

Targeted Lung Health Check Evaluation

Patient-level pathway - analysis

Final version

December 2024



Executive summary

This analysis of the full patient-level dataset* uses Sankey diagrams to visualise aggregate summaries of patient flows from the **eligible population** through the TLHC programme.

Comparative breakdowns are provided by implementation models (as they stood in January 2024, rather than reflecting any changes across the full programme delivery), demographics and key intersections.

Assessments are provided for how significant any highlighted differences (if any) are between breakdowns for attendance at lung health checks (LHC) and for low dose CT scan (LDCT), lung cancer detection and staging.

Distributions of lung cancer staging for those who took up the TLHC offer and those who

did not are compared.

Throughout this report the use of the symbol, , indicates there are concerns regarding data quality or a possible systematic reason for the observed findings, and should be treated with caution.

Findings are summarised in this executive summary in up to three ways:

1. Conversion rates –

- LHC uptake rate – defined as the number of people who attended an LHC as a proportion of those who were invited,
- CT scan conversion rate (realised) – defined as the number of people who received a CT scan as a proportion of those who attended an LHC

2. Proportion of the eligible population – the number of people who attended an LHC, received a CT scan or received a TLHC-associated lung cancer diagnosis as a proportion of the total eligible population,
3. Odds Ratio – the comparative likelihood of the following conversions when adjusted for the effects of all demographic and implementation factors:
 - LHC attendance for all the eligible population,
 - CT scan for all LHC attendees, and
 - TLHC-associated lung cancer diagnosis for all CT recipients.

** Phase 1 and 2 projects that supplied record-level data for activity between April 2019 and March 2024 inclusive - please see the Appendix for the full list of projects.*

Executive summary

Lung cancer outcomes

Over 1.5k people received a lung cancer diagnosis through the TLHC programme, most following their initial CT scan.

The overall cancer conversion rate following a CT scan is 1.5%, with 1.1% detected at initial scan, 1.4% at the 3-month and 12-month follow-up scans and 0.4% for the 24-month incidence scan.

People with TLHC-associated lung cancer diagnoses* were **much more likely to be diagnosed at stage 1 or 2** when compared with people whose lung cancers were detected using routine services (73% early-stage detection in TLHC vs 36% in non-TLHC groups).

* Please see [methodology](#) for how these groups are defined

Attendance at LHC

Higher rates of uptake were found for the following implementation models:

Outsourced administrative models, in which an external organisation takes responsibility for invitations and conducting LHCs,

Triage models, where individuals are assessed for eligibility prior to their LHC,

Opt-out invite models, in which individuals are provided with a pre-booked LHC slot and assumed to take part unless they indicate otherwise.

Demographic features of note:

People reporting their ethnic background as **White** are much more likely to attend their LHC than people whose ethnicity is **other than White**,

Men are associated with a greater uptake rate than **women**, and

People aged **65-74** years are more likely to attend an LHC than those **55-64** years or in the **75**-year groups.

Greater uptake rates were found for the following factors, but questions remain about the generalisability of these findings:

- People living in areas of **less deprivation** (quintiles 2-5) – deprivation influenced decisions about where to pilot the TLHC programme,
- **Face-to-face** and **Hybrid** LHC methods – few projects offer these approaches,
- **Current** and **Previous smokers** – smoking status was confirmed at LHC so those with **Unknown** status were more likely not to attend LHC.

Executive summary

Receiving a CT scan

Attendees at LHC are risk assessed and referred for a CT scan for further investigations where eligible.

Triage models are strongly associated with greater numbers of people going on to receive a CT scan. This finding remains significant after adjusting for all other demographic and implementation factors.

Men are more likely than **women** to go onto CT scan.

Factors associated with CT scan, but questions remain about the generalisability of the findings, include:

- **Increasing age** is strongly associated with likelihood of CT scan. Age, however, is part of the risk assessment process, with those in **older age** groups more likely to be considered high risk and thus

more likely to be referred to CT scan.

- **Current smokers** are highly likely to receive a CT scan. Despite smoking status being confirmed at LHCs, thus highly confounded, **current smokers** are much more likely than **previous smokers** to receive a CT scan. Smoking status is a factor in the risk assessment tools with **current smokers** more likely to be considered high risk and thus more likely to be referred to CT scan.
- **Hybrid** LHC models are strongly associated with likelihood of CT scans. This approach is offered by few projects, so these findings are based on comparatively few people.
- People reporting their ethnic background as **White** are much more likely to receive a CT scan than people whose ethnicity is

other than White. This association remains significant even after adjusting for all other demographic and model designs. Ethnicity, however, is part of the risk assessment process with some groups considered more at risk than others and therefore more likely to be referred to CT scan.

- People who live in areas of **high deprivation** (quintile 1) are more likely to go on to receive a CT scan than those living areas of **less deprivation** (quintiles 2-5), reversing the LHC uptake pattern. Deprivation is linked with lung cancer mortality, which was part of the consideration for where to trial the TLHC programme, which is why it is flagged here as this finding may not be generalisable if rolled out nationally.

Executive summary

Receiving a TLHC-associated lung cancer diagnosis

People with TLHC-associated lung cancers are **more likely to be diagnosed at stage 1 or 2** when compared with people whose lung cancers were detected using routine services.

Current smokers are highly likely to receive a TLHC-associated lung cancer diagnosis. Despite smoking status being confirmed at LHCs, thus highly confounded, **current smokers** are much more likely than **previous smokers** to receive a lung cancer diagnosis.

Women are more likely to receive a TLHC-associated lung cancer diagnosis than **men**. **Women** are associated with a greater proportion of the eligible population receiving a diagnosis even with lower likelihoods of attending an LHC and receiving a CT scan.

Factors associated with TLHC-associated lung cancer diagnoses, but questions remain about the generalisability of the findings, include:

- **Increasing age** is strongly associated with likelihood of receiving a TLHC-associated lung cancer diagnosis. Age, however, is part of the risk assessment process used at LHCs.
- People reporting their ethnic background as **White** are much more likely to receive a TLHC-associated lung cancer diagnosis than people whose ethnicity is **other than White**. Ethnicity, however, is part of the risk assessment process with some groups considered more at risk than others and therefore more likely to be referred to CT scan.

- People who live in areas of **high deprivation** (quintile 1) are more likely to receive a TLHC-associated lung cancer diagnosis than those living in areas of **less deprivation** (quintiles 2-5). Deprivation is linked with lung cancer mortality, which was part of the consideration for where to trial the TLHC programme, which is why it is flagged here.
- **Triage** models are strongly associated with likelihood of receiving a TLHC-associated lung cancer diagnosis. The reason why this LHC model affects the likelihood of a lung cancer diagnosis is unclear.

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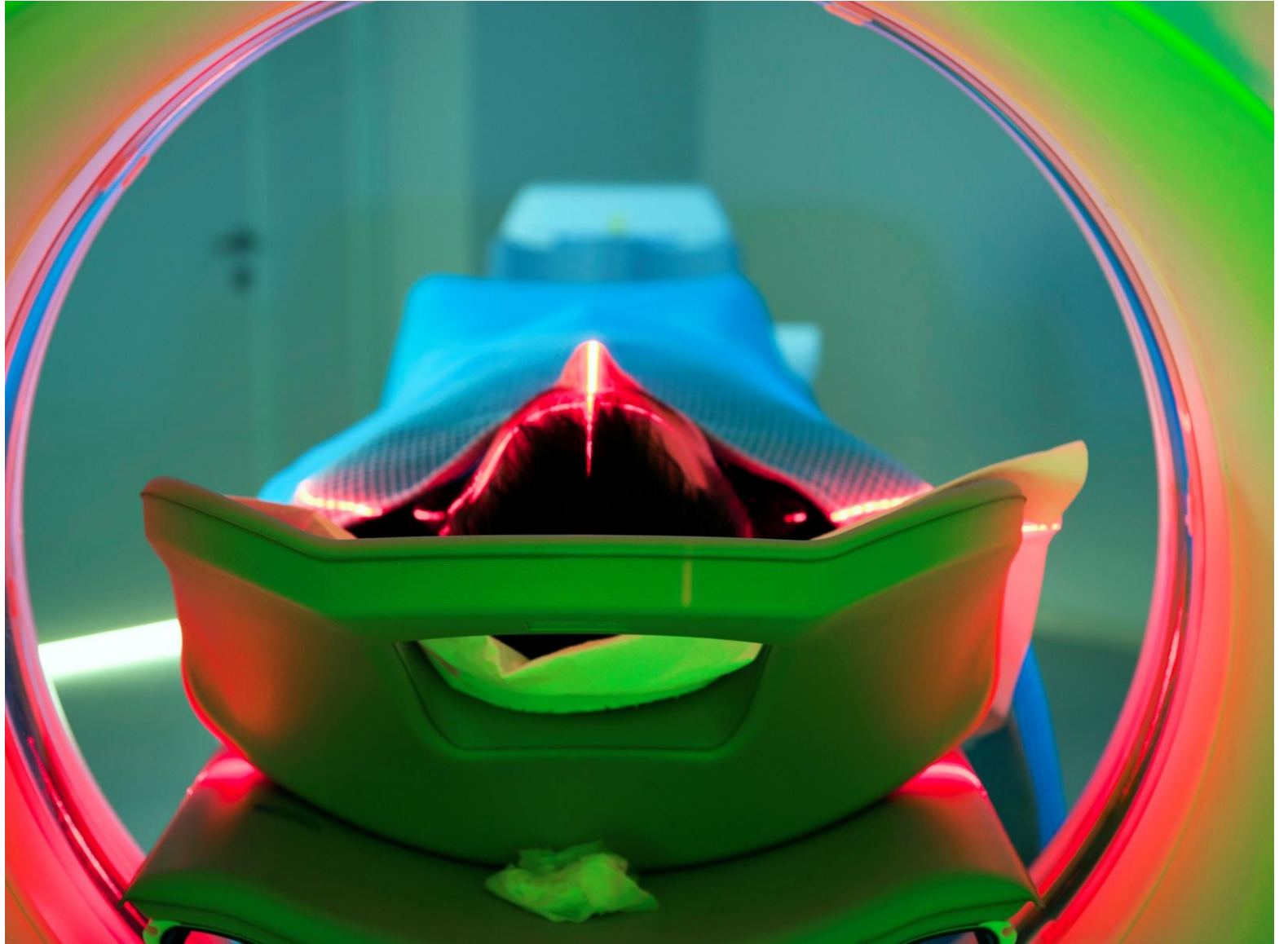
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Purpose of the report

Ipsos and the Strategy Unit have been conducting an evaluation of the Targeted Lung Health Check (TLHC) programme for NHS England (NHSE) since 2019. This report has been developed as part of the suite of final evaluation reporting outputs.

Previous progress reports have included aggregate analysis of participant data and have indicated differential programme uptake and CT scan conversion when looking at demographic sub-groups and different intervention models.

This report uses patient-level data, reported predominantly by Phase 1 projects, to map an aggregated summary of all patient pathways from invite to CT scan (including follow up scans). Sankey diagrams are used

to visually demonstrate this. The analysis enables the programme team to better understand patient flows through the pathway, points of drop-off and differences between different intervention models. Unlike the previous aggregate analysis, the Sankey diagrams provide an extra level of detail in visualising participant flows.

Logistic regression analyses¹ provide comparative likelihoods of an invitee attending an LHC, receiving a CT scan, receiving a lung cancer diagnosis and receiving an early-stage diagnosis.

The impact of the TLHC programme on early-stage lung cancer diagnosis is reviewed by comparison with lung cancer diagnoses picked up as part of routine care

This report also shows a “combined analysis” which allows us to look at the interaction between participant demographics and intervention model, focussing on the following key intersections:

- Deprivation by invite model (most deprived quintile compared with less deprived groups for opt-in/opt-out models)
- Age group by invite model (younger / older age groups compared for opt-in/opt-out models).

[1] For a review of the logistic regression technique please see: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3936971/>

01.

Introduction

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Methodology and limitations

Methodology

The patient level minimum dataset (MDS) was used in this analysis; this data is mainly available for the Phase 1 projects and any extensions of these projects in Phase 2.

This report follows the journey of those within the age criteria and an ever-smoker, known as the **eligible population**.

A status for each person was determined for milestones along the TLHC pathway, covering stages such as invites, LHC uptake (including mode of delivery and number of contact attempts), calculated risk assessment and the number of CT scans these participants underwent as well as cancer outcomes (see 'Lung cancer outcomes' section for details). Rules were applied to remove any double counting and manage data quality issues.

These details, along with participant demographic characteristics and details about

the project they were involved with, were aggregated up to produce summary counts of participants at key stages along the pathway.

An algorithm was written to calculate the flow of patients between steps for the whole programme, which allows for the selective use of filters to focus on a particular group, e.g. by organisation (e.g. project, Cancer Alliance), typology (e.g. delivery model), and demographic factors (e.g. deprivation decile, age group, etc.).

A web application was then developed to produce the Sankey diagrams (see subsequent slide for description).

The following analysis is based on TLHC activity data submitted up to March 2024 and NCRAS lung cancer activity to August 2023. The latter was the latest available data at the time of reporting.

Note, the totals presented in the Sankey analysis may not match the numbers reported based on the MDS in the main report because:

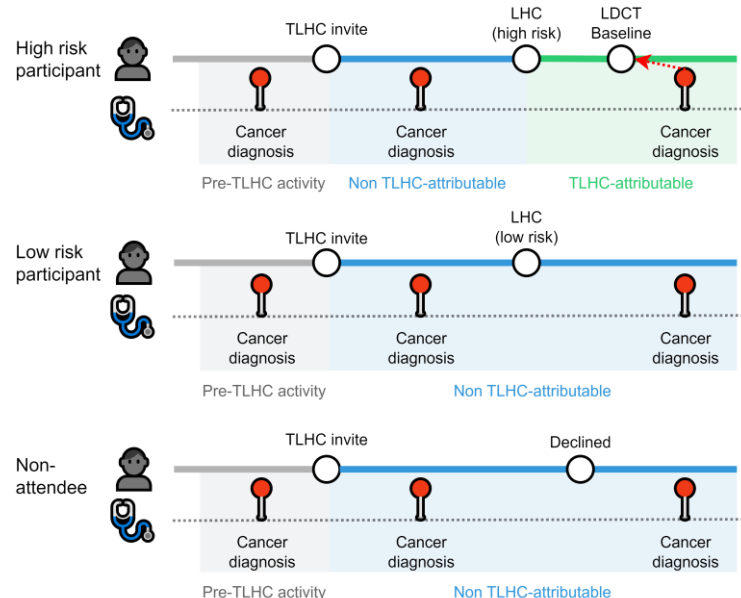
1. The Sankey analysis reports counts of people, whereas the MDS reports activity. So, someone with multiple LHC contacts is counted once in this Sankey analysis but may be counted multiple times in the MDS outputs,
2. Around 2% of participant records in this Sankey analysis were excluded following additional data quality checks to prevent double-counting and erroneous submissions,
3. Sequencing issues were identified and corrected, including just under 1,000 cases where CT scans for people were dated before they were invited to the programme.

Methodology and limitations

Methodology (continued)

Lung cancer outcomes

NCRAS lung cancer data was linked with TLHC activity on the pseudonymised NHS number, known as the ParticipantID, and any diagnoses made before the person was invited to the TLHC programme were excluded.



Each lung cancer diagnosis was associated with the nearest preceding TLHC event, one of either *invite* date, *LHC* date resulting in either a high or low risk assessment, or a *CT scan* date.

If the associated event was an *invite* or *LHC* resulting in a low risk assessment, then the diagnosis is considered to have been made by routine services without TLHC involvement.

These are termed **Non-TLHC** or **counterfactual** diagnoses in this report and include people who were not eligible for a CT scan because their risk score was too low and those who declined participation in the TLHC programme.

No time limit was put on these **non-TLHC** cancers; they may have been diagnosed soon after their invite / LHC (low risk) contact or diagnosed several years afterwards – they are assumed to have been made by routine services.

Diagnoses considered **TLHC-attributable** are those that:

- follow a *CT scan* or an *LHC* resulting in a high-risk assessment, and
- were diagnosed within 185 days of the above event – a threshold agreed upon to prevent spurious associations (see below).

These criteria increase the likelihood the diagnosis is a direct result of the TLHC programme intervention.

Those cancers associated with *CT scan* or an *LHC* resulting in a high-risk assessment but were diagnosed *following* the 185-day threshold are considered **Non-TLHC** cancers as these are assumed to have been made by routine services.

Methodology and limitations

Methodology (continued)

Setting the 185-day threshold

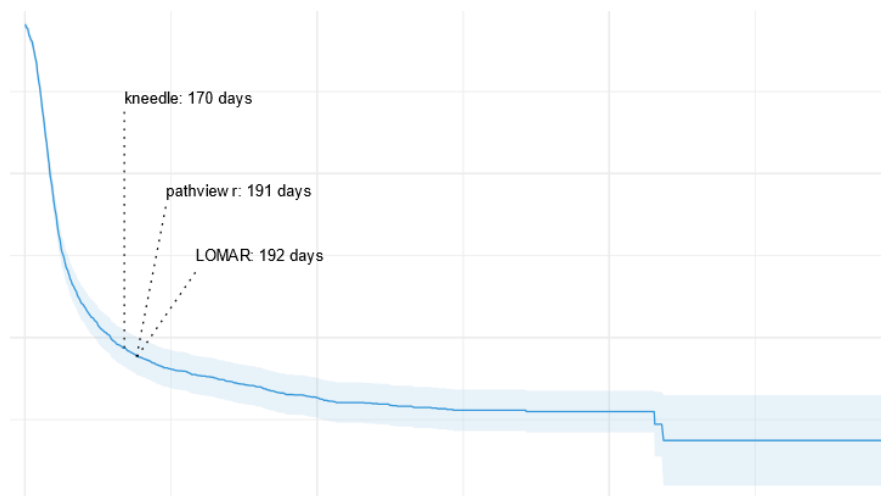
Some lung cancers are diagnosed soon after the TLHC event, indicating a close time relationship, whereas others are made over 1,000 days afterwards, reducing our confidence the two are linked.

To be assured the diagnosis resulted from the event a cut-off point was determined using Kaplan-Meier methods (see illustration).

The 'elbow' of the Kaplan-Meier curve represents the transition point between diagnoses made because of the TLHC contact and lung cancers that would have been picked up through routine practice.

Three R packages, each using different algorithms, were used to identify the elbow point, as shown in the diagram (right), the

average of which is 185 days. This was also sense-checked by clinicians.



Methodology and limitations

Limitations

An important limitation is the intervention model for each project, e.g. opt-in / opt-out, as used in this analysis reflects their delivery method as of January 2024 and makes no attempt to describe how this has changed over time. Each project's typology is based on information submitted by projects to the TLHC national programme team and shared with the evaluation team.

Projects have adapted their approach in response to external events, e.g. the COVID-19 lockdowns, or to the learning each project has made for what works for their populations, which means their approach as of January 2024 does not necessarily reflect their full history.

Another limitation is that some data quality issues remain, despite efforts to control and mitigate for this. The results are clearly visible in this report, such as participants who have

declined the invite going on to receive an LHC.

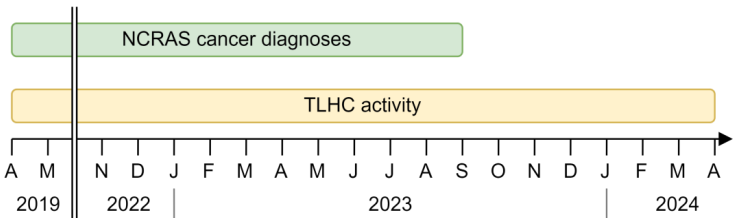
There are also data quality issues with some demographic data in the MDS (discussed in previous progress reports and flagged in relevant places through this report).

We compare the participant flows for each of these variations, highlighting key differences in conversion rates at each stage.

Throughout this report the use of the symbol, ⚠️, indicates there are concerns regarding data quality or a possible systematic reason for the observed findings, and should be treated with caution.

It should be noted that non-observable characteristics could be driving variation. The analysis is descriptive and designed to prompt questions, rather than be definitive.

Due to a lag in the NCRAS data available it is only possible to include cancer diagnoses up to the end of August 2023.

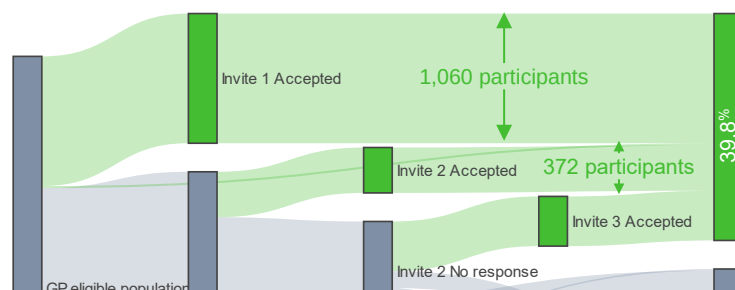


Some analyses in this report were constrained by data availability. Breakdowns for ethnicity were limited to binary groups ('white' vs 'other than white') due to low numbers. Breakdowns for invite model ('opt-in' vs 'opt-out' and 'opt-in & opt-out' vs 'combined') were to compare groups with equivalent numbers of people.

