforcement authorities and other factors known to inhibit disclosure” (144).</p> <p>An analysis of electronic health records of sex and labour trafficking survivors in a single primary care clinic in the US between 2015-2019 found of 138 patients experiencing sex or labor trafficking found most experienced PTSD, and half experienced housing insecurity and were undocumented (145) – all of which are barriers to accessing cancer screening which require sensitive tailored intervention to overcome.</p> <p>The evidence base was limited, however, and largely drawn from US populations.</p>	<p>The PHE review quoted findings from a systematic review of 44 documents that endorsed “victim-centred approaches to care that included culturally competent and trauma-formed care” for victims of human trafficking, and advocating for co-ordination between health providers, statutory and voluntary organisations (143,146).</p> <p>However, there is little to no evidence relating specifically to cancer screening uptake interventions for this marginalised population.</p>

Sex workers	<p>Context</p> <ul style="list-style-type: none"> As outlined in the Surrey Multiple Disadvantage JSNA, sex workers rarely appear in health datasets due to the private nature of the sex industry and the transience of the activities required in their work. More importantly, however, in the UK there is currently “no source of data [that] allows for the production of representative population estimates for [sex workers].” [45] Women make up the majority of the sex work population (around 85-90%), and around 37% of commercial sex workers are estimated to be migrants. There are few specialist services for this cohort, who are known to experience poor mental health, high rates of chronic disease and face severe, complex social inequity <p>Smoking and cancer Global data suggests smoking prevalence is higher amongst female sex workers, although national data is limited</p>	<p>Most research in relation to cancer screening in sex workers relates to cervical cancer screening uptake, due to this populations’ elevated risk of developing cervical cancer.</p> <p>Stigmatisation, fear of judgement, and the illegal nature of the work pose major barriers to healthcare engagement for this group of people.</p>	<p>Trauma-informed approaches are recommended for this population (60% of female sex workers meet the criteria for post-traumatic stress disorder) (Inclusion Health Groups SE Data Pack, Farley M, Barkan H. Prostitution, violence and posttraumatic stress disorder. <i>Women and Health</i>. 1998;27:37–49)</p> <p>Research conducted by Yorkshire and the Humber suggest alternative routes to accessing healthcare services are required by this population, including via Womens Hubs, key workers and sexual health clinics,</p>
Other marginalised groups	<p><i>Other marginalised groups should be identified on a local level; for Surrey, the priority populations defined as part of the HWS answer this call. Key information in relation to cancer screening for these groups are described in the first half of this table.</i></p>		

*The following priority populations identified by Surrey Health and Wellbeing Strategy are not included in the table above as they are not a population who will be eligible for lung cancer screening: (1) Children with additional needs and disabilities; (2) Young carers; (3) Older people 80+; (4) Young people out of work; (5) Looked after children

** Priority population and inclusion health groups

Appendix 5. Barriers and solutions to engaging with lung cancer screen mapped from the evidence base to inform a Pathway Navigation intervention tested in the Yorkshire Lung Screening Trial

Type of barrier	Specific barriers	Strategies/solutions
Personal capability (physical/practical/psychological)		
Forgetfulness	Forgot to respond to letter/to re-arrange telephone appointment/to re-arrange in person appointment/to attend in-person appointment	Send appointment confirmation letter and reminders (one-week, one day before) in accessible format for individual
Procrastination	Intends to re-arrange/be available for scheduled telephone or in-person appointment but does not execute plan	<p>When booking face-to-face appointments during initial triage appointment:</p> <ul style="list-style-type: none"> • Directly suggest adding appointment to diary/calendar whilst on the phone. • Work through attendance plan, asking if anything clashes at that time, if any other commitments need to be re-arranged, if any additional support is required to attend <p>Pro-active on-the-day follow up with individuals who do not attend, non-judgemental attitude, motivational interviewing to explore reasons for not attending, offer to re-book appointment (using strategies above)</p>
Fear, anxiety or worry: about screening	<p>Undergoing screening procedure itself</p> <p>Claustrophobia about scanner</p> <p>About exposure to radiation</p>	<p>Ensure communication approach provides:</p> <ul style="list-style-type: none"> • very clear, step-by-step guide to what will happen at the screening appointment, including type scanner (i.e. it is not an MRI scanner, it is like a polo mint, do not have to go completely inside • Reassurance that they can bring a family member or friend with them for support • Reassurance that staff will be supportive and understand, and can book a longer appointment so less pressure and can still choose not to • Clear information about modern type of CT scanner used (low radiation dose CT) and level of risk associated compared to potential benefit. Compare with equivalent sources (i.e., natural environment and xray).
Fear, anxiety or worry: about lung cancer	<p>Finding out they have lung cancer</p> <p>Finding out they have another lung disease</p> <p>Going through lung cancer treatment in the event of a positive result</p>	<p>Communication materials make it clear:</p> <ul style="list-style-type: none"> • What lung cancer screening is, and that most people will find out their lungs are working ok, but some people might benefit from more tests or treatment. • Benefits and efficacy of early detection and treatment on outcomes (correcting any misperceptions that lung cancer is always fatal) <p>During telephone triage appointment:</p> <ul style="list-style-type: none"> • Explore reasons for feeling unwilling or incapable of having treatment. This may link to another solution/action we can offer (e.g., misperceptions about treatment, fatalistic beliefs, mistrust of the healthcare system, competing priorities) <p>Explore whether they could feel differently once they have the result of the scan, and that the treatment options would depend on the outcome of the scan.</p>

Mistrust of healthcare system	Personal previous bad experience Friend/family/other previous bad experience	During telephone triage appointment: <ul style="list-style-type: none"> • explore what aspect of previous bad experience is preventing them attending the screening. This could link to another solution/action we can offer. • explain step-by-step what will happen during screening appointment/during the screening procedure, including in the scanner • Suggest they can bring a family member or friend with them for support • Explain what lung cancer screening looks for and possible outcomes, including the benefits of early detection and impact on outcomes
Competing priorities	Unable to or worried about taking time off work Caring responsibilities (partner, childcare, pets, other) Clashed with cultural/faith festival Other hospital appointments Recent bereavement / other emotional life event	In telephone appointment invitation letter emphasise that option to call service directly themselves, listing available times (ensuring these include evening/weekend options) Attempt contact for telephone appointment at multiple times (ideally 5 times) with a variety of days of the week and times Offer range of in-person appointment times, including week-day evenings and weekends Emphasise flexibility of scheduling in-person appointment; check when may be a more appropriate time for them to engage Offer to provide letter for workplace if needed Encourage booking provisional appointments if unsure of availability, and emphasise flexibility that it can be booked and easily changed if needed Ensure clear explanation given about how long the process will take Provide number to call/email address to contact if they need to cancel/rearrange Explain they are able to bring a friend/family member with them. Use motivational interviewing/problem-solving on phone appointment to help them find a solution to help with responsibilities while they have the appointment
Communication differences/difficulties	Understanding/health literacy: Can't read or understand the invitation letter clearly, or understand offer being made on the call or at the face to face appointment Leading to disengagement, misinformation and/or worry	<u>Invitation and telephone triage:</u> Check GP record for accessibility requirements and tailor invitation response, including proactive arrangement of Language Line for telephone appointment, or offer of in-person and/or video triage appointment for those requiring British Sign Language/makaton interpretation Ensure all written invitations use as-standard plain, simple accessible language.

	<p>Limited English language proficiency: Can't read or understand the invitation letter clearly, or understand offer being made on the call or at the face to face appointment</p> <p>Leading to disengagement, misinformation and/or worry</p>	<p>Provide information in multiple formats as standard (post, email and text formatted for e-readers, videos)</p> <p>Ensure all invitations include links to information in alternative formats and contact details to request help understanding if needed</p> <p>During telephone appointment offer to read the information in the letter to them over the phone/explain the LHC offer; check understanding before accepting decline</p>
	<p>Deaf/blind disability: Can't read or understand the invitation letter clearly, or understand offer being made on the call or at the face to face appointment</p> <p>Leading to disengagement, misinformation and/or worry</p>	<p>Check with individual what their communication and/or support needs they may have on the day are (in line with reasonable adjustments)</p> <p>Clearly communicate that this communication support needs will also be provided on the day (interpreters available etc.)</p> <p>Make provision to ensure that guide dogs can attend the on the day appointment, and ensure this is clearly communicated to individuals</p> <p><u>CT-scan appointment:</u> Check record for accessibility requirements and ensure language interpreter / DeafBlind / BSL interpreters are arranged in line with communication needs discussed and agreed during triage appointment</p>
Mobility issues	<p>Preventing travel to screening</p> <p>Preventing undergoing screening</p>	<p>Ensure the CT-screening sites are in easily accessible locations and that the unit has a lift with wheelchair access. Ensure this is clearly and proactively communicated during the invitation and telephone triage process.</p> <p>Explain that people can bring a family member or friend with them for support</p> <p>During the triage appointment, use motivational interviewing to explore options for travel to the appointment, encouraging consideration of strategies they usually use to attend important appointments</p> <p>If all other options have been exhausted, and there is no other way for them to attend the appointment, offer a taxi and help book this for them</p>
Co-morbidities and/or related treatments	<p>Worry that screening/scan could interfere with existing condition or treatment)</p>	<p>Explain in invitation information materials and telephone call that the eligibility check is designed to ensure only people that can be safely scanned are invited to undergo the CT scan</p>

		If the individual is still worried, suggest they can talk to a Senior Nurse or clinician or that they could contact their GP/treating doctor for peace of mind. Offer to arrange the call with Senior Nurse/Clinician for them if this is their chosen option.
	Variable health/clashing appointments or Comorbidities/related treatments take priority Preventing travel to screening	<u>In invitation materials and during telephone triage:</u> Emphasise flexibility of appointment <u>During telephone triage appointment:</u> <ul style="list-style-type: none"> • Ensure individual understands flexibility of appointment and that they can rearrange if needed • Explain how the benefits of undergoing lung cancer screening exist alongside competing comorbidities
Opportunity (social/physical)		
Has not received information about lung cancer (leading to lack of awareness/knowledge)	Limited exposure to accurate information about: <ul style="list-style-type: none"> • What lung cancer is; • Lung cancer risk factors; • Potential consequences of lung cancer • Treatment/survival outcomes for lung cancer 	Provision of easy-to-understand information, available in multiple formats and languages, about: <ul style="list-style-type: none"> • What lung cancer is • Risk factors and potential consequences • Benefits of early diagnosis for survival outcomes (that exist regardless of smoking status, age, current health status)
Has not received information about lung cancer screening (leading to lack of awareness/knowledge)	Didn't receive/doesn't remember receiving invitations Doesn't know what lung cancer screening is or what the process entails, including support options available to facilitate attendance Doesn't know potential benefits of lung cancer screening	Provision of easy-to-understand information, available in multiple formats and languages, about: <ul style="list-style-type: none"> • What lung cancer screening is, its purpose and potential benefits • Who is eligible for lung cancer screening • How to check eligibility for lung cancer screening Targeted communication channels established to raise awareness of screening among to communities at high-risk of not receiving or understanding postal invitation: <ul style="list-style-type: none"> • Co-produced strategies for each inclusion health group • Co-produced strategies for people with LD&A, people with limited English language proficiency, deaf and blind communities All communication, including invitation letter, to provide number to contact to request further information if they do not understand Information provided through more than one communication channel: post, email, text, physical posters, community engagement events
Travel to screening	Takes too long to get to screening location	Ensure CT scanning locations are easily accessed by public transport, with plenty of free, accessible parking. Ensure this is made clear in communications and invitation materials.