Interpreting Sankey diagrams

Sankey diagrams can be used to visualise flows through a system.

They show the flow / conversion rate after each step of the pathway (e.g. conversion from first invite to lung health check).



The width of the arrows is proportional to the flow / conversion rate.

They have been used for the patient level analysis to aggregate the flow of individual participants from their first TLHC invitation to their follow up CT scans.

The darker bands represent the number of

people at each stage in the process. The percentage of invited individuals at key points has been provided.

NB throughout this report, we use the term “individuals” to refer to people invited to take part in the programme. Once the individual actively participates in the programme i.e. by attending an LHC, we refer to them as “participants”.

How to read this report

Most of this report deals with the comparison of pairs of Sankey diagrams, each viewing the effect of a TLHC model design or individual demographic characteristic on the flow of people through key milestones in the programme.

Key findings are set out in slide headers, to help steer the reader.

Observations of particular interest are called out in blue call-out boxes on each slide, however not all points are highlighted in this way. These observations include differences between groups’ acceptance rate, LHC uptake, risk scores and CT scan rate.

We therefore encourage the reader to review and compare the detail of different Sankey diagrams to identify findings which may be of relevance to them.

Interpreting Odds Ratios

Statistical tests have been performed to inform how reliable the reported findings are.

Following each pair of Sankey plots is a slide showing the result of a *logistic regression* analysis on the association of the pair of features with four outcomes:

- LHC uptake,
- Receiving one or more scans,
- Receiving a TLHC-associated lung cancer diagnosis, and
- Receiving an early-stage TLHC-associated lung cancer diagnosis.

The Odds Ratio (OR) is a key measure from these tests, which indicates how much more likely the outcome is for each of the pair of features.

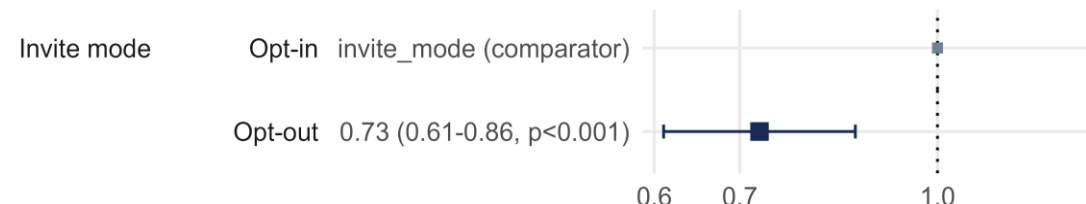
For example, let us assume that in a comparison opt-in versus opt-out models on attendance at LHC, the test shows the OR is 1.16 for *Opt-out* models.

This means a person in an opt-out model has **1.16 times the odds** of

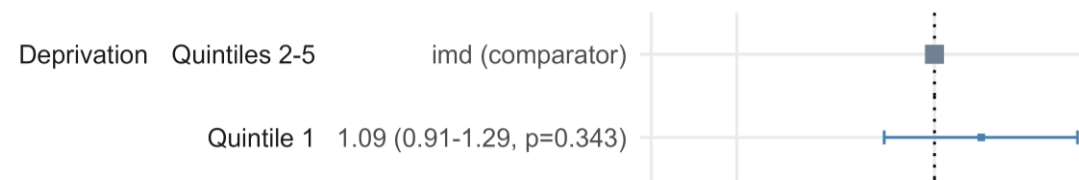
attending the LHC. Or in other words, the likelihood of the person attending LHC is **16% greater in an opt-out model** compared with opt-in models.

Accompanying each OR estimate is an odds-ratio plot comparing the features on the likelihood of the outcome along with a confidence interval (CI).

The plot indicates a statistically significant finding if the feature does not overlap the vertical dotted line, such as here:



Whereas this finding is not significant:



Definitions

TLHC-associated lung cancers

Diagnoses of lung cancer for participants made within 185 days of one of their TLHC contacts (either their Lung Health Check where they were assessed as high risk or a CT scan).

These diagnoses are considered attributable to the TLHC programme.

CT scan conversion rate

Throughout this document the CT scan conversion **realised** is reported. This is defined as the number of people who attended a baseline CT scan as a proportion of those who attended an LHC.

Logistic regression

A statistical analysis technique to predict the probability of one of two possible outcomes given some input data.

It has been used in this report to determine how likely someone who is eligible for the TLHC programme is to have each of the following four outcomes: attendance at Lung Health Check (LHC), undergo a CT scan (LDCT), receive a TLHC-associated lung cancer, which is early stage.

The inputs used to predict these outcomes are the pair of features examined in each Sankey plots, for example, the likelihood of a person attending LHC given that an *Opt-in* or an *Opt-out* invite model is used.

In the combined analyses we examine the

combined effect of a) invite model and deprivation, as well as b) invite model and age groups on these outcomes. These cases demonstrate how the invite model affects the outcomes after controlling for either deprivation or age (also known as ‘adjusting for’ deprivation or age).

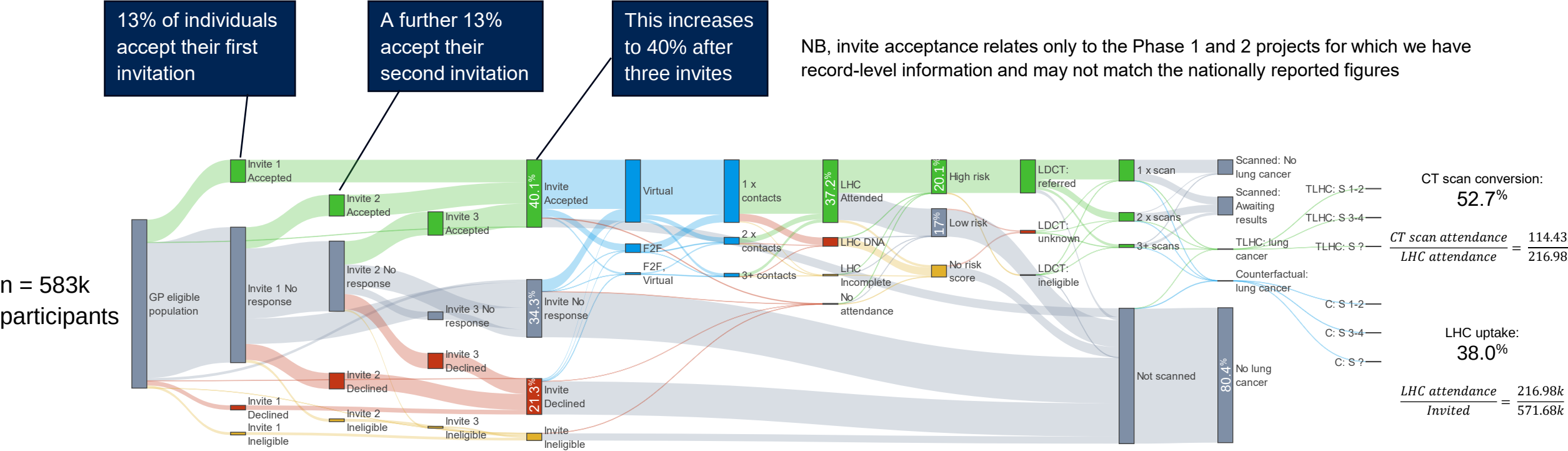
In the complex analyses at the end of this report we examine which factors remain significant predictors of the outcomes after adjusting for each other.

02.

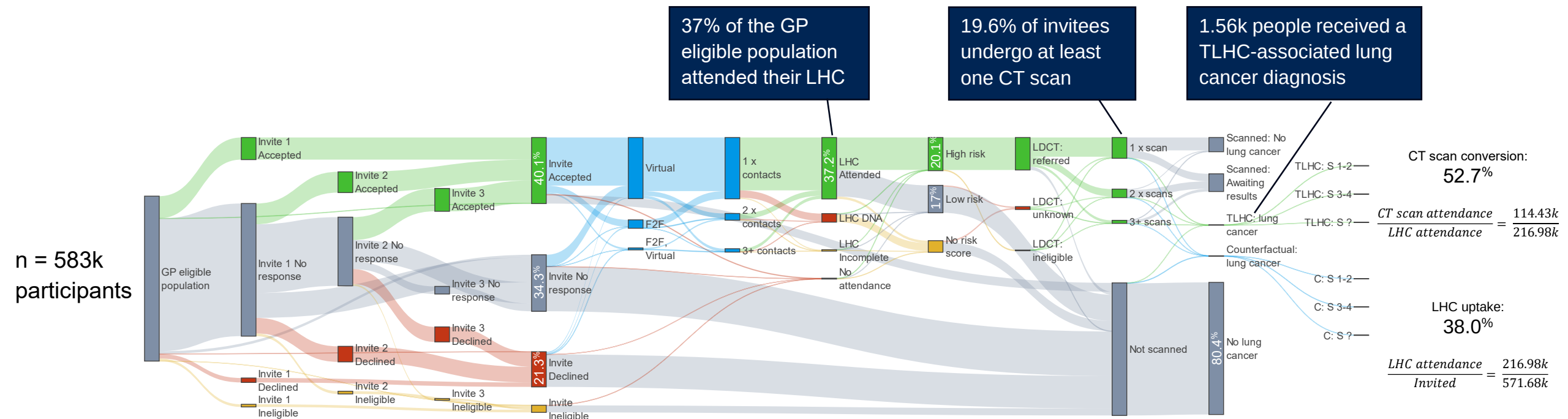
Overall pathway analysis

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40% of invitees ultimately accept their LHC invite. Each invitation results in 13% additional acceptances.



37% of invitees attend an LHC. Of those attending LHC, 52.7% are deemed high risk and go on to receive at least one CT scan



Most people with TLHC-associated lung cancers received their diagnosis following a baseline CT scan

Most TLHC-associated lung cancer diagnoses were made following an initial scan.

Over 1.5k people in the record-level data were diagnosed with lung cancer, 74% of which were associated with an initial scan.

Follow-up scans, undertaken to monitor suspicious findings from an earlier scan, are also commonly associated with lung cancer diagnosis:

- 192 (13%) diagnosed following a 3-month follow-up scan
- 75 (5%) diagnosed following a 12-month follow-up scan.

59 people were diagnosed following their Lung Health Check at which they were found to be at high risk of lung cancer.

Seven of these people went on to have a subsequent CT scan under the TLHC programme, however, all scans are dated after their lung cancer diagnosis.

One project with the most of these cases was contacted to double-check these findings; they confirmed none of these people had a LDCT under the TLHC programme, though all had some other form of diagnostic test, such as ‘CT thorax’, ‘Xray’ and ‘PET-CT’ which resulted in their lung cancer diagnosis.

Six of this cohort were recorded with exclusion reasons for why a LDCT was not proceeded with (four had a scan in the previous 12 months).

TLHC event	People diagnosed with TLHC-associated lung cancer
Initial scan	1,125
LHC Date high risk	59
3-month follow-up scan	192
12-month follow-up scan	75
24-month incidence scan	31
2-year+ nodule surveillance	<10
Other scan	88

This small cohort is reported as part of the TLHC-attributable lung cancer diagnoses with the assumption their diagnosis was made using diagnostic methods other than low dose CT scans.



Lung cancer conversion rates are highest for 3-month and 12-month follow-up scans

The overall lung cancer conversion rate following CT scan for this patient-level pathway analysis is 1.5%. NB, this is slightly different from the 1.7% rate found when taking all cancers detected by projects in phases 1 and 2 together, as reported in the main report.

The cancer conversion following the initial scan is 1.1%. Similar detection rates are found for the 3-month (1.4%) and 12-month (1.4%) follow-up scans.

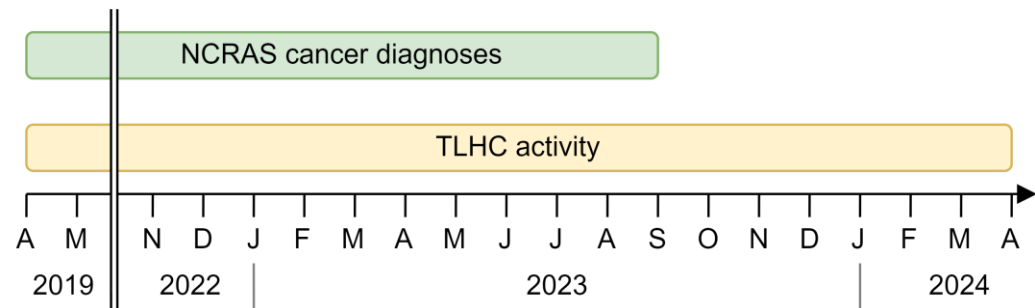
The 24-month scan has a rate of 0.4%, lower as this scan is offered to all people who had an initial scan and represents the incidence of new cancers since then.

By comparison, the cancer conversion rate for LHCs resulting in a high-risk score is 0.1% (59 people out of 102.8 k who received a Lung Health Check).

NB, other scans include those completed outside the standard protocol.

TLHC event	People diagnosed with TLHC-associated lung cancer	People scanned	Conversion rate
Initial scan	1,125	101.4 k	1.1%
3-month	192	13.6 k	1.4%
12-month	75	5.4 k	1.4%
24-month	31	7.39 k	0.4%
2-year+	<10	0.4 k	1.1%
Other scan	88	3.0 k	2.9%

Cancer conversion rates for each type of CT scan conducted up to the end of August 2023. This date was chosen to align with the latest data available from the NCRAS cancer data.



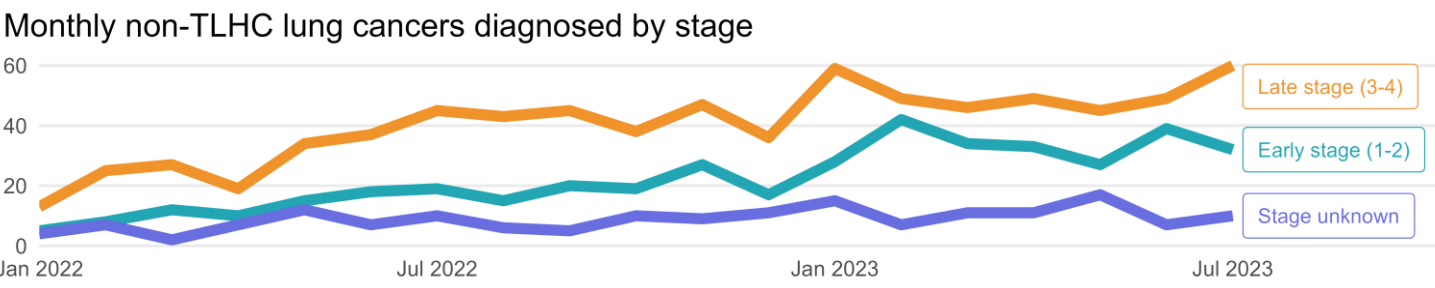
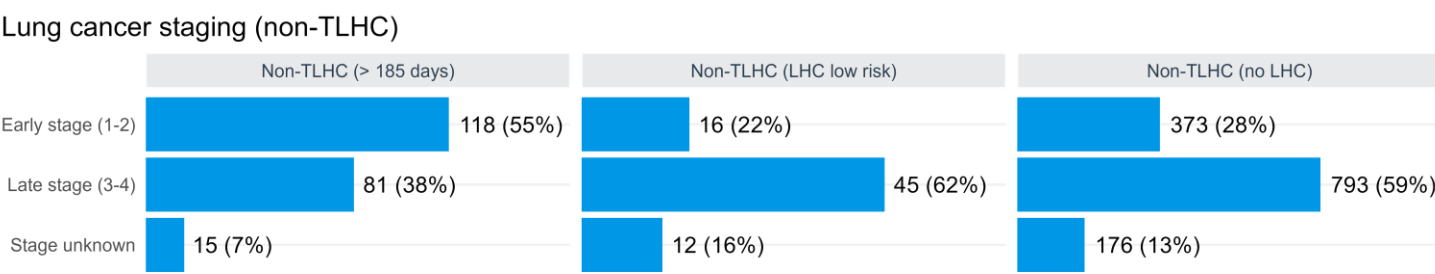
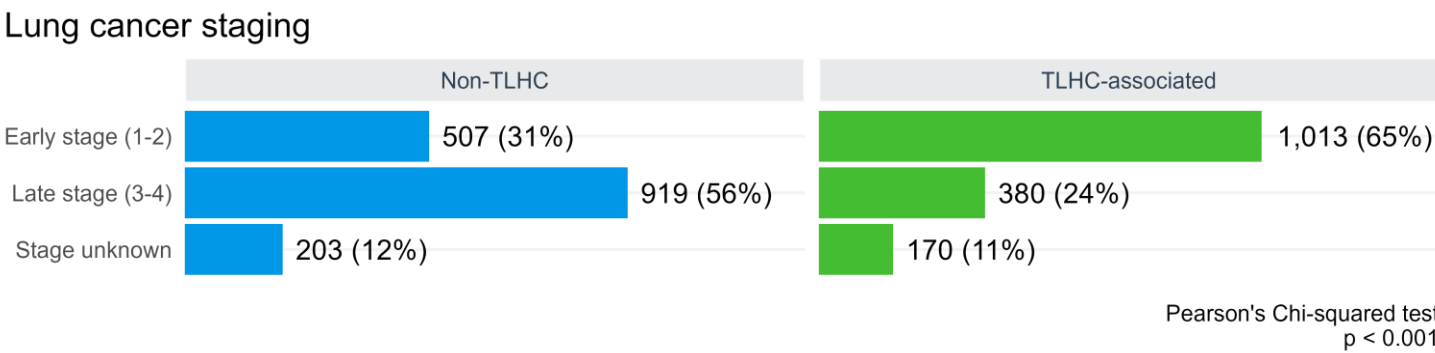
People with TLHC-associated lung cancers are more likely to be diagnosed at stage 1 or 2 when compared with people whose lung cancers were detected using routine services

People with TLHC-associated lung cancers are **more likely to be diagnosed at stage 1 or 2** when compared with people whose lung cancers were detected using routine services (labelled ‘Counterfactual: lung cancer’ on the Sankey chart).

Nearly two-thirds of lung cancers diagnosed by the TLHC programme are early stage, compared with around a third of cancers detected elsewhere. The differences in these distributions are statistically significant.

Non-TLHC cancers diagnosed following LHC resulting in *low risk* assessment and in people who *did not have a LHC* share show higher rates of cancers in stages 3 or 4, in contrast with cancers diagnosed more than 185 days following a TLHC contact, which has more cancers detected at stages 1 and 2.

The number of non-TLHC lung cancers diagnosed each month increased between Jan 2022 and July 2023.



03.

Implementation model analysis

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Implementation models used in this analysis

This section presents the analysis of patient numbers at each stage of the pathway, shown for each of the following main intervention model variations:

Invite model

Opt-in - where individuals are invited to participate, e.g. a letter offering the service and asking the individual to respond,

Opt-out – where individuals are assumed to take part unless they state otherwise, e.g. a pre-booked appointment or an unscheduled telephone call.

Combined – sending opt-out invitations to individuals recorded as ever-smokers along with a generic opt-in invitation to all other individuals in the age range.

Opt-in & Opt-out – a combined view of both groups (used as a comparator for ‘Combined’ model).

Triage before risk assessment

Yes – where the individual is assessed for eligibility (age and smoking status) prior to the LHC,

No – where the GP practice details are assumed to be correct, and the individual is eligible.

LHC delivery mode

Face to face (F2F) – an in-person appointment between the individual and the person completing the LHC,

Virtual – most often via telephone but could include video conferencing appointments.

Hybrid – using a combination of F2F and Virtual approaches.

Administration

This relates to processes for inviting individuals to participate, booking appointments and conducting LHC appointments:

In-house – all conducted by the responsible provider,

Outsourced – all conducted by contractor.

Summary of key findings from implementation model analysis

Opt-in / Opt-out

Both models identified around the same proportion of individuals to be high risk with most of these going on to receive at least one LDCT scan. *Opt-in* models demonstrate 6 percentage point (%pt) higher scan conversion indicating their LHC attendees are at greater risk.

There were some differences found in the early part of the pathway, with individuals slightly more likely to accept (4%pt) and attend LHC (3%pt) for opt-out models.

Opt-in models resulted in proportionally more invitees going on to receive a TLHC-associated lung cancer diagnosis.

Of all lung cancers detected, both models resulted in around two-thirds being detected at an early stage.

Combined / Opt-in & Opt-out

Combined models resulted in 2%pt fewer invited individuals undergoing a scan than the other two models combined.

This is likely a result of the smaller proportion of people who attended an LHC (12%pt fewer) for *combined* models, a finding reinforced by the 10%pt higher CT conversion rate.