	<p>No/limited public transport options</p> <p>No-one available to take them there and/or back</p> <p>Potential cost / can't afford travel</p> <p>Worries about parking</p>	<p>During telephone triage, appointment booking to:</p> <ul style="list-style-type: none"> • Check distance and book appointment at a time when van is at a location that is easiest for them to get to • Emphasise that the time of the appointment can be flexible to suit needs • Ensure and explain that there are refreshment/toilet facilities nearby to CT scan location • Explore option of family or a friend taking them • Remind them of the number they can call if they need to cancel/rearrange • Explore eligibility for Non-Emergency Patient Transport Services (NEPTS) and support individual to access if appropriate
Lack of social support / social network	<p>Family/friends not supportive Anxiety of family/friends</p>	<p>If raised as a barrier during telephone triage:</p> <ul style="list-style-type: none"> • offer a telephone call that includes the individual and one of their respective family/friend over loud speaker • explore how the lack of support from family/friends is impacting their decision • explain that it is entirely their decision <p>Ensure communication approach clearly explains purpose and importance of screening, and encourage individual to share with friends and family if they are concerned</p> <p>Offer a follow-up telephone call if the individual wants to speak again with friends/family before booking an in person appointment</p>
Motivation (automatic/reflexive)		
Avoidance of information about lung cancer, screening or lung cancer risk (avoiding negative emotions)	<p>Lack of awareness driven by avoidance of received information:</p> <ul style="list-style-type: none"> • Don't want to receive information about lung cancer (or other cancer) • Don't want to know about their personal risk of lung cancer • Don't want to know if they have lung cancer 	<p>Pre-arranged pro-active telephone appointments, that do not require participant response to initial invitation letter.</p> <p>Use of motivational interviewing and open communication techniques on telephone appointment to explore barriers to engaging with information (e.g. Are they scared of the outcome? Hold self-stigmatising views? Afraid of having to stop smoking? Treatment concerns?). The underlying reason may link to another solution/strategy.</p>
Believes already undergone a relevant scan therefore lung health check not needed	<p>Already undergone medical imaging/scans (other than chest CT) or already have regular check-ups for respiratory condition (e.g., COPD)</p>	<p>Explain during telephone triage how the CT scan offered in lung cancer screening is different from the other imaging/scans they may have already had, and why it is important (and that GP will be informed so they will have oversight of all ongoing tests/care)</p>
Taking part feels like too much effort		<p>Communications approach explains purpose and potential benefits of screening, and low-burden of initial telephone call</p>

		Explore during telephone triage call specific challenges that make it seem like too much of an effort, and problem-solve to find solution
Worried will be made to stop smoking/ unwilling to stop smoking	Worried about negative views/perceived blame others hold Self-stigma and self-blame associated with smoking and lung cancer risk	Communications approach make it clear that: <ul style="list-style-type: none"> • There will be no judgements on smoking. Ensure all staff are trained to be non-judgemental and non-blaming • The benefits of early diagnosis exist regardless of smoking status, age, current health status
	Worried they will be made to stop smoking	Communication materials make it clear that attending lung cancer screening does not mean they will be made to stop smoking (although support to quit is provided if they would like it)
	Feels screening is pointless because cannot/does not want to stop smoking	Communication materials make it clear that the benefits of early diagnosis exist regardless of smoking status, age, current health status Explain that if they would like to, they can choose to receive support to help them stop smoking but not mandatory
Does not feel they are at risk of lung cancer	Perceives they have not smoked enough / recently enough to be at risk Does not perceive that they have been exposed to risk factors (smoking, asbestos etc.)	Communication materials make it clear that: <ul style="list-style-type: none"> • The telephone appointment will calculate risk based on a number of different factors • An individual can still benefit from screening even if they have not smoked for a long time – the risk calculation can work that out
Does not feel they could benefit from lung cancer screening	Perceives they are too old to benefit Perceives they have smoked too long to benefit Perceives that their health is too poor to benefit	Communication materials make it clear that the benefits of early diagnosis exist regardless of smoking status, age, current health status
Fatalistic beliefs about lung cancer prognosis	Believes: “If I have lung cancer, I will die”; believes screening and/or treatment would not make any difference to survival if won’t make any difference	Communication materials make it clear: <ul style="list-style-type: none"> • What lung cancer screening is, and that most people will find out their lungs are working ok, but some people might benefit from more tests or treatment. • Benefits and efficacy of early detection and treatment on outcomes (correcting any misperceptions that lung cancer is always fatal)
Unwilling to have treatment for lung cancer	Perceptions that they would not be willing to undergo surgery or other non-surgical (eg, chemotherapeutic, radiographic) treatments and therefore diagnosis is pointless	Communication materials make it clear: <ul style="list-style-type: none"> • What lung cancer screening is, and that most people will find out their lungs are working ok, but some people might benefit from more tests or treatment. • Benefits and efficacy of early detection and treatment on outcomes (correcting any misperceptions that lung cancer is always fatal)

During telephone triage appointment:

- Explore reasons for feeling unwilling or incapable of having treatment. This may link to another solution/action we can offer (e.g., misperceptions about treatment, fatalistic beliefs, mistrust of the healthcare system, competing priorities)
- Explore whether they could feel differently once they have the result of the scan, and that the treatment options would depend on the outcome of the scan.