The *combined* model means that many people are invited to participate when they are not all eligible; the aim is to ensure all those in the population who could benefit from the TLHC programme can participate. However, this approach results in a 23%pt higher declined rate.

This greater pool of ineligible invitees has a negative impact on conversion rates to LHC and LDCT and means this model fares less well compared with opt-in & opt-out models combined.

Of all lung cancers detected under the *Combined* model 62% were detected at an early stage.

Triage / no Triage

Around 2%pt more individuals in a Triage model go on to an LDCT.

Whilst fewer individuals accept invitations for an LHC under a *Triage* model (5%pt fewer), the conversion from invite to completed LHC is 2%pt higher, meaning more eligible people can be properly assessed.

The likelihood of an invitee attending LHC, undergoing an LDCT and receiving a TLHC-associated lung cancer diagnosis are higher for *Triage* models.

72% of all lung cancers detected under a *Triage* model are early stage, 3%pt more than models without *Triage*.

Summary of key findings from implementation model analysis

F2F / Virtual

⚠ Comparisons between these groups should be treated with caution as the *F2F* consists of just one project. It should be noted that – whilst many projects offer some form of *F2F* offer (e.g. for participants with a disability) – only one project has a fully *F2F* service model.

Accepted invitations are 10%pt higher for *F2F* model than Virtual, and the conversion from invite to completed LHC is higher still (11%pt more).

Around 3%pt more participants go on to at least one LDCT for *F2F* LHC models.

An invitee to a *F2F* models has a greater likelihood of attending LHC, undergoing an LDCT and receiving a TLHC-associated lung cancer diagnosis, however, they have a lower likelihood of their diagnosis being early stage.

Administration

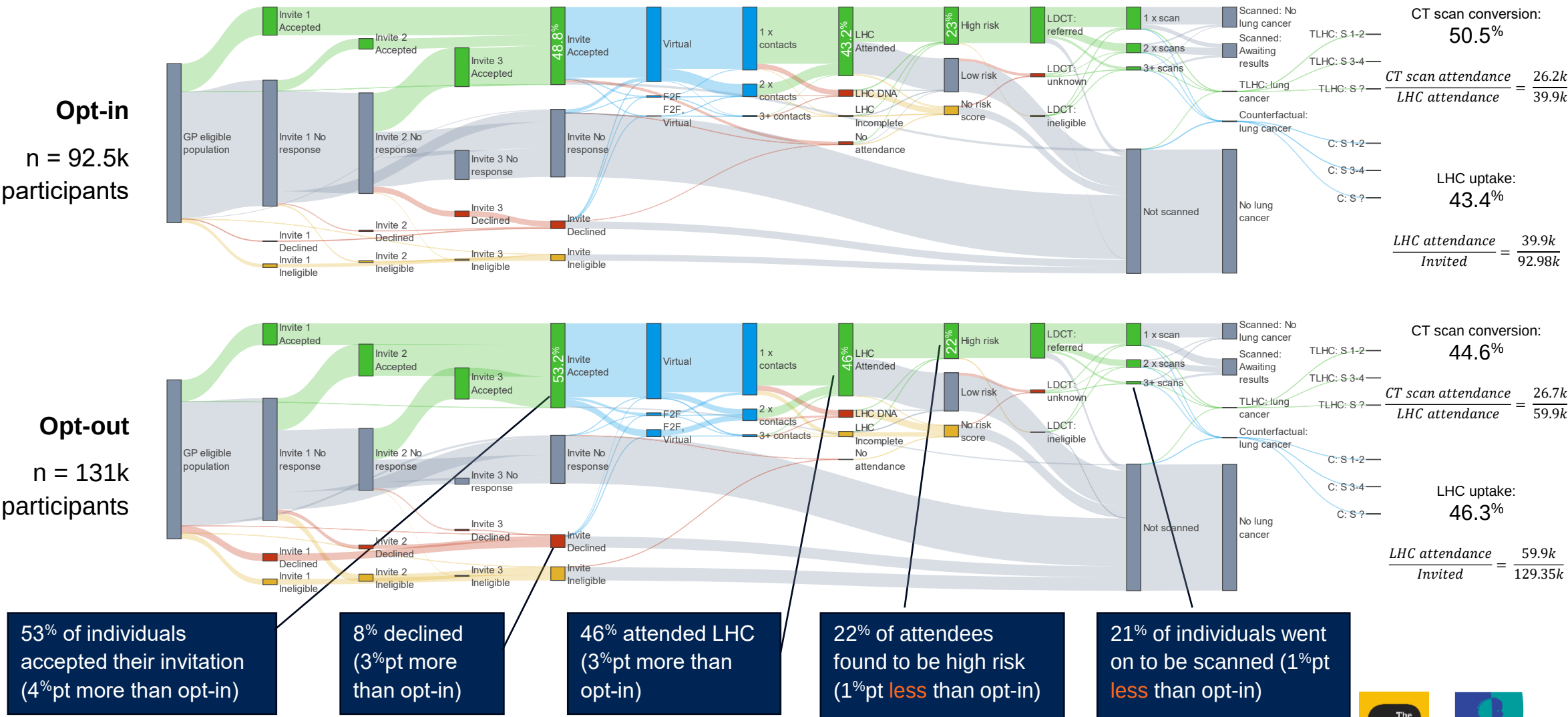
Around 21% of individuals in an *Outsourced* model go on to an LDCT (3%pt more than models delivered *In-house*).

Outsourced models also recruit 14%pt more individuals to attend an LHC appointment. It is likely the high declined rate for LHC for *In-house* models is the driver behind these differences.

On the other hand, *In-house* models have a 12%pt higher CT conversion rate indicating their LHC attendees are more likely to be at risk of lung cancer.

70% of TLHC-associated lung cancer diagnoses are early stage, 15%pt more than in *Outsourced* models.

Opt-out models are associated with 3%pt higher LHC attendance but appear to have 1%pt fewer invitee attendance at CT scan. Of those attending LHC 6%pt more go on to receive a CT scan under an Opt-in model.



Opt-out models result in more invitees attending an LHC but are associated with decreased likelihood of invitees going on to receive an LDCT scan and subsequently be diagnosed with TLHC-associated lung cancer or TLHC-associated lung cancer which is early stage.

Attendance at LHC

The odds of an invitee attending an LHC are increased by **11% (OR 1.11)** by using an **opt-out model** compared with opt-in models. This increase is statistically significant.

LDCT

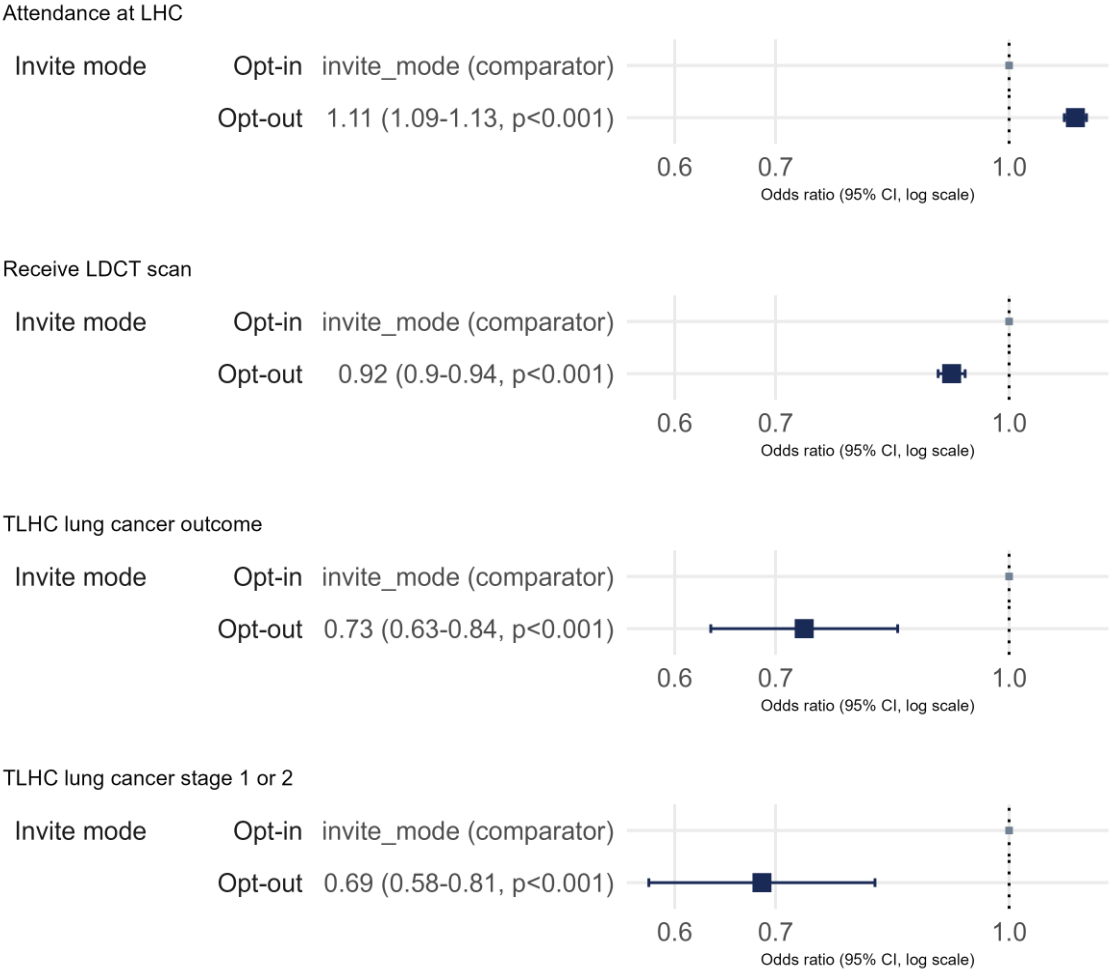
The odds of an invitee receiving an LDCT scan are **decreased** by **8% (OR 0.92)** by using an **opt-out model** compared with opt-in models. This decrease is statistically significant.

Lung cancer diagnosis

The odds of an invitee receiving a *TLHC-associated* lung cancer diagnosis are **decreased** by **27% (OR 0.73)** by using an **opt-out model** compared with opt-in models. This decrease is statistically significant.

Early-stage lung cancer diagnosis

The odds of an invitee receiving a TLHC-associated lung cancer diagnosis at stage 1 or 2 are **decreased** by **41% (OR 0.69)** by using an **opt-out model** compared with opt-in models. This decrease is statistically significant.



OR = Odds Ratio



Opt-in and opt-out models result in a greater proportion of lung cancers diagnosed at an early stage compared to routine services

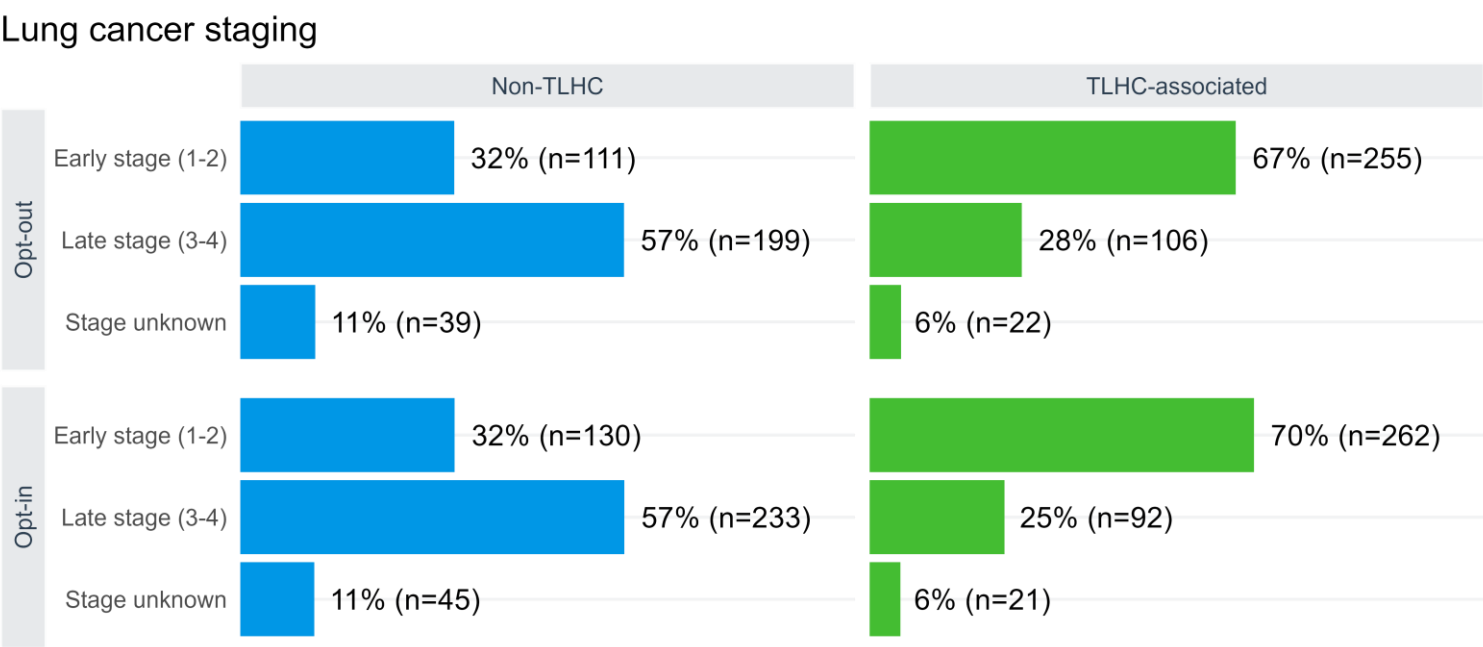
People with TLHC-associated lung cancers are **more likely to be diagnosed at stage 1 or 2** when compared with people whose lung cancers were detected using routine services (labelled 'Counterfactual: lung cancer' on the Sankey chart), regardless of opt-in / opt-out model.

Over two-thirds of lung cancers diagnosed by the TLHC programme (**70%** for *Opt-in*; **67%** for *Opt-out*) are early stage, compared with a third of cancers detected elsewhere (**32%**).

Additionally, TLHC-associated lung cancers are less likely to be unstaged (**6%** for *Opt-in* and *Opt-out*) compared with those detected elsewhere (**11%** for *Opt-in* and *Opt-out*).

The differences in these distributions are statistically significant.

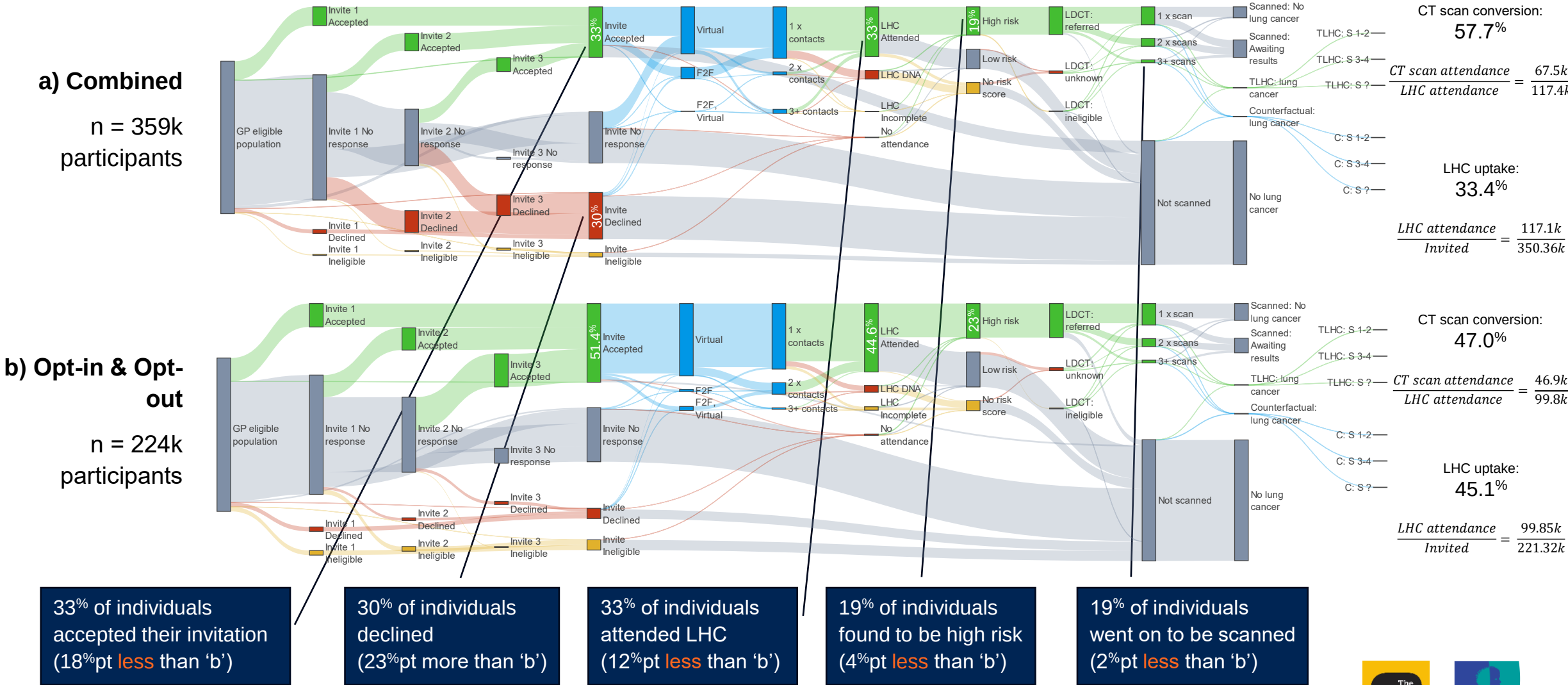
NB, it is likely that these breakdowns will always show that TLHC-associated lung cancers are different to the non-TLHC associated group due to large differences at the population level.



Pearson's Chi-squared test
Opt-in: p < 0.001
Opt-out: p < 0.001



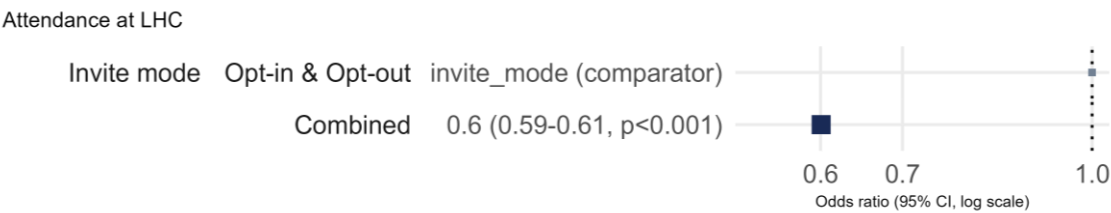
Combined invite models are associated with 2%pt fewer CT scans due to 12%pt lower attendance at LHC. Of those attending LHC 10.7%pt more go on to receive a CT scan under Opt-in & Opt-out models.



Invitees to *Combined* models have reduced likelihoods of a) attending LHC, b) receiving a CT scan, c) receiving a TLHC-associated lung cancer diagnosis and d) receiving an early-stage TLHC lung cancer diagnosis when compared with *Opt-in & Opt-out* models

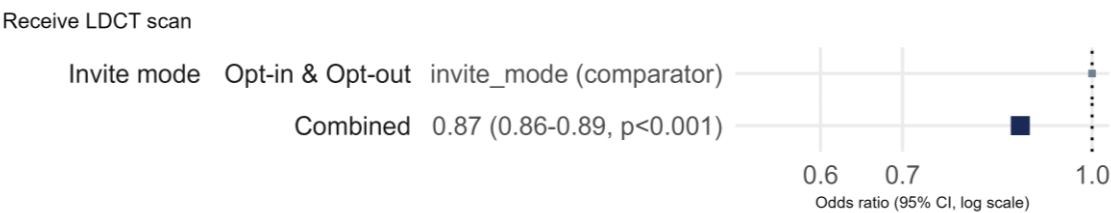
Attendance at LHC

The odds of an invitee attending LHC are **decreased** by **40% (OR 0.6)** using a **combined model** compared with opt-in & opt-out models. This decrease is statistically significant.



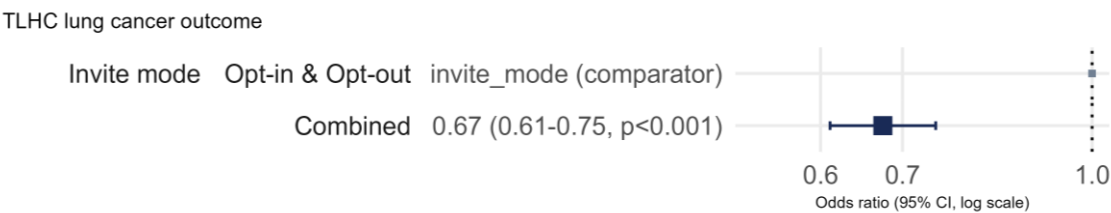
LDCT

The odds of an invitee receiving an LDCT scan are **decreased** by **13% (OR 0.87)** using a **combined model** compared with opt-in & opt-out models. This decrease is statistically significant.



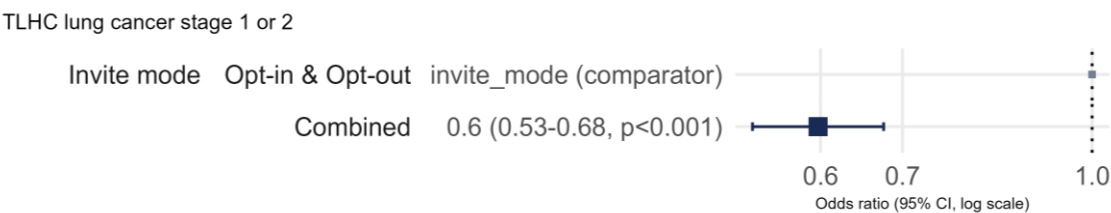
Lung cancer diagnosis

The odds of an invitee receiving a *TLHC-associated* lung cancer diagnosis are **decreased** by **33% (OR 0.67)** using a **combined model** compared with opt-in models. This decrease is statistically significant.



Early-stage lung cancer diagnosis

The odds of an invitee receiving a TLHC-associated lung cancer diagnosis at stage 1 or 2 are **decreased** by **40% (OR 0.6)** using a **combined model** compared with opt-in & opt-out models. This decrease is statistically significant.



OR = Odds Ratio



Combined models and Opt-in & Opt-out models result in a greater proportion of lung cancers diagnosed at an early stage compared to routine services

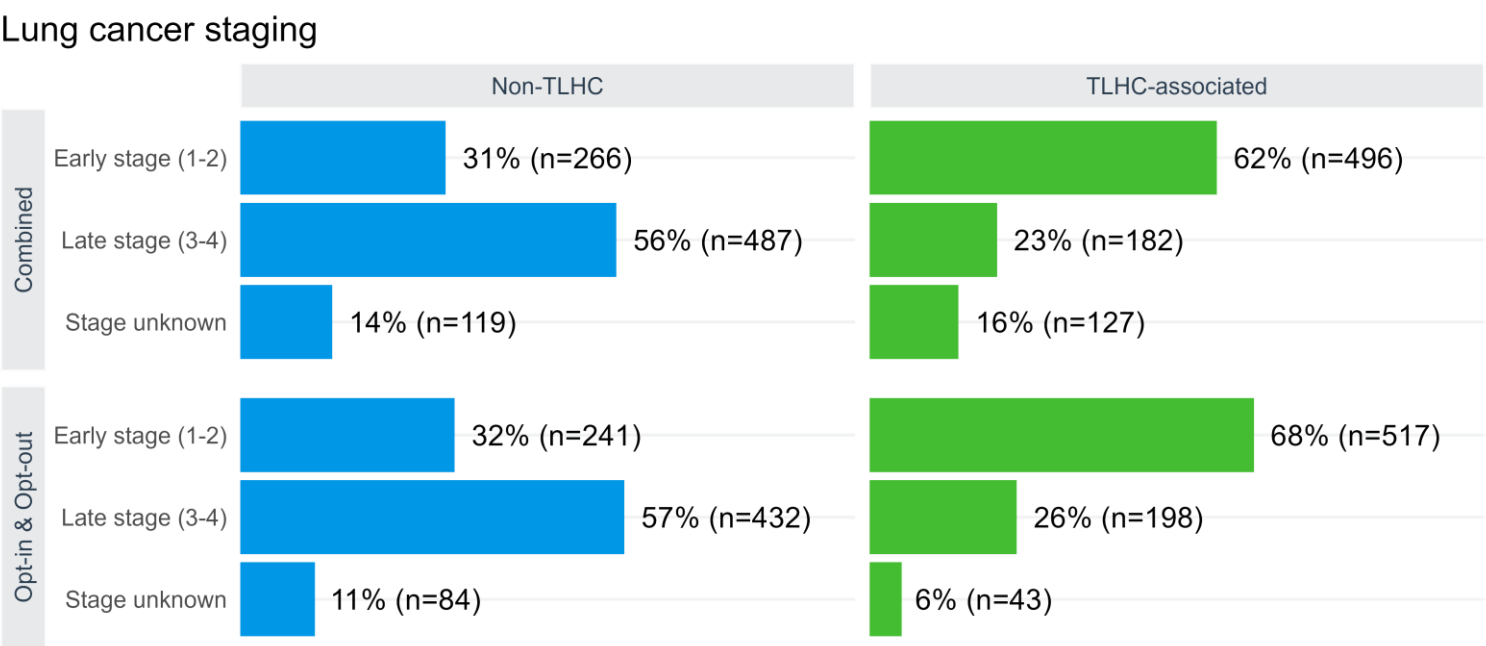
People with TLHC-associated lung cancers are **more likely to be diagnosed at stage 1 or 2** when compared with people whose lung cancers were detected using routine services, (labelled ‘Counterfactual: lung cancer’ on the Sankey chart).

Over two-thirds of lung cancers diagnosed by the TLHC programme (**68%** for *Opt-in & Opt-out*; **62%** for *Combined*) are early stage, compared with under a third of cancers detected elsewhere (**32%** and **31%**).

TLHC-associated lung cancers are less likely to be unstaged for *Opt-in & Opt-out* models (**6%**) compared with those detected elsewhere (**11%**). However, *Combined* models show around the same rate of unstaged cancers (**16%** TLHC-associated; **14%** Non-TLHC).

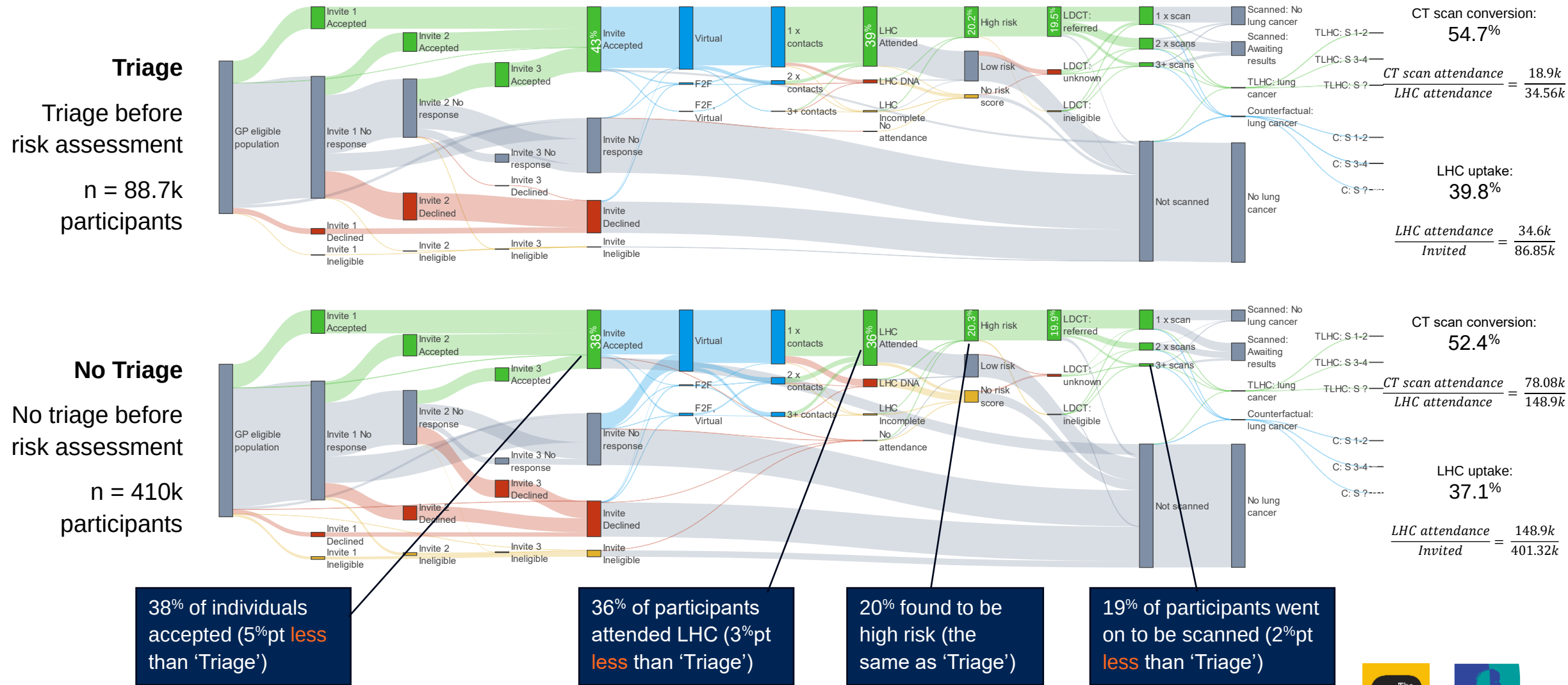
The differences in these distributions are statistically significant.

NB, it is likely that these breakdowns will always show that TLHC-associated lung cancers are different to the non-TLHC associated group due to large differences at the population level.



Pearson's Chi-squared test
Opt-in & Opt-out: $p < 0.001$
Combined: $p < 0.001$

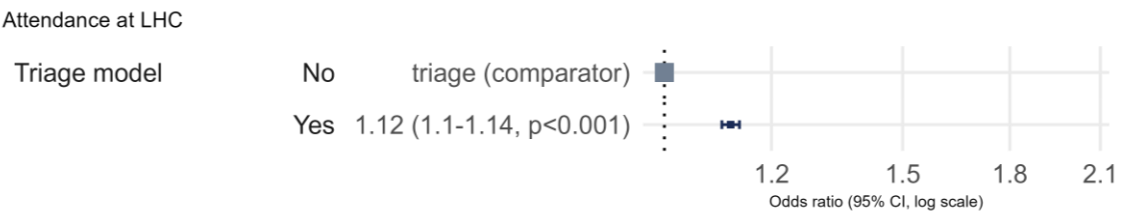
Triage models are associated with 3%pt higher LHC attendance, and 2%pt more invitees receiving a CT scan. Of those attending LHC 2.3%pt more go on to receive a CT scan with Triage models.



Invitees to *Triage* models have higher likelihoods of a) attending LHC, b) receiving a CT scan, c) receiving a TLHC-associated lung cancer diagnosis and d) receiving an early-stage TLHC lung cancer diagnosis when compared with models that do not triage.

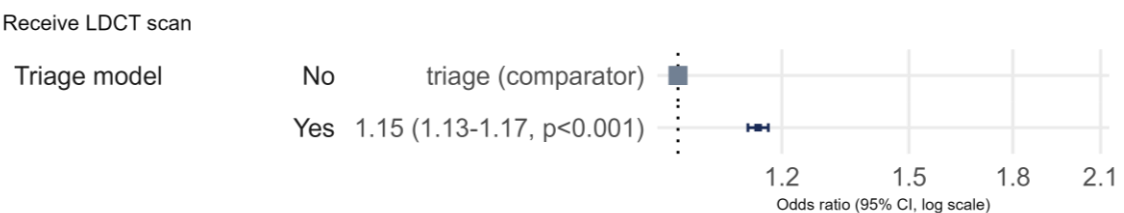
Attendance at LHC

The odds of an invitee attending LHC are increased by **12% (OR 1.12)** using a triage model compared with projects that do not. This increase is statistically significant.



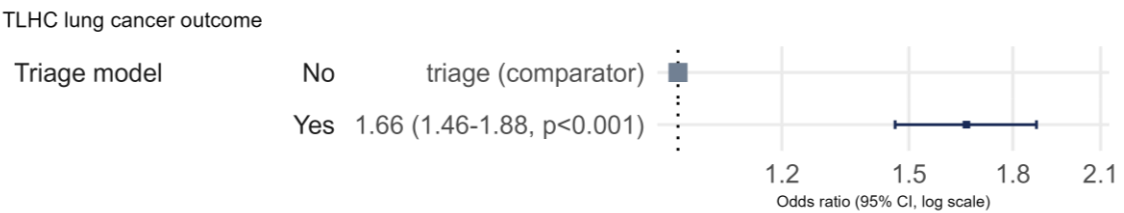
LDCT

The odds of an invitee receiving an LDCT scan are increased by **15% (OR 1.15)** using a triage model compared with projects that do not. This increase is statistically significant.



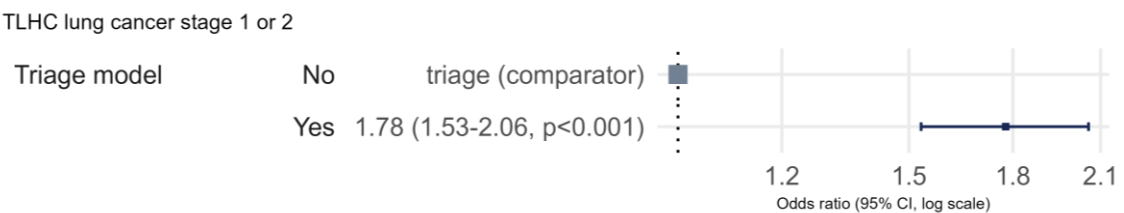
Lung cancer diagnosis

The odds of an invitee receiving a *TLHC-associated* lung cancer diagnosis are increased by **66% (OR 1.66)** using a triage model compared with projects that do not. This increase is statistically significant.



Early-stage lung cancer diagnosis

The odds of an invitee receiving a TLHC-associated lung cancer diagnosis at stage 1 or 2 are increased by **78% (OR 1.78)** using a triage model compared with projects that do not. This increase is statistically significant.



OR = Odds Ratio



Triage and Non-Triage models result in a greater proportion of lung cancers diagnosed at an early stage compared to routine services

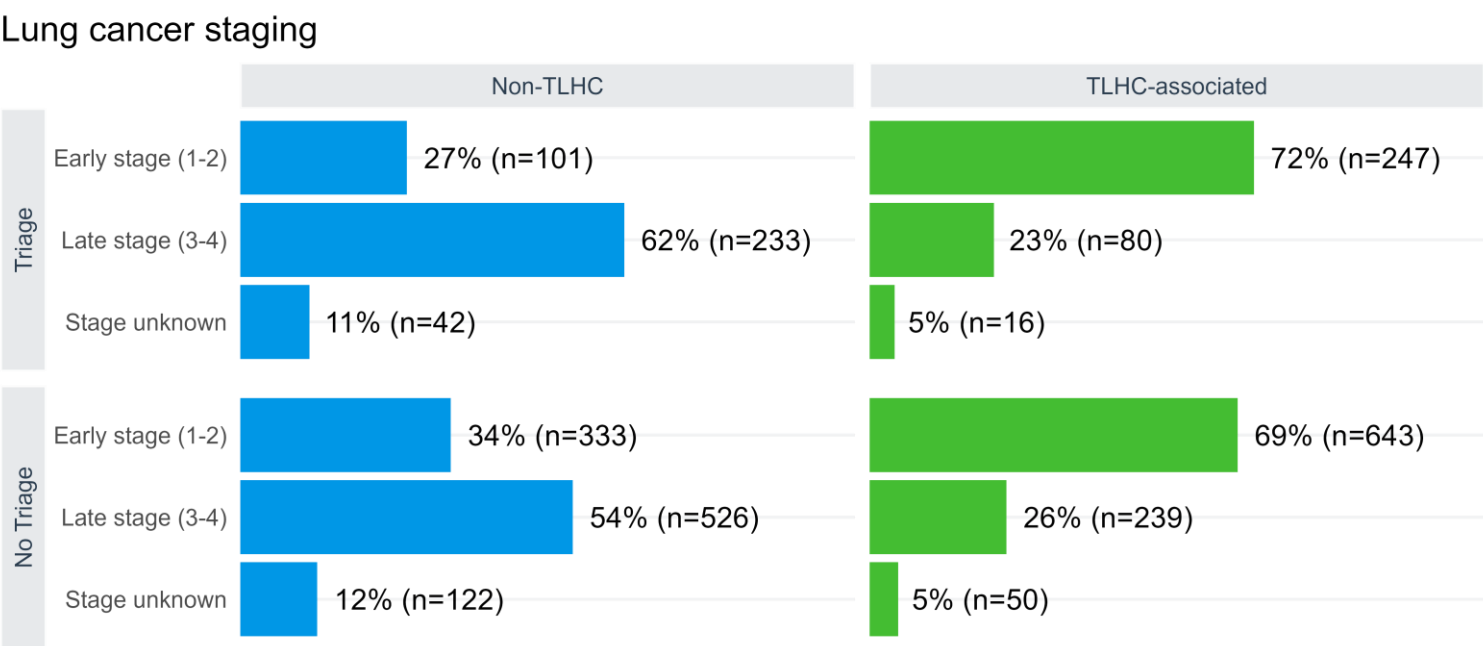
People with TLHC-associated lung cancers are **more likely to be diagnosed at stage 1 or 2** when compared with people whose lung cancers were detected using routine services, (labelled ‘Counterfactual: lung cancer’ on the Sankey chart).

Over two-thirds of lung cancers diagnosed by the TLHC programme (**72% for Triage**; **69% for No Triage**) are early stage, compared with around a third of cancers detected elsewhere (**34%** and **27%**).

TLHC-associated lung cancers are less likely to be unstaged regardless of Triage model (**5%**) compared with those detected elsewhere (**12%** and **11%**).

The differences in these distributions are statistically significant.

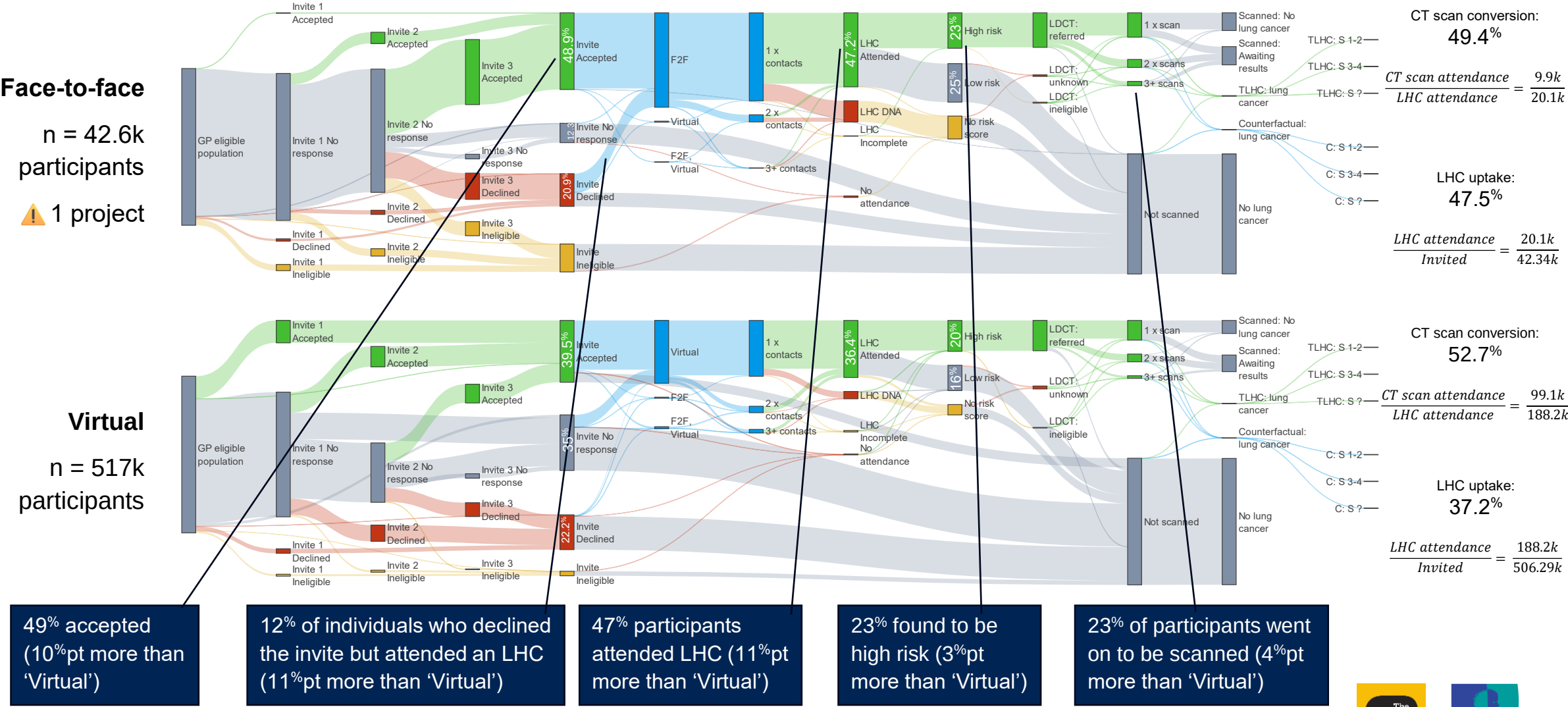
NB, it is likely that these breakdowns will always show that TLHC-associated lung cancers are different to the non-TLHC associated group due to large differences at the population level.