Appendix 6. Replication of table summarising studies evaluating interventions designed to improve equitable lung cancer screening participation, as published in Sayani et al. (2023) (69)

Citation	Study Type	Study Setting	Proposed Aim Of Study	Intervention	Outcome Measures	Effectiveness	Smoking Cessation Linked To LCS Intervention
UK studies							
Crosbie et al. 2019	Nonrandomized study UK	Retail locations in socioeconomically deprived neighborhoods on the basis of the IMD	To determine the feasibility of a community-based LCDT LCS pilot program	Letters of invitation were sent to age-eligible smokers identified through primary care practices. Individuals who booked an LHC appointment were assessed for lung cancer risk using the PLCO score. Individuals with PLCO score greater than or equal to 1.51% were offered immediate LDCT screening through a mobile scanner	1.The statistical association between participant demographics and lung cancer risk (PLCO score) 2.Percentage of attendees qualifying for LDCT 3.Number of individuals screened with LDCT 4.Percentage of lung cancers detected	1.9926 ever-smokers invited by mail of which 28.5% booked an LHC 2.56.2% of LHC attendees have a PLCO risk score of > 1.51% 3.96% of eligible attendees received LDCT 4.3% of attendees had lung cancer identified through the program 5.75% of attendees were ranked in the lowest deprivation quintile	Smoking cessation advice offered during LHC
Ghimire et al. 2019	Nonrandomized study UK	Community health hub in the area of economic deprivation	To assess the impact of targeted health promotion and community-based lung health checks on the uptake of LDCT in deprived neighborhoods as measured by the IMD	Targeted health campaign conducted promoting lung health. Letters of invitation were sent to age-eligible smokers identified through primary care practices. Individuals who booked an LHC appointment were assessed f using the Liverpool Lung Project risk calculator to determine the risk of lung cancer over the next 5 years. Those with 5% or higher risk were referred to LDCT	1.Attendance rates 2.Percentage uptake LDCT	1.40% of invitees attended the lung health check 2.Of those eligible for LCS, 85% had LDCT	Smoking cessation clinic referrals
Crosbie et al. 2019	Nonrandomized	Retail locations in	To report on the results of two	Letters of invitation were sent to age-eligible smokers identified through	1.Screening adherence i.e.	1.90% of eligible attendees completed T0 and T1 scans	Smoking cessation advice

	zed study UK	socioeconomically deprived neighborhoods on the basis of the Index of Multiple	rounds of community-based mobile LCS in socioeconomically deprived neighborhoods	primary care practices. Individuals who booked an LHC appointment were assessed for lung cancer risk using the PLCO score. Individuals with PLCO score greater than or equal to 1.51% were offered immediate LDCT screening through a mobile scanner (T0) and reinvited to screen after 12 mo (T1)	percentage of attendees who completed T0 and T1 scans 2. Incidence and stage of lung cancer in the scanned population	(1194/1323) 2.1.6% of the scanned population had lung cancer detected and 79% of those lung cancers were stage 1	offered during LHC—unclear if ongoing smoking cessation services were provided at T1
Bartlett et al. 2020	Nonrandomized study UK	Mobile scanners and a hospital in West London	To compare participant uptake between a mobile and hospital-based CT scanner	Letters of invitation were sent to age-eligible smokers identified through primary care practices. Individuals who booked an LHC appointment were assessed for lung cancer risk using the PLCO score and LLP. Individuals with PLCO score greater than or equal to 1.51% or LLP greater than or equal to 2% were offered immediate LDCT screening at the hospital site or mobile scanner	1. Attendance rates and percentage uptake of LCS at each site	1. At the hospital site, 20.4% attended while at the mobile site, 21.7% attended. 2. Of the 1159 patients who were eligible for LDCT, 1145 underwent baseline LDCT scanning (98.8%)	Not described
Ruparel et al. 2019	Randomized controlled trial UK	Out patient clinics at a London Hospital	To assess the impact of an informational film on the decision to participate in lung cancer screening	Primary care records used to identify ever-smokers 60–75 years of age and invite them to an LHC. Attendees to LHC were randomly assigned to each arm of the study. The control group received an informational booklet only. The intervention group received an informational film and an informational booklet	1. Percentage uptake of LDCT across control and intervention groups	1. LDCT completion rates across intervention and control groups were 76.7% and 78.9% respectively	Not described
Quaife et al. 2020	Randomized controlled trial	Out patient clinics at a London Hospital	To assess the impact of a targeted, stepped, and low-burden invitation	Primary care practices serving communities with lower socioeconomic status as measured by the IMD-identified eligible patients through EHR i.e., ever-smokers between 60–75 years of	1. IMD ranking of invitees 2. Percentage of attendance of the LHC appointment	1. 96.2% of invitees ranked as most deprived (60.9%) or second-most deprived (35.3%) on the basis of IMD	Attendees could opt-into a smoking cessation program