Pearson's Chi-squared test
No Triage: p < 0.001
Triage: p < 0.001



F2F models suggest 11%pt higher LHC attendance and 3%pt higher risk participants (23%), though data quality limitations due to few F2F models. Of those attending LHC 3.3%pt fewer go on to receive a CT scan with F2F models. ⚠️



F2F models result in greater likelihood of invitees attending LHC and receiving CT scan and cancer diagnosis, but less likely to be diagnosed with an early stage. Though data quality limitations due to few F2F models ⚠️

Attendance at LHC

The odds of an invitee attending an LHC are increased by **56% (OR 1.56)** using a **Face-to-Face method** compared with projects that provide LHCs virtually. This increase is statistically significant.

LDCT

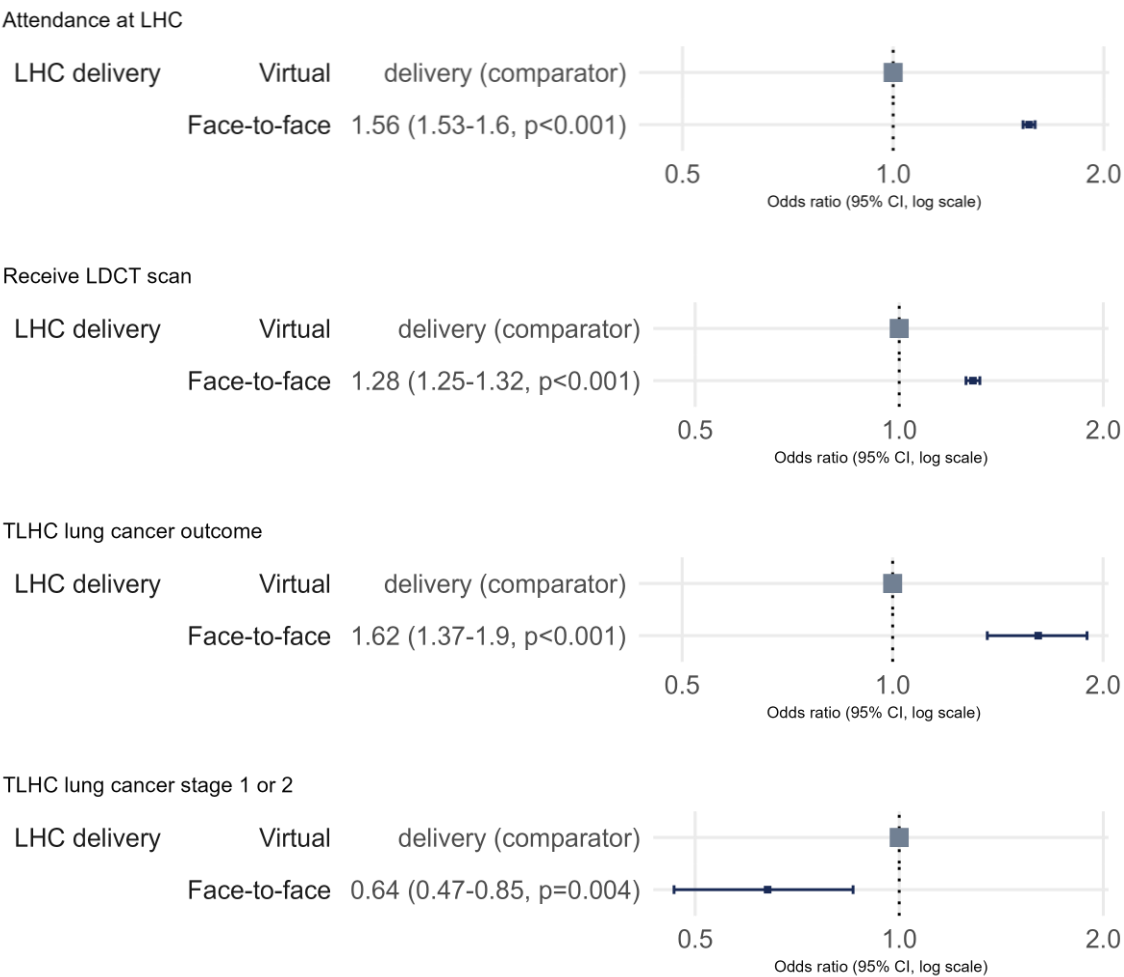
The odds of an invitee receiving an LDCT scan are increased by **28% (OR 1.28)** using a **Face-to-Face method** compared with projects that provide LHC virtually. This increase is statistically significant.

Lung Cancer Diagnosis

The odds of an invitee receiving a *TLHC-associated* lung cancer diagnosis are increased by **62% (OR 1.62)** using a **Face-to-Face LHC model** compared with projects provide virtual LHCs. This increase is statistically significant.

Early-stage lung cancer diagnosis

The odds of an invitee receiving a TLHC-associated lung cancer diagnosis at stage 1 or 2 are **decreased** by **36% (OR 0.64)** using a **Face-to-Face delivery model** compared with projects that deliver LHCs virtually. This decrease is statistically significant.



Virtual LHC models result in a greater proportion of lung cancers diagnosed at an early stage compared to routine service, but F2F models result in a high proportion of lung cancers with unknown stage, though data quality limitations due to few F2F models ⚠️

People with TLHC-associated lung cancers diagnosed via Virtual LHC delivery are **more likely to be diagnosed at stage 1 or 2** when compared with people whose lung cancers were detected using routine services*, but services offering Face-to-Face LHCs are more likely to result in unstaged lung cancers ⚠️ (F2F attendances are mostly from one project so may be influenced by local issues).

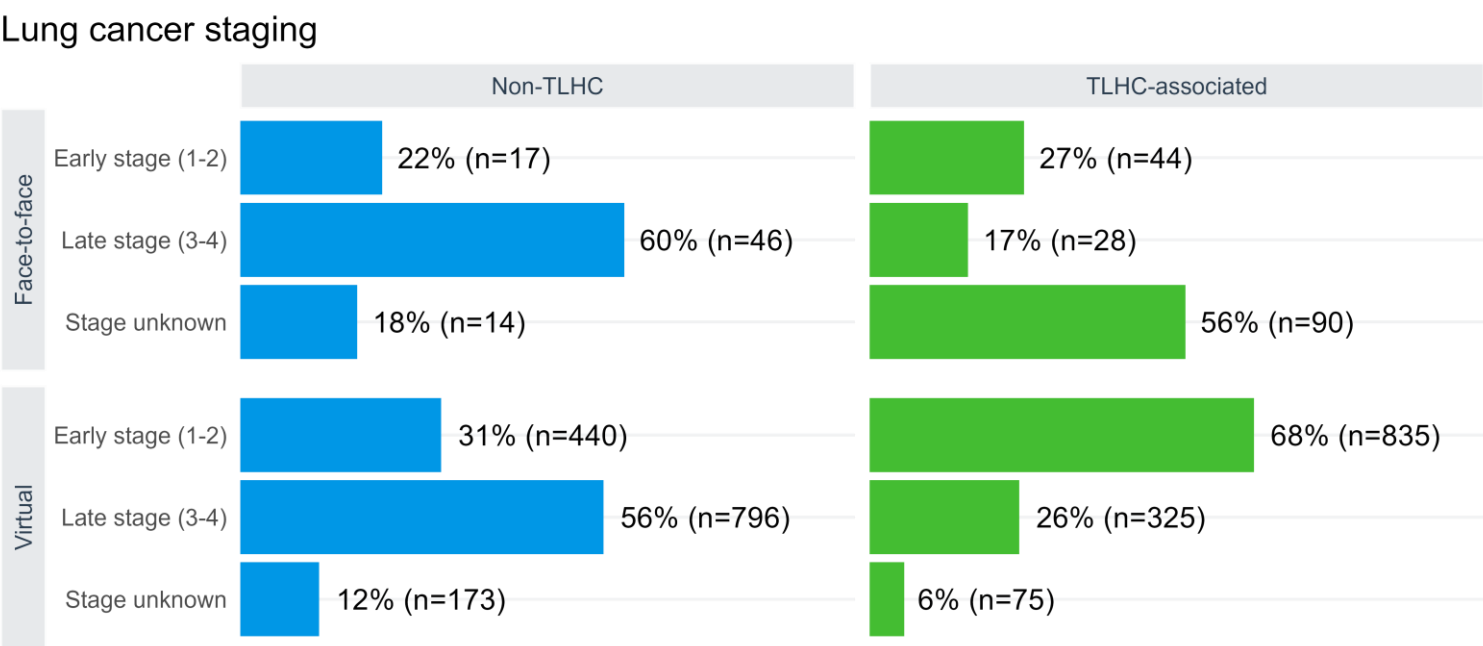
Over two-thirds of lung cancers diagnosed by the TLHC programme using *Virtual* LHCs (68%) are early stage, compared with around a third of cancers detected elsewhere (31%).

Where a F2F LHC model is used, however, there is a similar rate of early-stage diagnosis (27% TLHC, vs 22% routine), with a greater rate of unstaged lung cancer diagnoses (56% TLHC vs 18% routine).

The differences in these distributions are statistically significant.

NB, it is likely that these breakdowns will always show that TLHC-associated lung cancers are different to the non-TLHC associated group due to large differences at the population level.

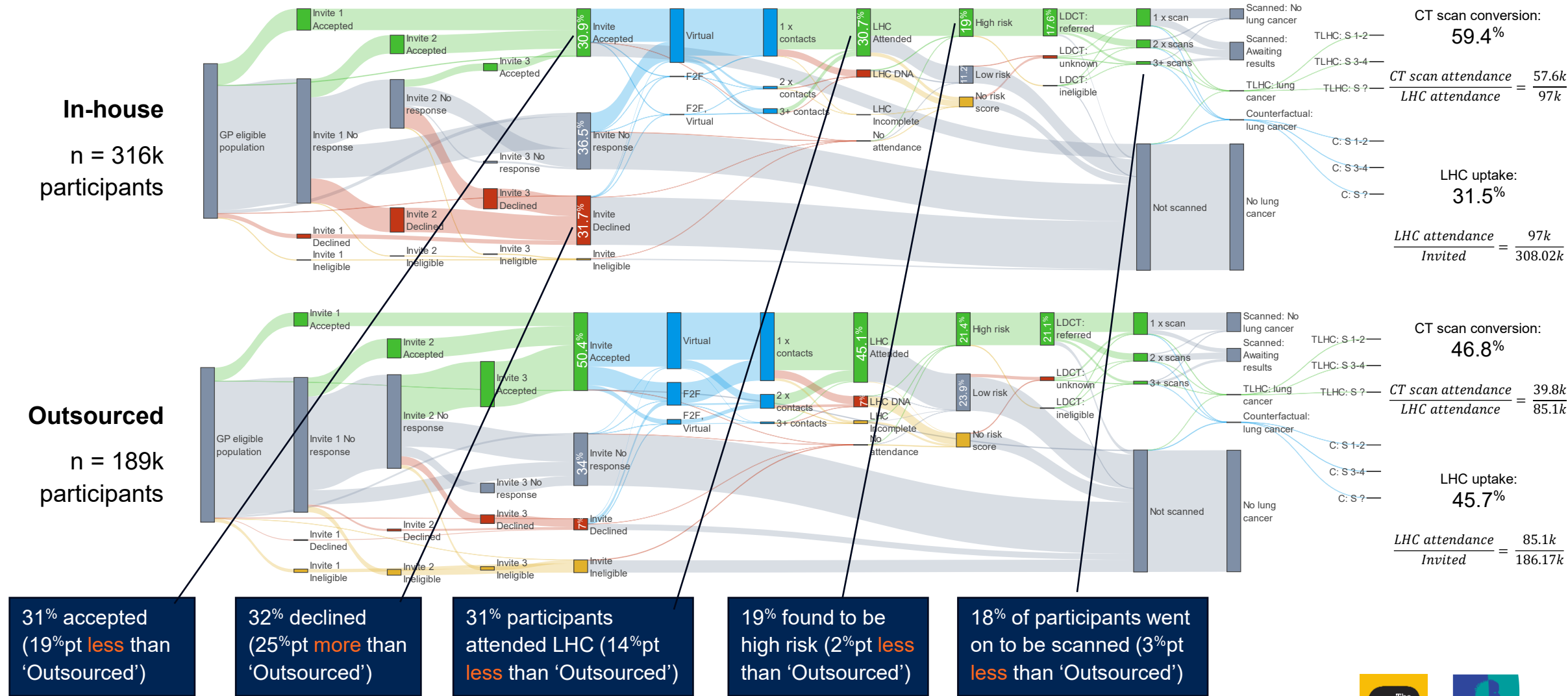
* labelled 'Counterfactual: lung cancer' on the Sankey chart



Pearson's Chi-squared test
Virtual: p < 0.001
Face-to-face: p < 0.001

⚠️ F2F only group consists of just one project so is subject to data quality issues

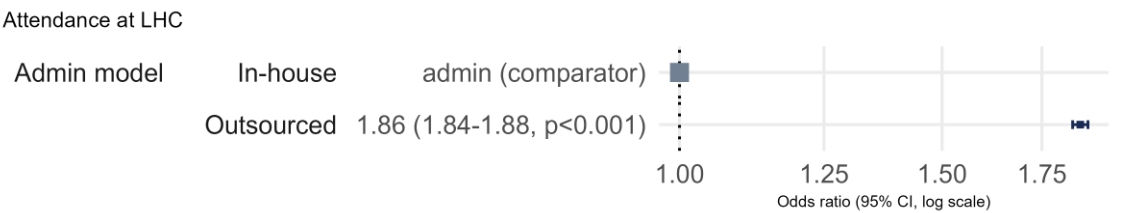
Outsourced models are associated with 14%pt higher LHC attendance and 3%pt more invitees receiving a CT scan. Of those attending LHC, 12.6%pt more go on to receive a CT scan with In-house models.



Outsourced administrative models result in greater likelihood of invitees attending LHC, receiving CT scan, and receiving a lung cancer diagnosis which is early stage

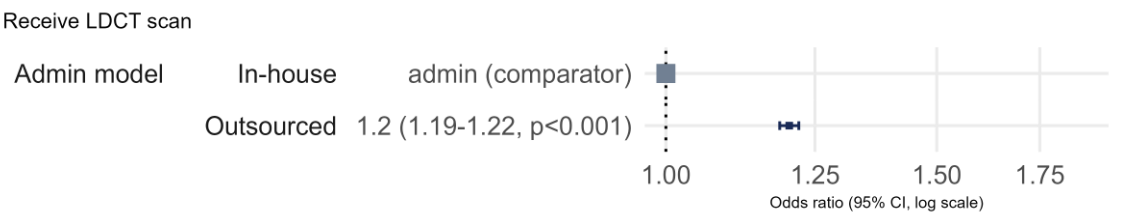
Attendance at LHC

The odds of an invitee attending LHC are increased by **86% (OR 1.86)** using an **Outsourced admin model** compared with projects that use In-house models. This increase is statistically significant.



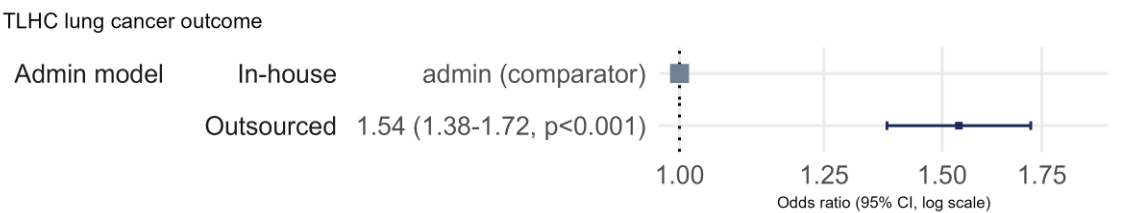
LDCT

The odds of an invitee receiving an LDCT scan are increased by **20% (OR 1.2)** using an **Outsourced admin model** compared with projects that use In-house models. This increase is statistically significant.



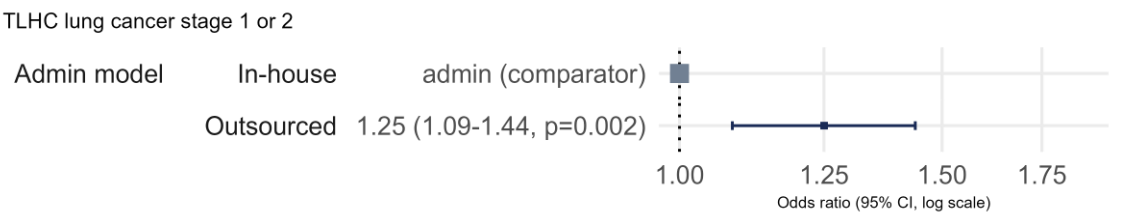
Lung Cancer Diagnosis

The odds of an invitee receiving a *TLHC-associated* lung cancer diagnosis are increased by **54% (OR 1.54)** using an **Outsourced admin model** compared with projects that use In-house models. This increase is statistically significant.



Early-stage lung cancer diagnosis

The odds of an invitee receiving a TLHC-associated lung cancer diagnosis at stage 1 or 2 are increased by **25% (OR 1.25)** using an **Outsourced admin model** compared with projects that use In-house models. This increase is statistically significant.



In-house and Outsourced administrative models result in a greater proportion of lung cancers diagnosed at an early stage compared with those detected using routine services. In-house models showed the highest rate of early-stage diagnosis.

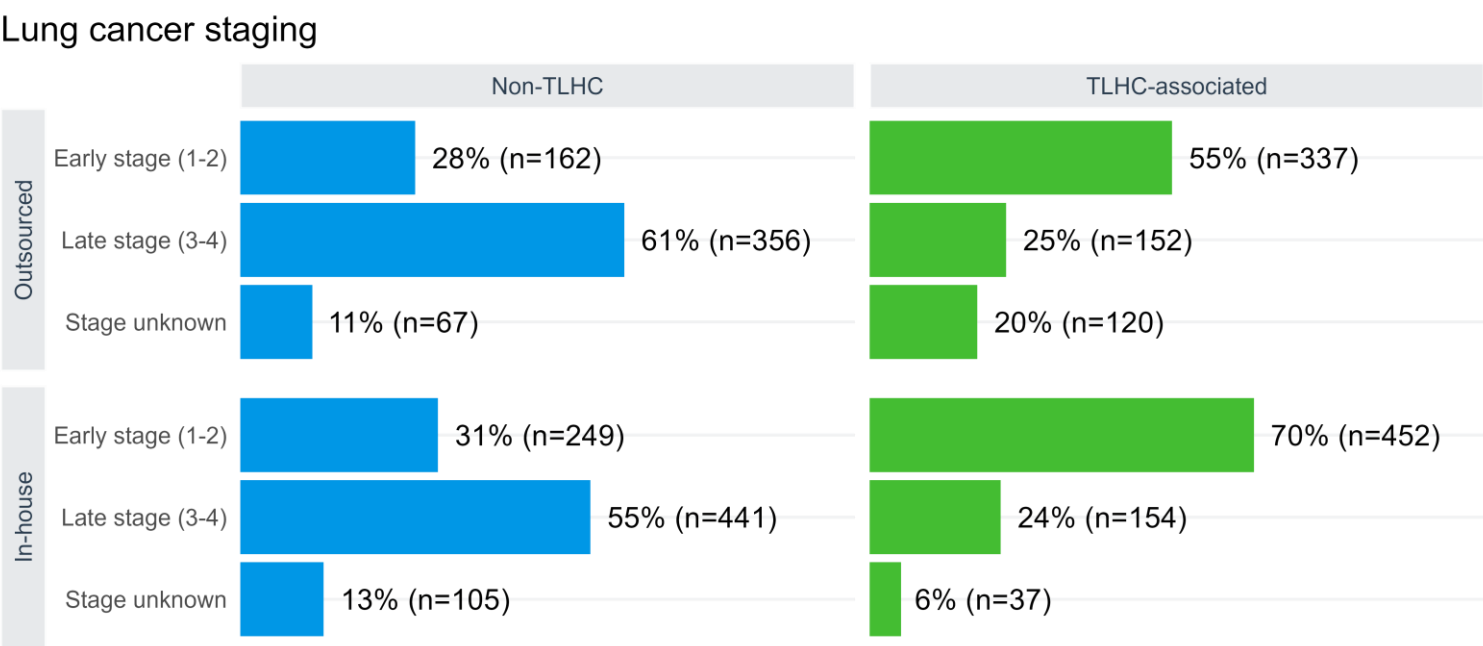
People with TLHC-associated lung cancers are **more likely to be diagnosed at stage 1 or 2** when compared with people whose lung cancers were detected using routine services, (labelled ‘Counterfactual: lung cancer’ on the Sankey chart).

In-house models resulted in **70%** of TLHC-associated lung cancers being diagnosed at an early stage, compared with **55%** diagnosed using an *Outsourced* admin model, which are greater than the proportion of early-stage lung cancers detected elsewhere (**31%** and **28%**).

Outsourced admin models result in the greatest proportion of unstaged lung cancers (**20%**), which is higher than the rate diagnosed elsewhere (**13%** and **11%**) and those diagnosed using *In-house* models (**6%**).

The differences in these distributions are statistically significant.

NB, it is likely that these breakdowns will always show that TLHC-associated lung cancers are different to the non-TLHC associated group due to large differences at the population level.



Pearson's Chi-squared test
Outsourced: p < 0.001
In-house: p < 0.001



04.

Demographic analysis

« Back to contents

Introduction to section

This section presents the analysis of patient numbers at each stage of the pathway, shown for each of the following demographics.

Analysis presented in previous reports has indicated specific patterns in LHC uptake and CT scan conversion for these characteristics. Understanding any differences is important in explaining any patterns of inequality that might require action.

Deprivation

Individuals living in areas considered to be among the **20% most deprived** in England (Indices of Multiple Deprivation, 2019, quintile 1) **compared with individuals living in less deprived areas** (Indices of Multiple Deprivation, 2019, quintiles 2-5).

⚠ Deprivation was associated with areas selected to pilot the TLHC programme, which means there is over-representation of higher deprivation areas in the data.

Age

Based on the reported age of the individual at invitation, split into two groups; those aged **55-64 years** and **65-74 years**.

⚠ Age is a factor used in the risk assessments carried out at the LHC; ([LLPv3](#) and [PLCOM2012](#)), with older participants being considered at higher risk of developing lung cancer.

Gender

Based on the reported gender at birth of the individual, either **Female** or **Male**.

Ethnicity

Based on individuals' broad-group ethnicity, comparing **White** (comprised of all ONS 'white' ethnicities) with other ethnicities combined, termed **Other than White**, excluding individuals without ethnicity reported*.

⚠ Ethnicity is a factor used in the risk assessments carried out at the LHC; ([LLPv3](#) and [PLCOM2012](#)).

⚠ There are data quality concerns regarding the completeness and accuracy of ethnicity coding in the GP eligible population. This is why 'unknown' ethnic categories are excluded in this analysis.

*Data quality does not allow analysis beyond this binary grouping meaning variation by ethnicity is not fully explored in this analysis.

Summary of key findings from demographic analysis

Deprivation ⚠️

Invitees living in areas with the highest deprivation (Q1) were less likely to attend LHC (-6%pt), than those living in less deprived areas, but were more likely to be assessed at higher risk of lung cancer (2%pt more invitees), and undergo a CT scan (11%pt higher CT scan conversion rate - realised).

Invitees living in areas of highest deprivation were more likely to receive a TLHC-associated lung cancer diagnosis, and for this diagnosis to be early stage.

Age ⚠️

The older group were more likely to be found at higher risk (11%pt), and consequently were more likely to undergo at least one scan (22%pt higher CT conversion rate – realised).

The younger age group were less likely to accept invitations than the older age group (-4%pt), which led to 5%pt fewer LHC assessments.

Gender

Female and *Male* individuals had approximately (represented by '~') the same rates of invitation acceptance (~40%) and attended LHCs at approximately the same rate (~38% of invitees).

Male participants were slightly more likely to be assessed as high risk (2%pt), and consequently to undergo at least one scan (3%pt), with 8%pt higher CT scan conversion rate.

Ethnicity ⚠️

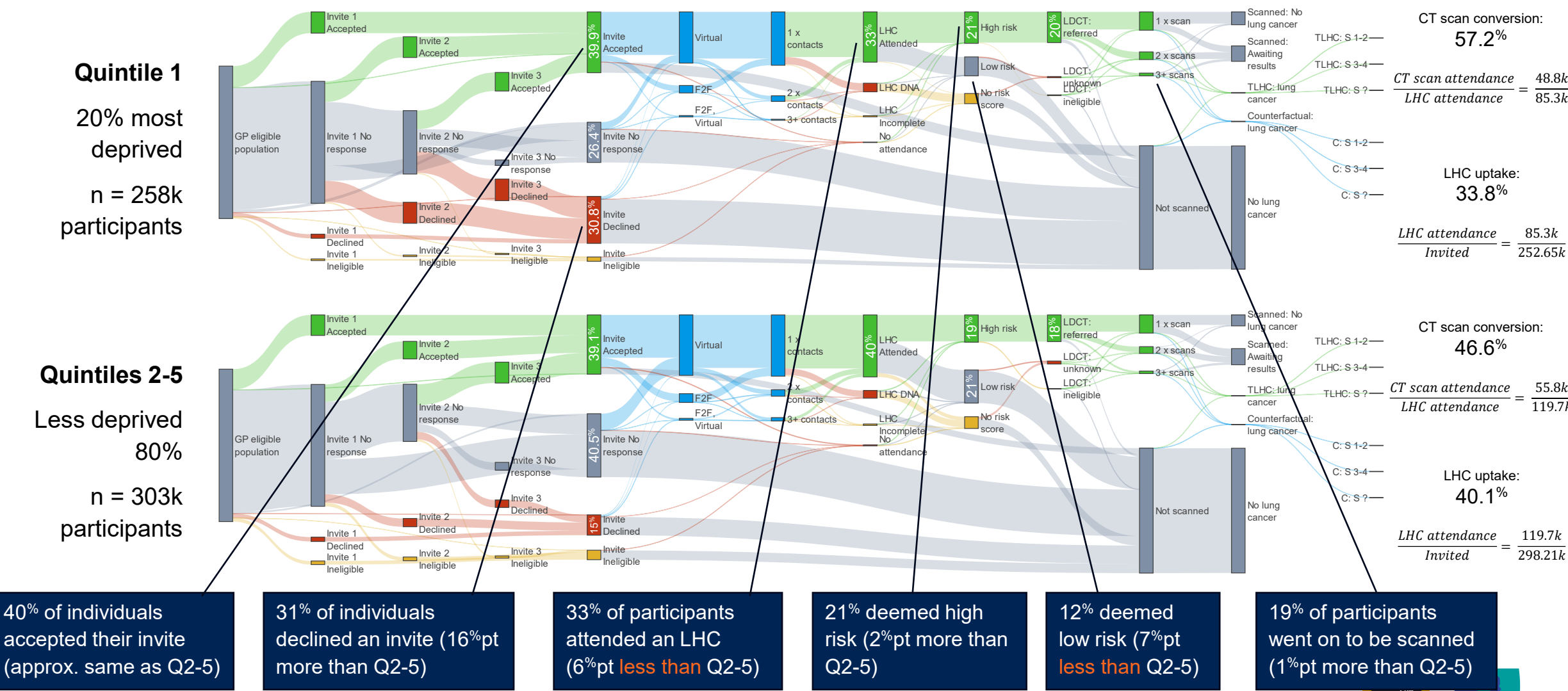
People whose reported ethnicity includes *White** backgrounds are 18%pt more likely to undergo one or more scans (2.8%pt higher CT scan conversion).

This disparity appears to stem from levels of engagement with the programme; with people reportedly from *White* backgrounds more likely to accept their invitation (25%pt) and people reportedly from *Other than White* ethnic backgrounds are more likely to decline their invitation (19%pt).

This disparity continues to LHC attendance, where there is a 33%pt difference in those who attended and a 19%pt difference in those found to be high risk.

*White refers to the broad ethnic groups comprising ONS White British, White Irish and White Other categories

Invitees from areas of high deprivation are 6%pt less likely to attend an LHC but 2%pt more likely to be deemed high risk (an 11%pt higher CT scan conversion rate). People living in areas of high deprivation are 2%pt more likely to receive a CT scan ⚠️



Despite being less likely to attend an LHC, people in the most deprived areas are more likely to be assessed as high risk, undergo a CT scan, and subsequently receive a lung cancer diagnosis which is early stage ⚠️

Attendance at LHC

The odds of an invitee attending LHC are **decreased** by **25% (OR 0.75)** if they live in **an area of high deprivation** compared with people living in less deprived areas. This decrease is statistically significant.

LDCT

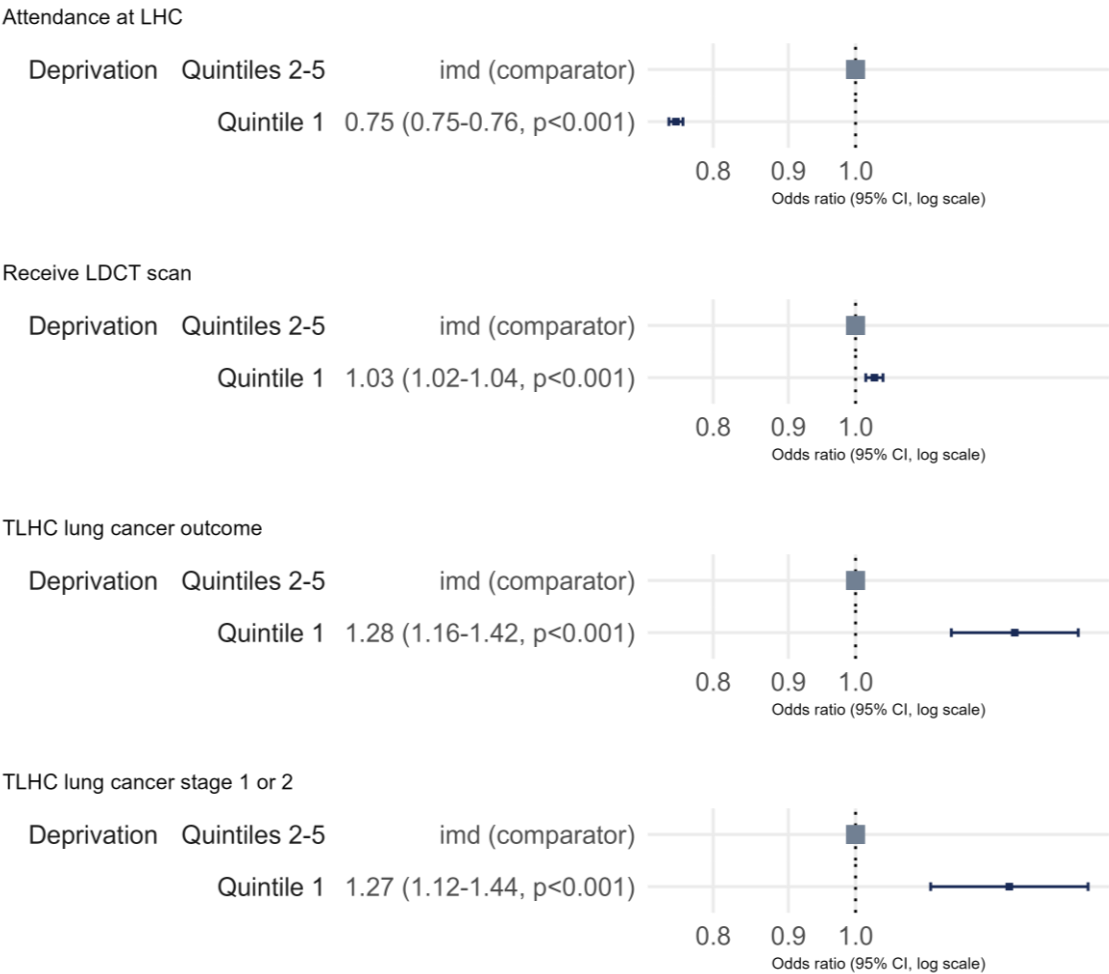
The odds of an invitee receiving an LDCT scan are increased by **3% (OR 1.03)** if **they live in an area of high deprivation** compared people living in less deprived areas. This increase is statistically significant.

Lung Cancer Diagnosis

The odds of an invitee receiving a *TLHC-associated* lung cancer diagnosis are increased by **28% (OR 1.28)** if **they live in an area of high deprivation** compared with people living in less deprived areas. This increase is statistically significant.

Early-stage lung cancer diagnosis

The odds of an invitee receiving a TLHC-associated lung cancer diagnosis at stage 1 or 2 are increased by **27% (OR 1.27)** if **they live in an area of high deprivation** compared with people living in less deprived areas. This increase is statistically significant. This is likely a consequence of the previous finding that overall cancer detection rates are higher in the people living in the most deprived areas.



A greater proportion of lung cancers are diagnosed at an early stage compared to routine services, regardless of deprivation ⚠️

People with TLHC-associated lung cancers are **more likely to be diagnosed at stage 1 or 2** when compared with people whose lung cancers were detected using routine services, (labelled ‘Counterfactual: lung cancer’ on the Sankey chart).

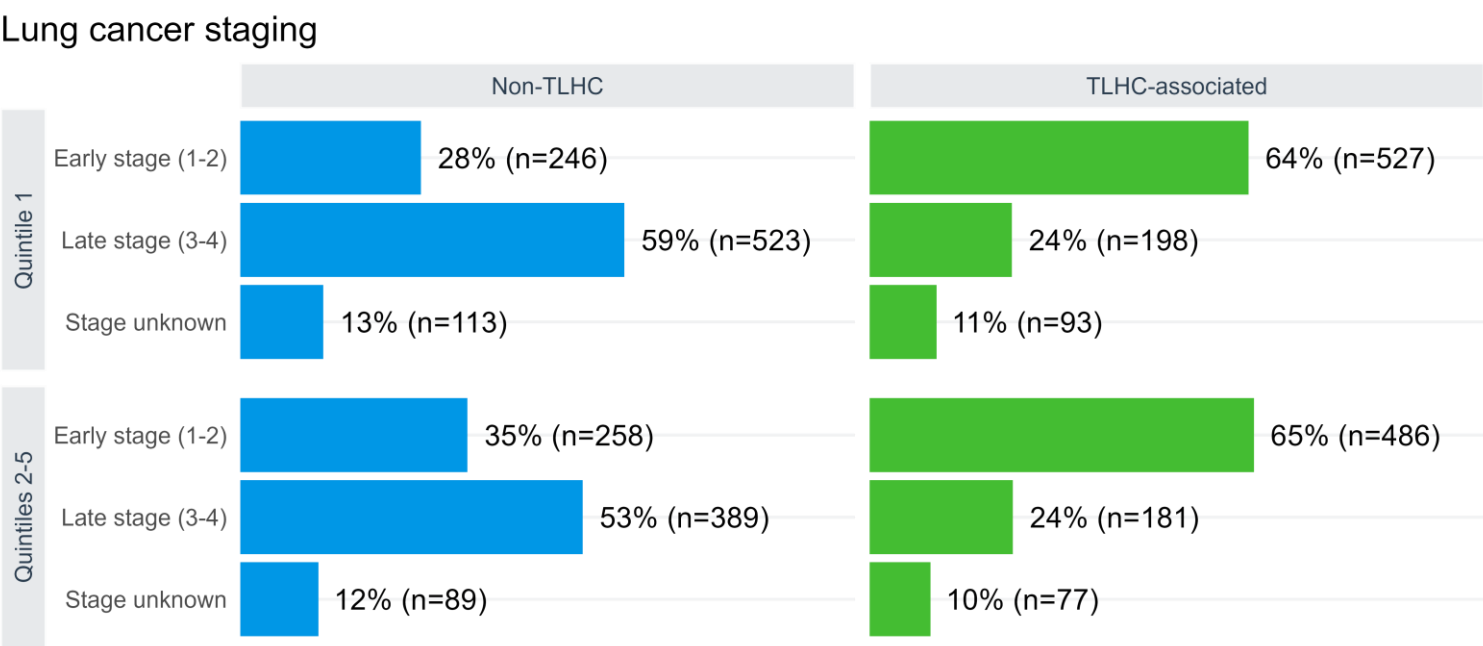
Just under two-thirds of lung cancers diagnosed by the TLHC programme for people are early stage regardless of relative deprivation (65% and 64%), compared with over a third of cancers detected elsewhere for people living in the *less deprived* areas (35%) and lower for those living in the *most deprived* areas (28%).

The likelihood of lung cancer diagnosis being unstaged is approximately the same, regardless of deprivation or TLHC involvement (10%, 11%, 12%, 13%)

The differences in these distributions are statistically significant.

NB, it is likely that these breakdowns will always show that TLHC-associated lung cancers are different to the non-TLHC associated group due to large differences at the population level.

⚠️ Mortality was a factor in the selection of areas to pilot the TLHC programme, and because deprivation is correlated with mortality it means there is over-representation of higher deprivation areas in the data.

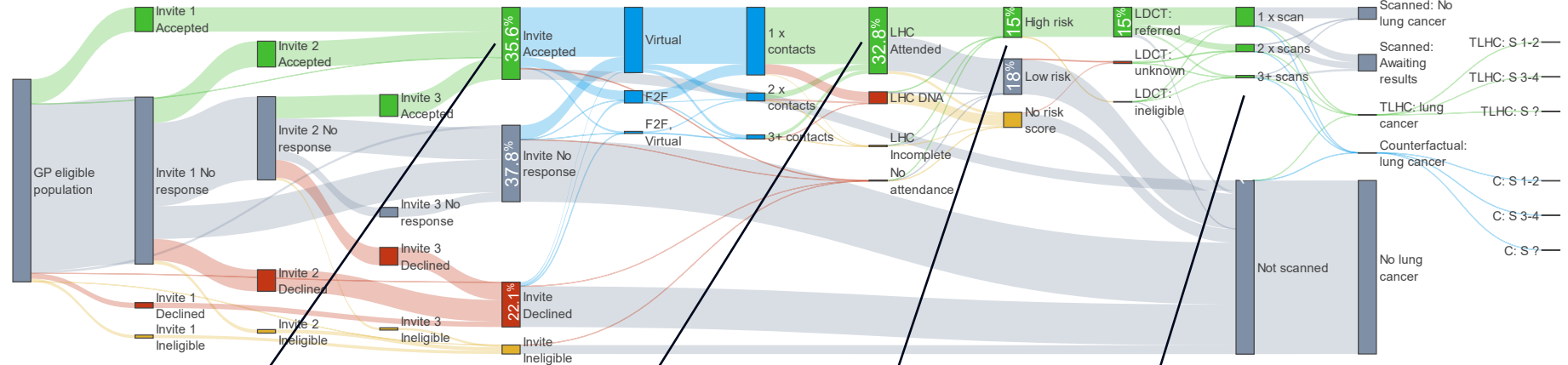


Pearson's Chi-squared test
Quintile 1: p < 0.001
Quintiles 2-5: p < 0.001

Younger age groups are 5%pt less likely to attend an LHC, 11%pt less likely to be deemed high risk and 11%pt less likely to receive a CT scan (22.3%pt lower CT conversion rate) ⚠

55-64 years

n = 295k participants



CT scan conversion:
43.3%

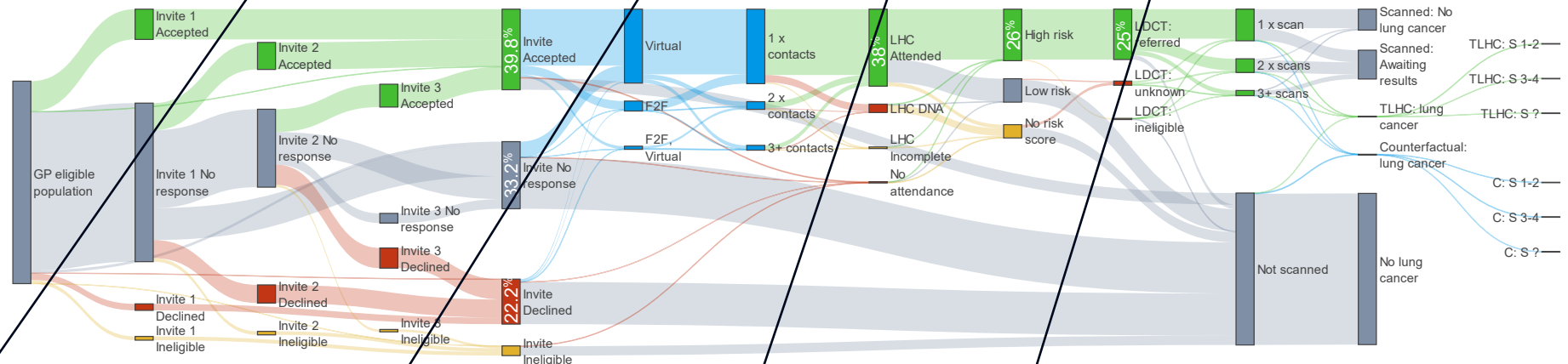
$$\frac{CT\ scan\ attendance}{LHC\ attendance} = \frac{41.9k}{96.7k}$$

LHC uptake:
33.3%

$$\frac{LHC\ attendance}{Invited} = \frac{96.7k}{290.38k}$$

65-74 years

n = 240k participants



CT scan conversion:
65.6%

$$\frac{CT\ scan\ attendance}{LHC\ attendance} = \frac{59.9k}{91.4k}$$

LHC uptake:
38.7%

$$\frac{LHC\ attendance}{Invited} = \frac{91.4k}{236.35k}$$

36% of individuals accepted their invite (4%pt less than 65-74yrs)

33% of invitees attended LHC (5%pt less than 65-74yrs)

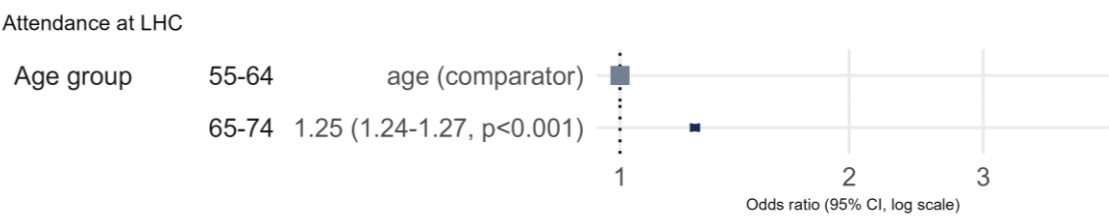
15% found to be high risk (11%pt less than 65-74yrs)

14% of invitees went on to be scanned (11%pt less than 65-74yrs)

People aged 65-74 years are more likely to attend an LHC, receive a CT scan, be diagnosed with lung cancer and the diagnosis be early stage, when compared with those aged 55-64 years ⚠️

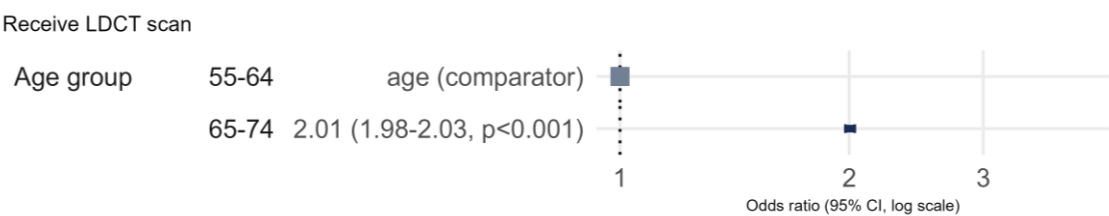
Attendance at LHC

The odds of an invitee attending an LHC are increased by **25% (OR 1.25)** if they are **aged 65-74 years** compared with people aged 55-64 years. This increase is statistically significant.