	UK		intervention on the uptake of LDCT	age. Patients received stepped invitations to participate in LHC through primary care endorsement, prenotification, leaflets, reminders, and prescheduled appointments. The intervention arm included a modified leaflet	3.The proportion of attendees eligible for LDCT 4.The difference in attendance levels between intervention and control groups	2.52.6% of invitees attended LHC appointment 3.84% of attendees eligible for LDCT 4. No difference in LHC attendance between intervention (52.3%) and control (52.9%) groups	
Grover et al. 2020	Nonrandomized study UK	Primary care practice in areas of economic deprivation as measured by IMD rank	To assess the impact of targeting patients from annual COPD review to participate in LDCT	Patients identified from chart review conducted at annual COPD check. Eligible patients offered LCS	1.Patient socioeconomic status2.Number of LDCT scans conducted3.Prevalence of lung cancer in the study population	1.79.3% of attendees were from the most deprived quintiles (IMD ranking)2.925 attendees underwent LDCT3.Lung cancer prevalence was 2% (n = 19/925)	None
Balata et al. 2019	Nonrandomized study	Retail locations in socioeconomically deprived neighborhoods on the basis of the IMD	To understand participants' views of the importance of free, community-based, mobile CT screening	Letters of invitation were sent to age-eligible smokers identified through primary care practices. Individuals who completed two rounds of lung screening were eligible to participate in a self-completed questionnaire	1.Percentage of participants that found the location to be an important factor for attendance.2.Statistical associations between participant demographics and location preference	1.75% stated community-based 'location was important' for LCS participation. 2.25% of participants would not attend LCS if it was hospital-based3.Willingness to attend hospital-based LCS significantly decreased with increasing deprivation (IMD rank) and among current smokers	Smoking cessation advice offered during initial intake–no information about ongoing smoking cessation services provided
International studies							
Fagan et al. 2019	Pre and posttest study	Academic Health care system–primary care practice	To assess the feasibility of a telephone-based SDM process	Eligible patients are identified through EMR. DCP software used to guide telephone-based SDM led by a trained decision-counselor	1.Percentage uptake of LDCT2.Association between uptake and DCP completion	1.829 eligible individuals identified by EMR2.297 individuals were reachable by telephone out of which 54 were eligible for screening with LDCT3.28 participants	Tobacco cessation hotline offered to all current smokers

			integrated into primary care			were recruited to study of which 20 completed SDM4.9 participants completed DCP and LDCT	
Giamboy. 2017	Prospective study US	Community health centers to target geographic areas identified as having higher rates of smoking and lung cancer incidence	To implement an EHR clinical decision support system for nurses that will increase referrals to lung cancer screening	EHR system modified to flag individuals eligible for referral to LCS. Nurses provide education and refer patients for LDCT. Nurse navigator responsible for identifying and providing further education for patients who are referred but have not yet screened	1.Number of patient referrals to the LCS program2.Number of referrals coming from the nurse pathway	1.In 2016, 15 patients screened2.In 2017, 45 patients were screened; of these 25 out of 45 patients were referred by means of the nurse pathway	Tobacco dependence clinic available to all smokers
Erkmen et al. 2018	Prospective study US	The clinical setting for minority underserved populations	To assess the feasibility of guided discussion on willingness and ability to undergo lung cancer treatment during an SDM visit	Healthcare providers refer patients to the LCS program. Patients undergo SDM sessions with a physician or a physician assistant using an SDM online decision-making website. SDM session, LDCT, and discussion of scan results occur on the same d	1.Percentage of patients that proceed with LDCT after SDM visit	1.176/179 underwent LDCT screening after the SDM visit	None
Yoshida et al. 2012	Randomized controlled trial Japan	Municipalities with reported low rates of lung cancer screening	To evaluate the effectiveness of a leaflet designed to promote participation in LCS	A leaflet containing educational information related to lung cancer risk and LCS was mailed to the intervention arm. Intervention and control arms received a questionnaire to collect lifestyle information and assess the effectiveness of the leaflet (intervention arm only). All participants returned the	1.Effectiveness of leaflet (measured as a “yes” the leaflet is an effective way to motivate participation in LCS2.Intervention versus control group LCS rates	1.60% of participants in the intervention arm reported that the leaflet was effective2.LCS rates for intervention versus the control group were 38.8% and 37.7%, respectively	None

				questionnaire by means of return envelope attached			
Begnaud et al. 2017	Randome control trial US	Academic health system- Primary care or pulmonary clinics	To evaluate the impact of targeted electronic messaging through a patient portal to increase LCS uptake in former smokers	Eligible patients identified by means of EHR. Intervention groups sent electronic messages describing LCS and eligibility through a patient portal. The control group received the usual care	1.Number of participants who read the electronic message2.The number who responded to the message3.The number who completed a smoking history4.The number who were eligible for screening by self-reported smoking history5.Number of screening examinations completed	1.Total of 99 participants in the intervention arm2.66 (67%) in the intervention group read the message3.24 (36%) of 66 responded to the message4.19 (79%) of 24 respondents completed the smoking history5.Four participants underwent screening in the intervention group compared with one participant in the control group	None
Cardarelli et al. 2017	Randome control trial US	Community settings with high lung cancer incidence and mortality incidence	To evaluate the impact of a community-engaged LCS campaign on the uptake of lung cancer screening	A campaign designed using focus groups with community members. The intervention arm received campaign material consisting of postcards, flyers, television, newspaper, and radio advertisements along with supporting websites. The control arm did not receive the campaign. Telephone surveys were administered in every region to analyze the reach of the campaign and uptake of LDCT assessed	1.Percentage of survey participants who had been exposed to the campaign in the past 4–6 mo2.Percentage of those exposed to the campaign who reported taking action in response to the campaign3.Percentage of LDCT uptake in each region	1.50.3% of survey participants have been exposed to the campaign2.83.6% of those exposed to the campaign reported taking some action3.Regions reported an incremental increase in uptake of regional LDCT in the intervention arm which was not reported in the control arm	None
Dharod et al. 2019	Nonrandomi	Academic health system–	To assess the feasibility of targeted electronic	Patients were selected on the basis of age and smoking history by means of EHR. Electronic messages through	1.Number of patients who read the invitation2.Number of	1.1000 invites sent by means of patient portals2.86% read the invitation3.40% visited the	None