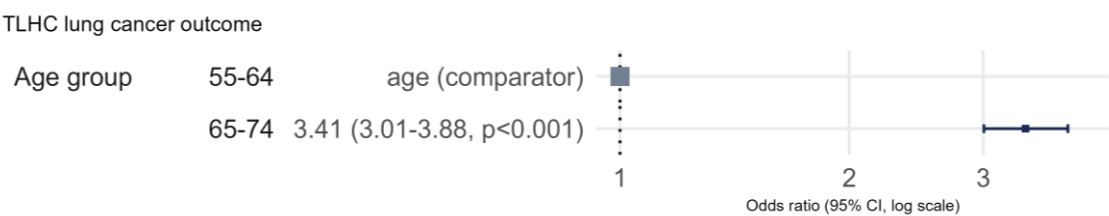
LDCT

The odds of an invitee receiving an LDCT scan are increased by **101% (OR 2.01)** if they are **aged 65-74 years** compared with people aged 55-64 years. This increase is statistically significant.



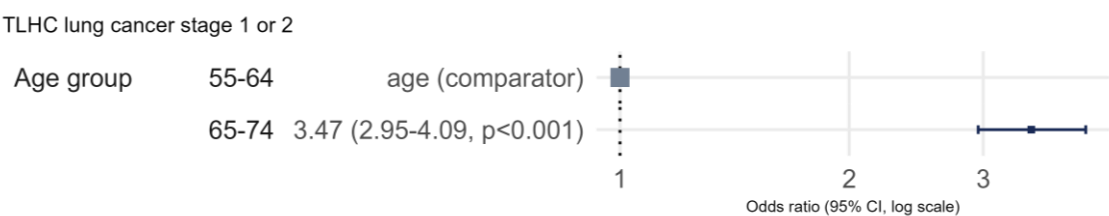
Lung Cancer Diagnosis

The odds of an invitee receiving a *TLHC-associated* lung cancer diagnosis are increased by **241% (OR 3.41)** if they are **aged 65-74 years** compared with people aged 55-64 years. This increase is statistically significant.



Early-stage lung cancer diagnosis

The odds of an invitee receiving a TLHC-associated lung cancer diagnosis at stage 1 or 2 are increased by **247% (OR 3.47)** if they are **aged 65-74 years** compared with people aged 55-64 years. This increase is statistically significant.



⚠️ Age is a factor used in the risk assessments carried out at the LHC with older participants being considered at higher risk of developing lung cancer.

A greater proportion of TLHC-associated lung cancers are diagnosed at an early stage compared to routine services, regardless of age group ⚠️

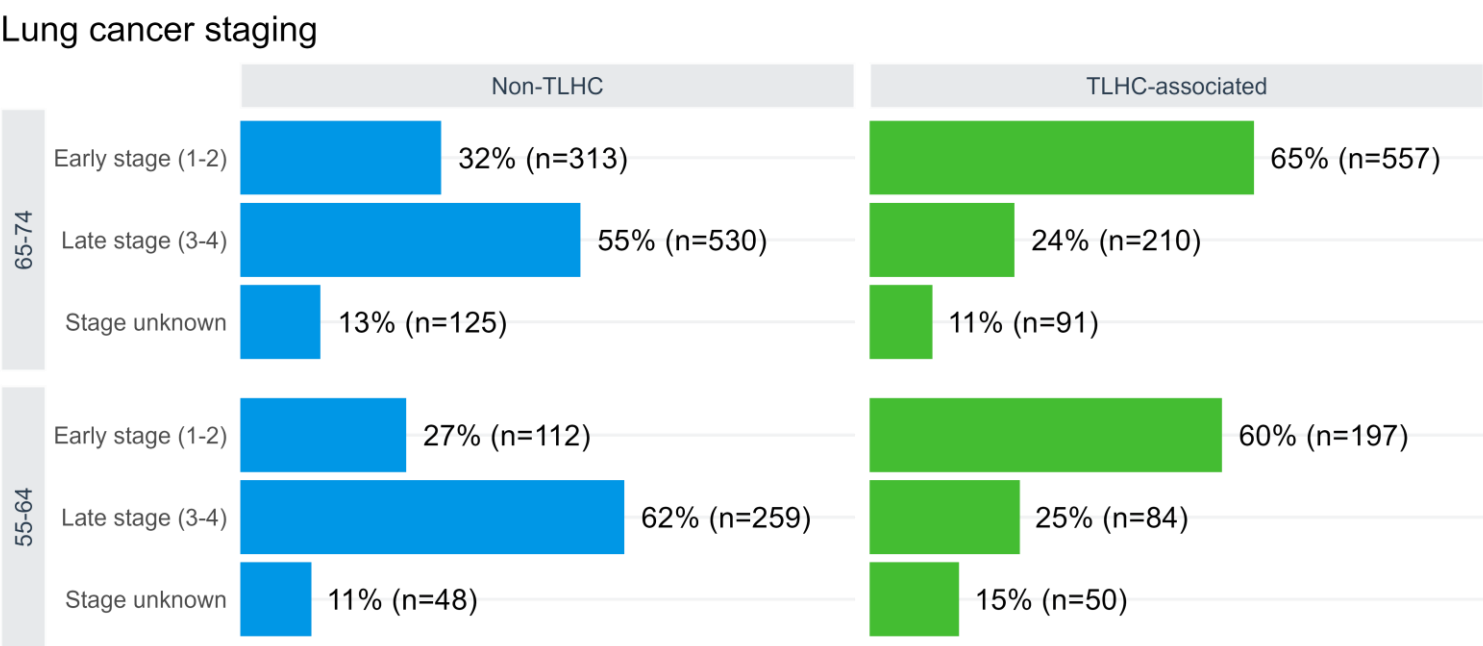
People with TLHC-associated lung cancers are **more likely to be diagnosed at stage 1 or 2** when compared with people whose lung cancers were detected using routine services, (labelled ‘Counterfactual: lung cancer’ on the Sankey chart).

Most TLHC-associated lung cancers were diagnosed at an early stage, (60% in 55-64yrs, 65% 65-74yrs), compared with just under a third of lung cancers detected elsewhere (32% and 27%).

The likelihood of lung cancer diagnosis being unstaged is approximately the same, regardless of age group or TLHC involvement (11%, 15%, 13%, 11%)

The differences in these distributions are statistically significant.

NB, it is likely that these breakdowns will always show that TLHC-associated lung cancers are different to the non-TLHC associated group due to large differences at the population level.

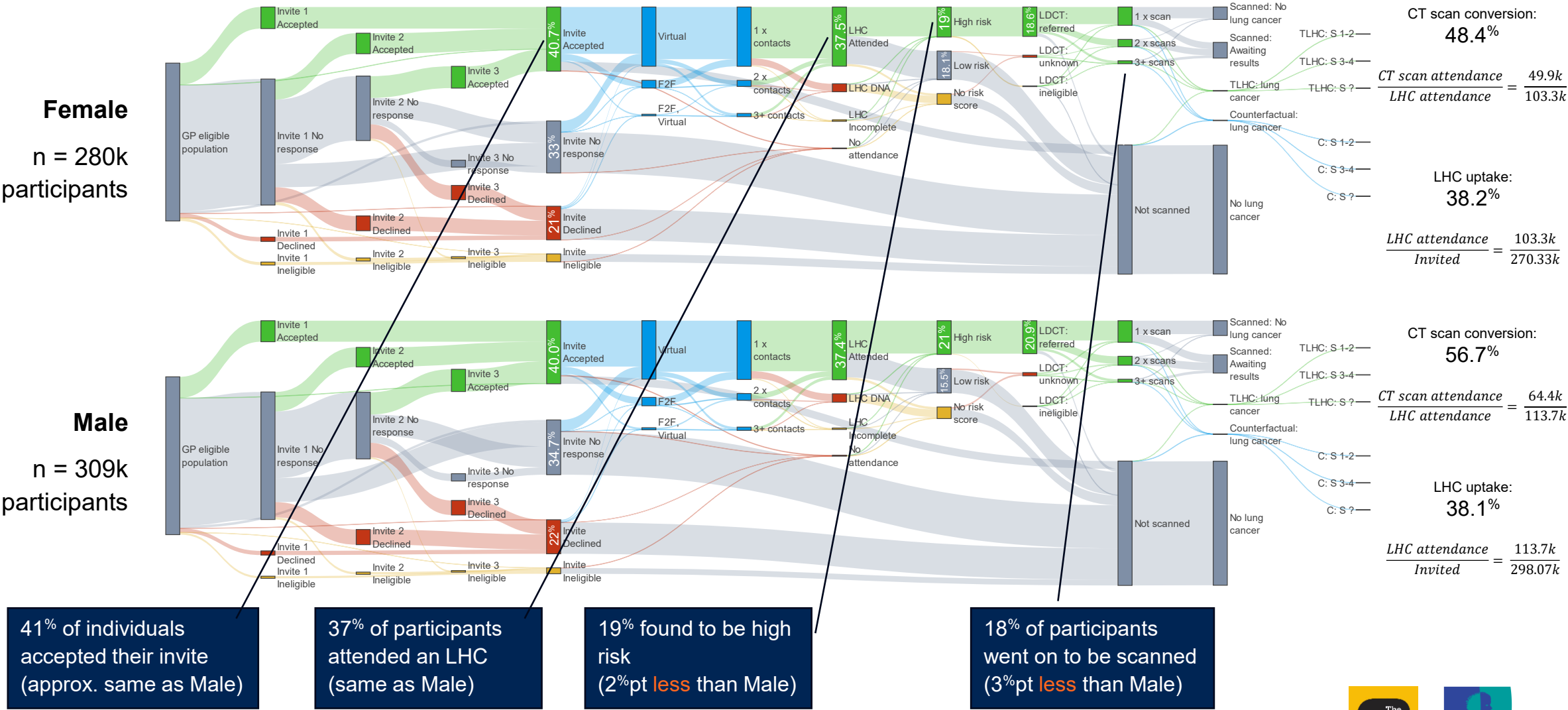


Pearson's Chi-squared test
65-74: p < 0.001
55-64: p < 0.001

⚠️ Age is a factor used in the risk assessments carried out at the LHC with older participants being considered at higher risk of developing lung cancer.



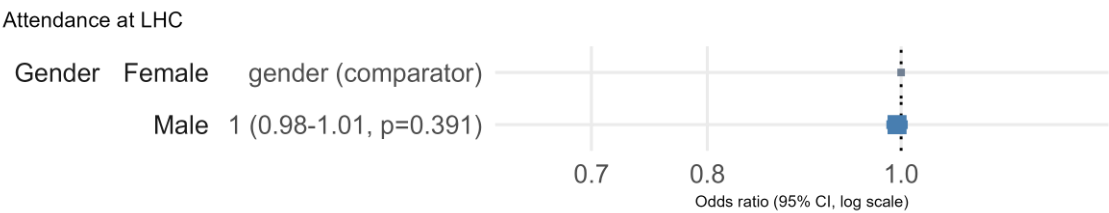
Little difference between genders for attendance at LHC. Male invitees 2%pt more likely to be deemed high risk (8.3%pt higher CT conversion rate), and 3%pt more likely to receive a CT scan



Likelihood of attending an LHC is not related to gender. Men are more likely to receive a CT scan but less likely to receive a lung cancer diagnosis and even less likely to receive an early-stage diagnosis

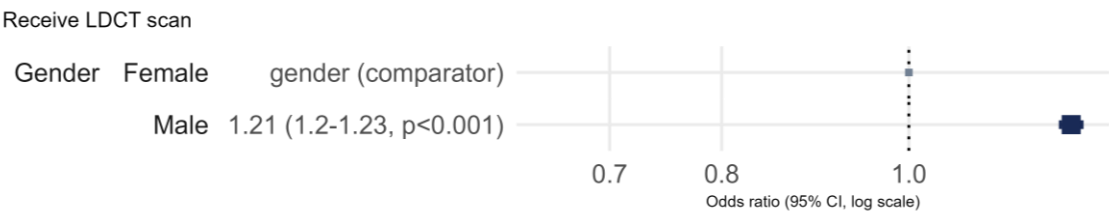
Attendance at LHC

The odds of an invitee attending an LHC are **approximately the same** for males and females.



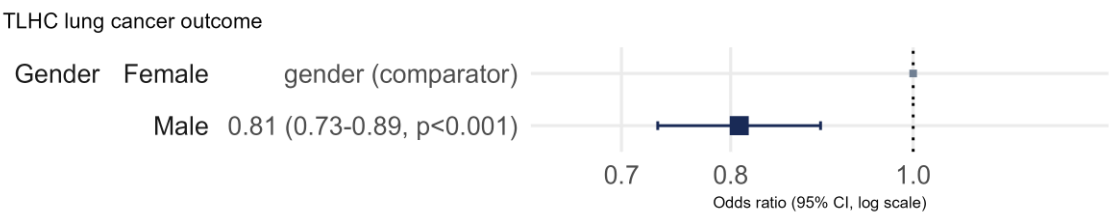
LDCT

The odds of an invitee receiving an LDCT scan are increased by **21% (OR 1.21) for males** compared with female participants. This increase is statistically significant.



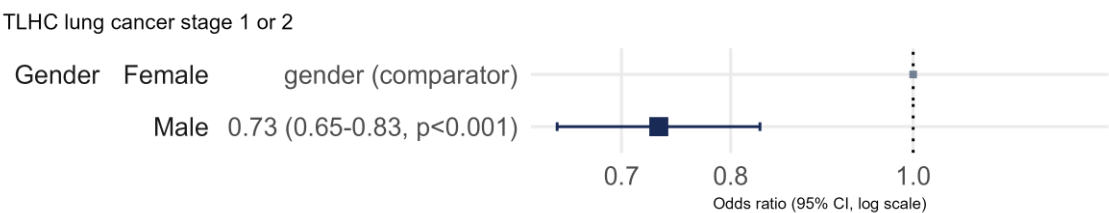
Lung Cancer Diagnosis

The odds of an invitee receiving a *TLHC-associated* lung cancer diagnosis are **decreased** by **19% (OR 0.81) for males** compared with female participants. This decrease is statistically significant.



Early-stage lung cancer diagnosis

The odds of an invitee receiving a TLHC-associated lung cancer diagnosis at stage 1 or 2 are **decreased** by **27% (OR 0.73) for males** compared with female participants. This decrease is statistically significant.



A greater proportion of TLHC-associated lung cancers are diagnosed at an early stage compared to routine services, regardless of gender

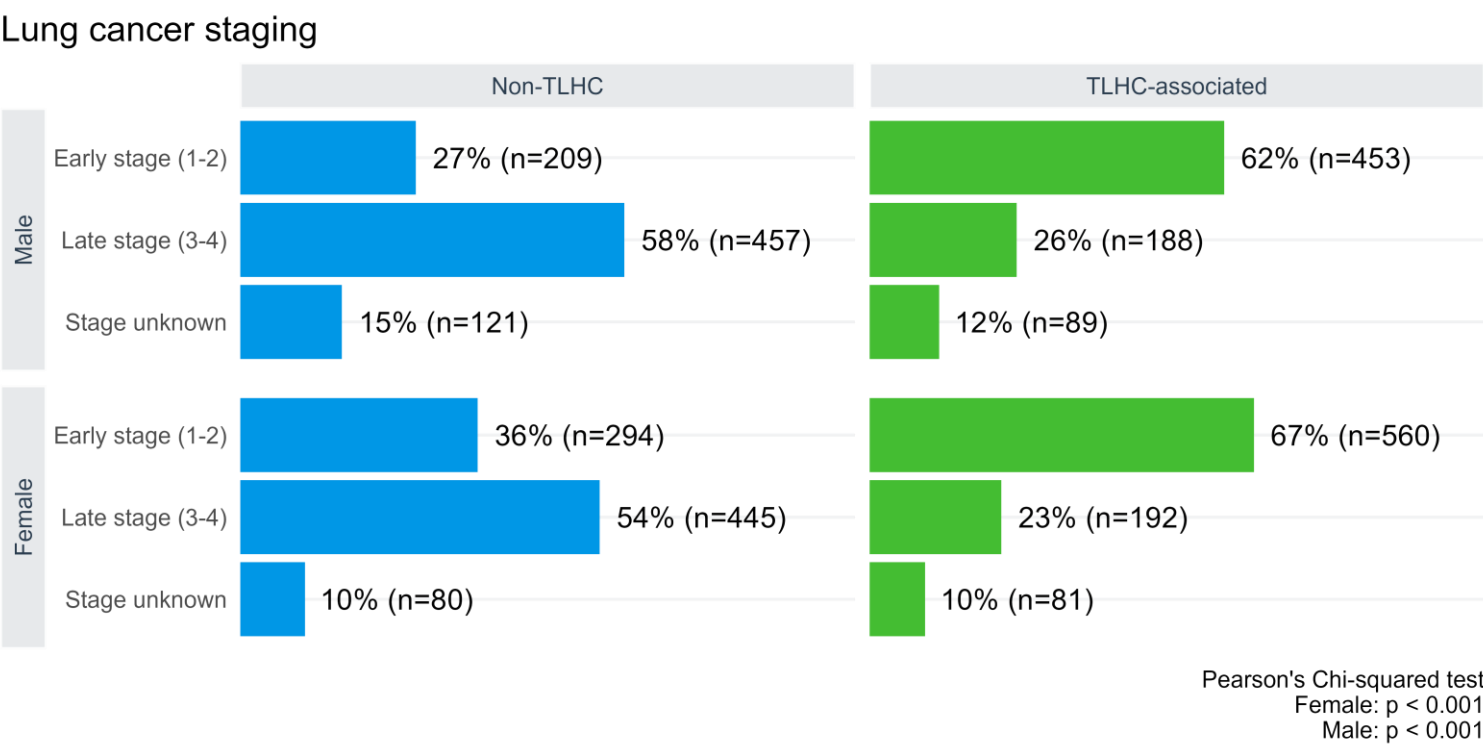
People with TLHC-associated lung cancers are **more likely to be diagnosed at stage 1 or 2** when compared with people whose lung cancers were detected using routine services, (labelled ‘Counterfactual: lung cancer’ on the Sankey chart).

Around two-thirds of TLHC-associated lung cancers are early stage (62% Males, 67% Females), compared with around a third detected elsewhere (27% and 36%).