	zed study US	hospitals and community clinics	messaging through a patient portal to increase LCS uptake	the portal. Messages included a link to a screening eligibility assessment and a decision aid. Eligible patients underwent SDM and could proceed with LDCT	patients who visit the interactive website3.The number of patients who complete the interactive website. The proportion of eligible screening patients4.The proportion of patients who were eligible for LCS5.The proportion of patients who completed LCS	interactive website4.35% of patients completed the interactive component5.99/1000 were identified as screening eligible by the website6.22/1000 patients completed LDCT	
Veronesi et al. 2017	Nonrandomized study Italy	40 km radius of the regional hospital	To assess the feasibility of direct home telephone calling to identify eligible patients and to promote the uptake of lung cancer screening	1000 families were contacted by phone and participated in an eligibility questionnaire. Eligible individuals willing to undergo LDCT scheduled for a free lung cancer screening	1.The proportion of patients eligible from 1000 families2.The proportion of patients who underwent LDCT after a telephone call	1.44 individuals were eligible but 13 agreed to participate in LDCT2.12 underwent LDCT (1.2%).	Those who scheduled an LDCT appointment also consented to a smoking cessation interview
Federman et al. 2014	Retrospective cohort study US	Veteran Affairs Healthcare system	To assess the effectiveness of an EHR clinical reminder to increase the uptake of LCS	Eligible patients identified by means of EHR. Clinical reminders are sent to healthcare providers to conduct eligibility assessments and recommend LDCT screening to the patient	1.Percentage of completed reminders2.Percentage of eligible patients3.Percentage uptake of LDCT	1.64.9% of clinical reminders were completed and of those, 39.9% met the LCS criteria2.Of the eligible patients, 59.7% agreed to participate, and 76.4% of those completed LDCT screening	None
Mazzone et al. 2017	Pre and posttest study	Healthcare Clinic	To assess the impact of a centralized counseling system consisting of SDM,	Patients are referred to the program by their healthcare providers. On referral, patients booked for SDM visits, risk assessment, and LDCT if eligible. Study participants	1.Knowledge improvement scores2.Percentage uptake of LDCT	1.Knowledge scores improved after visit $p = 0.03$ to $p < .000$ 12.95% of patients proceeded with LDCT	None

	US		educational videos, and personalized risk assessment on knowledge and uptake of lung cancer screening	completed knowledge questionnaires before and after the visit, and later after 1 mo			
Wang et al. 2020	Retrospective data analysis US	Academic medical center associated with a community health center	To assess the feasibility of integrating tobacco cessation and LCS referrals into a screening mammography program	All patients participating in screening mammography were asked to complete an intake questionnaire containing smoking history and interest in tobacco cessation programs questionnaire was available in multiple languages and interpreters were also present. Pack-years were calculated by program staff and referrals to LCS were made as needed	1.Smoking status of screening mammography patients2.The proportion of current smokers who requested a referral to a smoking cessation program3.The proportion of patients eligible for LCS on the basis of pack-year smoking history4.The proportion of smokers newly identified for LCS through the program	1.10.5% self-reported as current cigarette smokers, 29.1% self-reported as former smokers2.Among current smokers, 26.4% requested a referral to the tobacco cessation program3.9.3% (n = 70) of ever-smokers were eligible for LCS on the basis of pack-year smoking history4.2% of the study population newly identified as eligible for lung cancer screening	Tobacco cessation services
Percac-Lima et al. 2018	Randomized controlled trial US	Five community health centers affiliated with an academic primary care network	To evaluate the impact of a patient navigation program to increase LCS uptake in current smokers	EHR is used to identify current smokers who were 55–77 years old. The intervention group received invitation materials by means of mail and a call from the patient navigator about LCS. The control group received the usual care	1.The proportion of patients eligible for LCS in the intervention group2.The proportion of patients across intervention and control groups that had LDCT	1.Of 259 patients in the intervention group, 135 were eligible.2.Percentage uptake of LDCT was 23.5% in the intervention and 8.6% in the control group	None

Reuland et al. 2018	Pre and posttest study US	Academic primary care practice	To assess the effectiveness of a video-based decision aid to promote decision-making for LCS within a primary care setting	Patients (on the basis of age and smoking history) identified by means of EHR and sent recruitment package by means of post. Eligibility for LCS is determined by means of telephone and patient scheduled for an in-person visit. Study participants viewed the video at the clinic and completed a baseline knowledge survey, follow-up survey, and another survey at 3 mo	1.Screening-related knowledge score pre and postintervention2.Screening behavior measures, assessed by means of chart review, including LDCT ordering, and LDCT completion within 3 mo	1.Of the 716 recruitment packages mailed and 378 patients reached by means of telephone, 80 patients were found to be eligible and ultimately 50 participated.2.Knowledge increased from pre- to postdecision aid viewing (mean = 2.6 vs. 5.5)3.13/50 participants had LDCT ordered4.10/50 participants completed LDCT	None
Lam et al. 2021	Prospective study US	Genomics Institute and Oncology Department of Hospital	To assess the utilization of a personalized gene-based risk test and its effect on attendance for LCS uptake and adherence in a small, community-based pilot	Patients were recruited by means of advertisements and physician referrals. Participants completed a questionnaire and did a cheek swap. LDCT offered to eligible patients	1.Adherence and attendance rates of LDCT screening ~ categorized as "Timely" and "Late". Timely was defined as scheduling attendance within 4 wks after a positive scan. Late was defined as those who attended more than 4 wks after their scheduled attendance for a positive	1.98% of enrolled participants underwent a baseline CT scan2.The rate of "timely" adherence was 43% "Overall" adherence (including timely and late) was 63%. No adherence was 37%	Smoking cessation counseling offered to current smokers
Volk et al. 2020	Randomized controlled trial US	13 Texas State tobacco quitlines	To determine the effect of a video-based PDA about LCS on decision-making, knowledge, and	Quitline call centers sent recruitment packages to clients. Clients received either the video or a brochure as standard educational materials (EDU). Follow-up	1.Knowledge of LCS at 1-wk, 3-month, and 6-month intervals2.Percentage LDCT scheduled across intervention and control	1.LCS knowledge is higher in the PDA group. Scores at 1 wk 57.5% 3 months 44.4% and 6 months 49.9% compared with the 1-wk assessment.2.29.5% of PDA patients and 37.4% of EDU patients scheduled LDCT	The intervention was centered around a smoking cessation service

			screening outcomes	questionnaires completed by mail/ phone at 1 wk, 3 mo and 6 months	groups3.Percentage uptake LDCT	by 6 months3.85.1% of the PDA group and 80% of the EDU group who scheduled LDCT got screened within 6 months	
Tanner et al. 2020	Nonrandomized study US	Eight Veteran Affairs hospitals	To measure adherence rates in LCS of the Veterans Affairs LCS demonstration project	Clinical sites required at minimum: leadership support, clinical champions, onsite CT scanner, radiologist, multidisciplinary lung cancer program, and tobacco cessation program. Eligible patients identified by means of EHR. The program coordinator confirmed eligibility and conducted SDM in person. Patients booked for LDCT if eligible. Follow-up scans booked by phone	1.Percentage adherence to annual LDCT after baseline screening (follow-up scan within 15 months is considered adherent)	1.Adherence from baseline scan to T1 was 82.2% and from T1 to T2, adherence was 65.2%	Smoking cessation is available at the clinical site
Kinsinger et al. 2017	Nonrandomized study US	Eight Veteran Affairs hospitals	To assess the feasibility of a multipronged intervention on the uptake of LCS	Clinical sites required at minimum: leadership support, clinical champions, onsite CT scanner, radiologist, multidisciplinary lung cancer program, and tobacco cessation program. Eligible patients identified by means of EHR. The program coordinator confirmed eligibility and conducted SDM in person. Patients booked for LDCT if eligible	1.Percentage of eligible patients2.Percentage uptake LDCT	1.84.3% of identified patients eligible for screening2.57.5% of eligible patients agreed to be screened and of those who agreed, 85.9% completed the first LDCT	Smoking cessation is available at the clinical site
Monu et al. 2022	Randomized study US	Not applicable	To determine the impact of different advertisement images on the self-reported likelihood of undergoing lung cancer screening	Screen-eligible participants were recruited by means of a crowdsourcing recruitment tool. Participants were randomized to view combinations of construal level (intervention) and regulatory focus (control) images. After viewing the	1.Percentage of participants that completed the survey2.Percentage likelihood to screen for lung cancer in each group	1.79% of participants completed the survey2.Images with high construal and promotion focus led to a greater self-reported likelihood of screening among participants	None

				images, participants were asked about their likelihood to undergo LCS		at high risk for lung cancer (60% versus 30% in control)	
Williams et al. 2021	Pre and posttest study US	12 community sites ~ 8 African American churches, three federally qualified health clinics, and one community recreation center	To alter the participants' knowledge, attitudes, and beliefs about lung cancer risk factors and to connect screening eligible participants to free LDCT screening services and tobacco cessation services	Weekly education sessions are held at community sites and are led by community health workers. Educational and informational tools (flyers, posters, checklists) are provided to community members. Participants completed the questionnaire. Follow-up occurred by phone	1. Participant knowledge regarding LCS, cues to action, and intent to undergo LCS 2. Percentage uptake LDCT screening	1. Knowledge regarding LCS increased: 25.3% (pretest) versus 79.8% (posttest) 2. 3 months postintervention, 38% of eligible participants underwent LDCT	Tobacco cessation services available to current smokers
Fabbrini et al. 2018	Randomized controlled study US	Veteran Affairs Health care system	To measure the impact of targeted invitation strategies on the uptake of lung cancer screening	Eligible patients identified by means of EHR. The intervention group received invitation materials by post with a follow-up one wk later. The care coordinator conducted risk assessments and booked patients for LCS if eligible. The control group received the usual care	1. Percentage of patients for LCS on the basis of EHR 2. Percentage uptake LDCT 3. Percentage uptake of LDCT across intervention and control groups	1. 66% of patients identified by means of EHR were eligible for LDCT 2. 19% of the study population completed LDCT 3. Uptake of LDCT 22% in the intervention group (received invitation materials and care navigation) underwent LDCT versus 9% in the control group	Tobacco cessation program
Han et al. 2019	Pre and posttest study US	LDCT screening program in a hospital setting	To evaluate the effects of personalized cancer risk information on patients' perception of risk and interest in	Eligible patients referred from community primary care practices to the LCS program. SDM consultations are conducted by pulmonary physicians using personalized decision aid. Pre and postintervention surveys were conducted, and participants who	1. Interest in LCS pre and postintervention 2. Percentage uptake of LDCT	1. Interest in LCS increased from 4.37 on a five-point scale to 4.70 postvisit 2. 100% eligible patients scheduled and completed LDCT	Participants were asked about their interest in smoking cessation but no services were described

			lung cancer screening	had LDCT also did a qualitative interview			
Azubuike et al. 2020	Pre and posttest study US	Family Medicine clinic	To increase provider compliance with USPSTF LCS guidelines using a multiprong intervention	1-hour educational session conducted for staff. Flyers were placed in the clinic to remind providers to order LDCT tests. Pre and posteducational session tests were administered. EHR is used to identify eligible patients and is contacted by the office manager using a phone script to complete the assessment form. Providers followed up on forms and ordered LDCT for those interested	1.Population eligible for LDCT2.Percentage of LDCT ordered3.LDCT uptake difference pre vs. postintervention	1.27 patients eligible for LDCT2.8/27 patients referred to LDCT3.19/27 eligible patients declined LDCT4.Preintervention, 0 LDCT orders vs. 8 LDCT orders postintervention	None
McDonnell et al. 2018	Prospective-Mixed methods US	The academic medical center serves low-income individuals	To assess the feasibility of a clinic-based decision aid to promote discussion and referral to LDCT	Eligible patients identified by means of EHR. Patients were randomly selected to receive mailed invitations and phone calls. Providers received educational materials. The patient booked an appointment with the provider and together completed 8-page decision aid designed at a grade 5 reading level. Patients and providers participate in the survey. Patients also completed an exit interview	1.Acceptability of DA2.Percentage of patients wanting to receive LDCT	1.Participants felt DA was easy to read (100%), helpful for making decisions (100%), for discussing personal values (95%), the appropriate time required to read and use the DA (100%), and 95% reported increased satisfaction with the visit.2.80% of eligible patients expressed a desire for LDCT DA	None
Spalluto et al. 2020	Retrospective-mixed methods US	Lung screening program at Academic medical center	To assess the impact of adding a dedicated program coordinator on LCS adherence rates	Retrospective data collection to identify patients that underwent LDCT. Participants completed a cross-sectional survey by means of telephone. Program coordinator responsibilities included: SDM, smoking cessation, and tracking of program participants	1.Percentage adherence to annual follow-up LDCT	1.30.4% adherence before the program coordinator vs. 69.6% after hiring a program coordinator	Tobacco treatment counseling

Raz et al. 2021	Randome control trial US	Integrated health care system	To determine the effects of an educational LCS video on utilizing chest CT and smoking habits for individuals who are participating in in-person, telephone, or online smoking cessation services	E-mail invitation (followed up by postcard and phone call as needed) sent to existing patients of a smoking cessation program. The E-mail contained a link to 30 min educational video describing lung cancer risk and LCS. The survey is to be completed after watching the educational video for the intervention group. The control group did not receive invite or video	1.Percentage of participants who completed the survey and education video2.Percentage uptake of chest CT across control and intervention group	1.14% completed watching the video and 13% completed the survey2.Chest CT uptake was 8.5% and 8.6% for the intervention and control groups respectively	Smoking cessation counseling (group or telephone)
Watson et al.2002	Pre and posttest study US	LCS program in the hospital setting	To determine the impact of ONN on uptake and	ONN provided education and resources to staff. Identified eligible patients from EHR, confirmed eligibility with the primary care provider, and contacted patients to book assessments. ONN identified and removed barriers to access, such as costs. Eligible patients underwent LDCT and the time between referrals and reporting was tracked	1.Increase uptake of LDCT2.Decrease time from primary care provider referral to LDCT, and from LDCT to reporting results back to provider and patient	1.Hospital LDCT increased from 38% to 65%2.No decrease in time from referral to LDCT screening. Reporting back of results to provider and then patient improved by 2,6 ds and 1.5 d respectively	Tobacco cessation referrals to quitlines and other resources provided to patients
Headrick et al. 2020	Nonrandomized study US	Rural community settings to target geographically isolated communities	To assess the feasibility of a mobile LCS program	Mobile CT scanner buses traveled to rural communities to increase the uptake of LCS. Raised awareness of LDCT though print media, television, and the internet	1.Number of sites traveled2.Number of LDCT scans	1.Traveled to 104 sites during the 1-year duration2.548 patients underwent LDCT	None
Peckham 2016	Gray literature US	Hospital	To describe the role of a nurse practitioner in improving the	Eligible patients referred by physicians or self-referred. Patients are contacted by a nurse practitioner to schedule risk assessment and	1.Number of patients that underwent LDCT2.Rate of follow-up LDCT scans	1.424 patients screened from 2014–20162.96% screening follow-up rate	Smoking cessation advice offered during SDM

			uptake of LDCT in an LCS program	LDCT. Nurse practitioners managed care pathway			
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