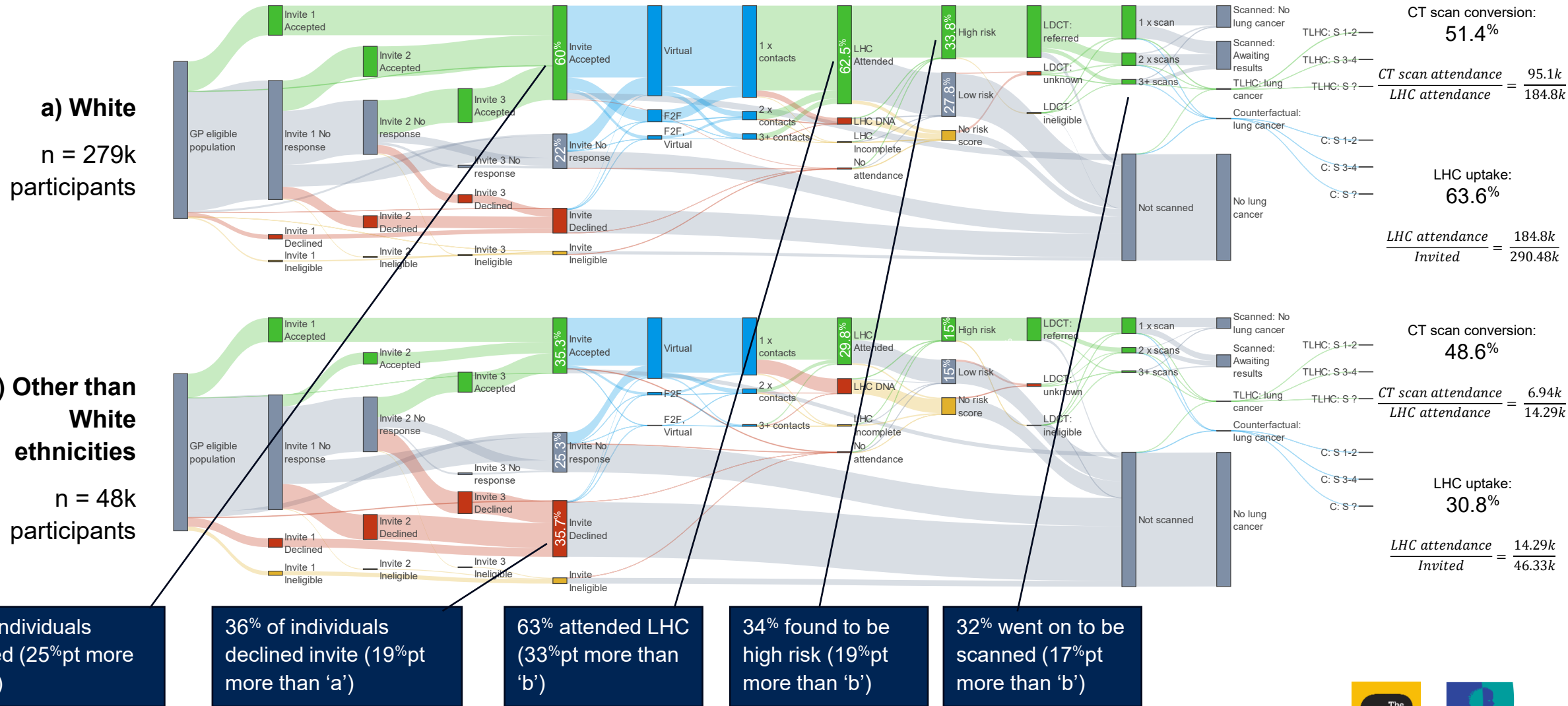
The likelihood of lung cancer diagnosis being unstaged is approximately the same, regardless of gender or TLHC involvement (12%, 10%, 15%, 10%)

The differences in these distributions are statistically significant.

NB, it is likely that these breakdowns will always show that TLHC-associated lung cancers are different to the non-TLHC associated group due to large differences at the population level.



White individuals are 33%pt more likely to attend an LHC, consequently 19%pt more invitees likely to be deemed high risk and 18%pt more likely to undergo a CT scan (a 1.5%pt higher CT scan conversion rate). ⚠️



Invitees with *Other than White* ethnic backgrounds are significantly less likely to attend an LHC, receive a CT scan, be diagnosed with lung cancer, or be diagnosed at an early stage than people from *White* ethnic backgrounds ⚠️

Attendance at LHC

The odds of an invitee attending LHC are **decreased** by **86%** (**OR 0.14**) for people of ***Other than White* ethnicity** compared with people of White ethnic background. This decrease is statistically significant.

LDCT

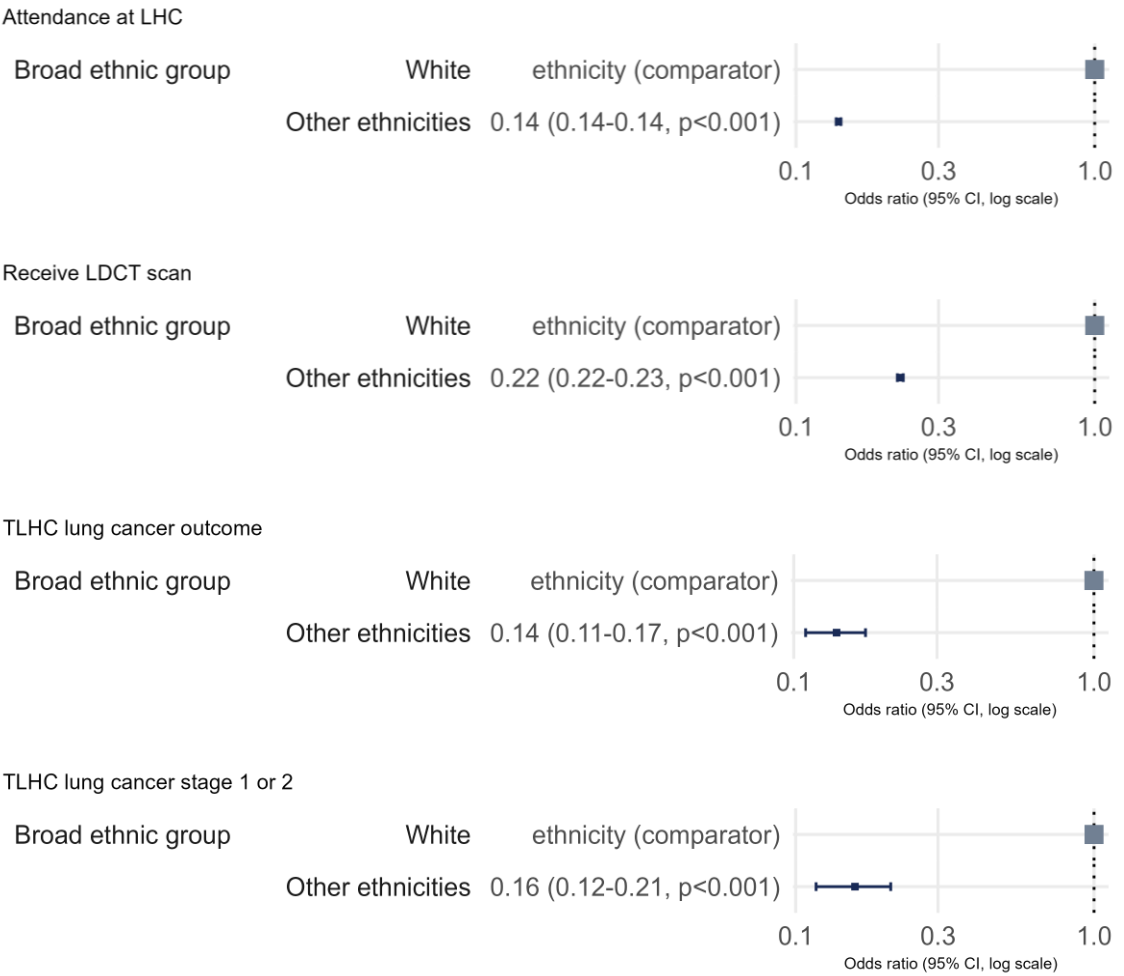
The odds of an invitee receiving an LDCT scan are **decreased** by **78%** (**OR 0.22**) for people of ***Other than White* ethnicity** compared with people of White ethnic background. This decrease is statistically significant.

Lung Cancer Diagnosis

The odds of an invitee receiving a *TLHC-associated* lung cancer diagnosis are **decreased** by **86%** (**OR 0.14**) for people of ***Other than White* ethnicity** compared with people of White ethnic background. This decrease is statistically significant.

Early-stage lung cancer diagnosis

The odds of an invitee receiving a *TLHC-associated* lung cancer diagnosis at stage 1 or 2 are **decreased** by **84%** (**OR 0.16**) for people of ***Other than White* ethnicity** compared with people of White ethnic background. This decrease is statistically significant.



A greater proportion of TLHC-associated lung cancers are diagnosed at an early stage compared to routine services, regardless of ethnicity ⚠️

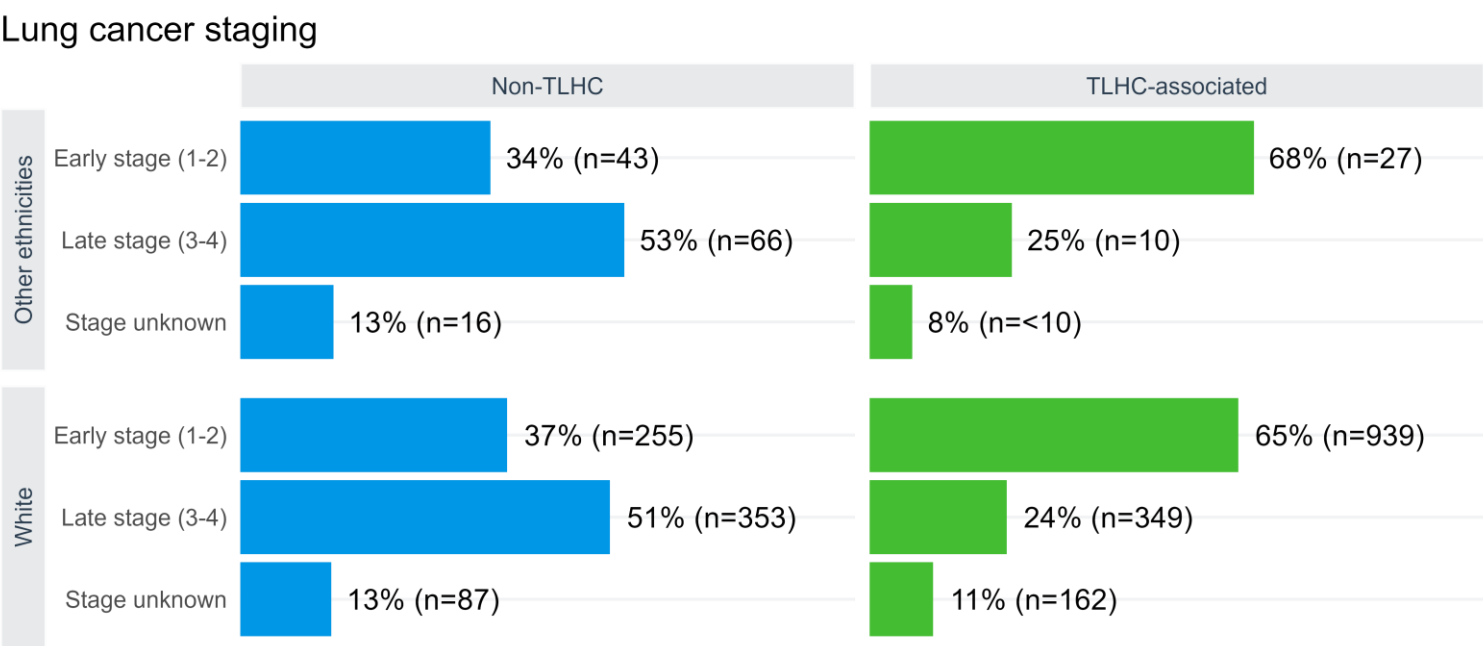
People with TLHC-associated lung cancers are **more likely to be diagnosed at stage 1 or 2** when compared with people whose lung cancers were detected using routine services, (labelled ‘Counterfactual: lung cancer’ on the Sankey chart).

Around two-thirds of TLHC-associated lung cancers are early stage (65% White, 68% Other ethnicities), compared with around a third detected elsewhere (34% and 37%).

TLHC-associated lung cancers are less likely to be unstaged regardless of ethnic group (8%, 11%) compared with those detected elsewhere (13%).

The differences in these distributions are statistically significant.

NB, it is likely that these breakdowns will always show that TLHC-associated lung cancers are different to the non-TLHC associated group due to large differences at the population level.



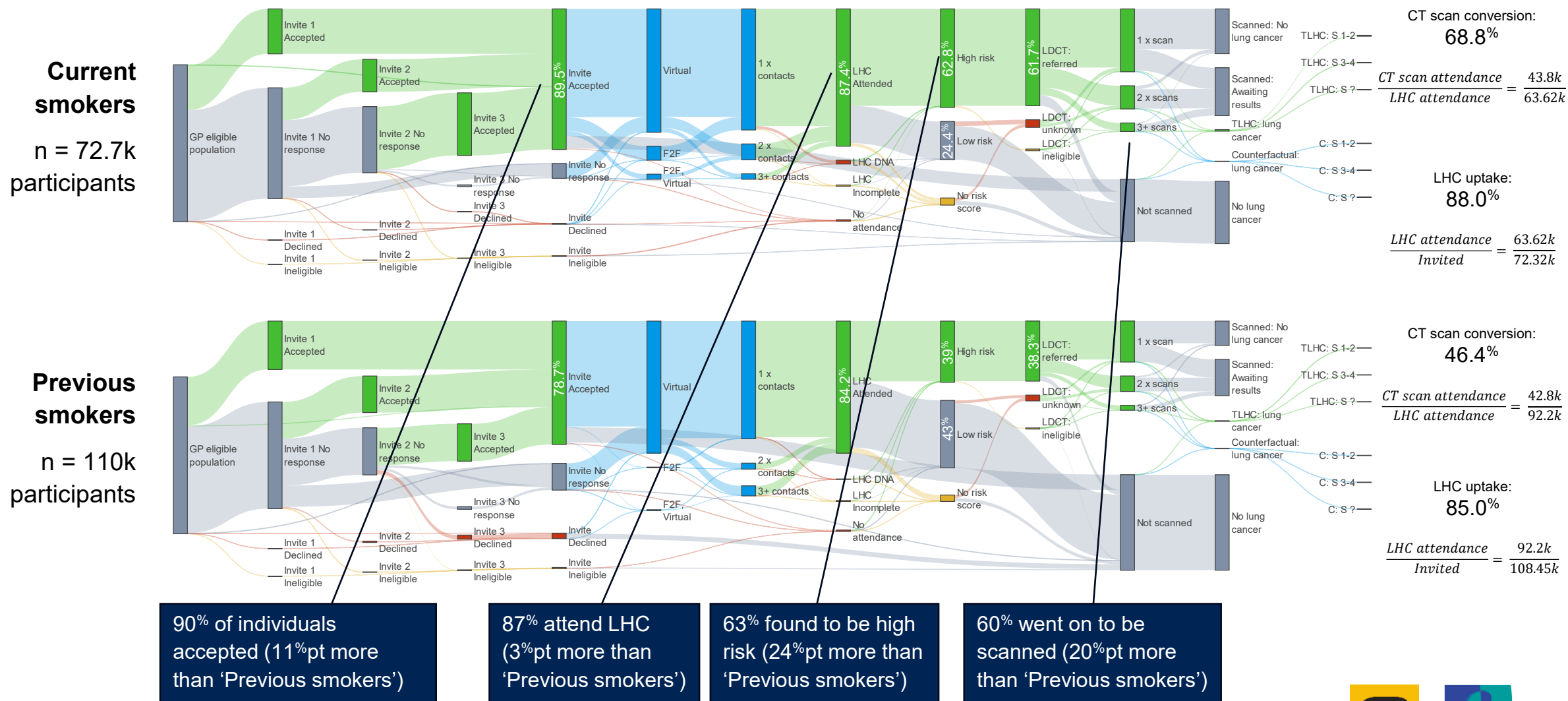
Pearson's Chi-squared test
White: p < 0.001
Other ethnicities: p = 0.001

⚠️ Ethnicity is a factor used in the risk assessments carried out at the LHC and there are data quality concerns re: completeness and accuracy of ethnicity coding.



NB, smoking status is confirmed at LHC - people who did not attend are marked as 'Unknown' and not shown here.

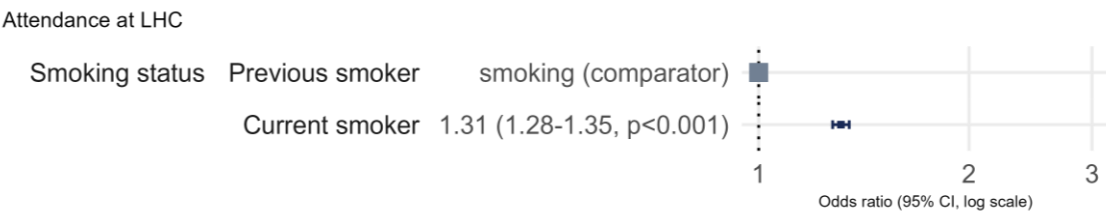
Current smokers are associated with 11%pt higher invites accepted, 3%pt more likely to attend an LHC and 24%pt more likely to be deemed high risk and consequently 20%pt more likely to undergo a CT scan (22.4%pt higher CT scan conversion rate) ⚠



Invitees who are current smokers are more likely to attend an LHC, receive a CT scan, be diagnosed with lung cancer and receive an early-stage diagnosis than ex-smokers ⚠️

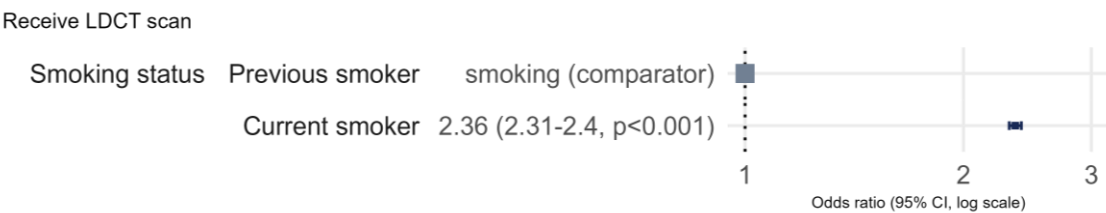
Attendance at LHC

The odds of an invitee attending LHC are increased by **31% (OR 1.31) for current smokers** compared with previous smokers. This increase is statistically significant. This finding may be affected by smoking status being confirmed at the LHC contact.



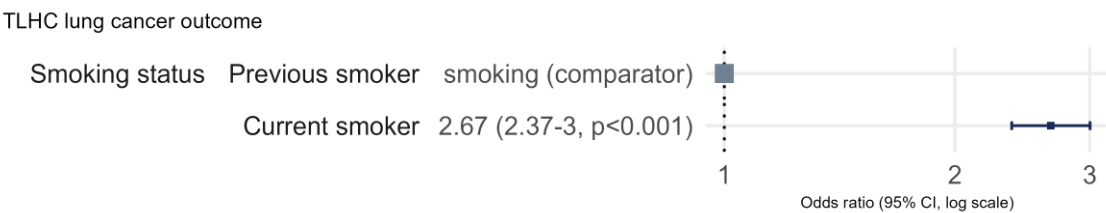
LDCT ⚠️

The odds of an invitee receiving an LDCT scan are increased by **136% (OR 2.36) for current smokers** compared with previous smokers. This increase is statistically significant.



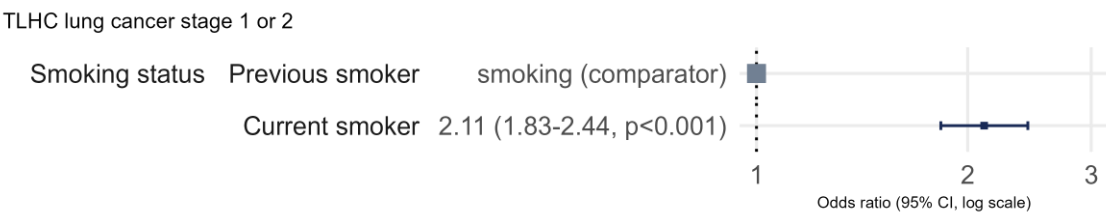
Lung Cancer Diagnosis

The odds of an invitee receiving a *TLHC-associated* lung cancer diagnosis are increased by **167% (OR 2.67) for current smokers** compared with previous smokers. This increase is statistically significant.



Early-stage lung cancer diagnosis

The odds of an invitee receiving a TLHC-associated lung cancer diagnosis at stage 1 or 2 are increased by **111% (OR 2.11) for current smokers** compared with previous smokers. This increase is statistically significant.



⚠️ Smoking status is a factor in the PLCOm2012 risk score.



A greater proportion of TLHC-associated lung cancers are diagnosed at an early stage compared to routine services, regardless of smoking status ⚠️

People with TLHC-associated lung cancers are **more likely to be diagnosed at stage 1 or 2** when compared with people whose lung cancers were detected using routine services, (labelled ‘Counterfactual: lung cancer’ on the Sankey chart).

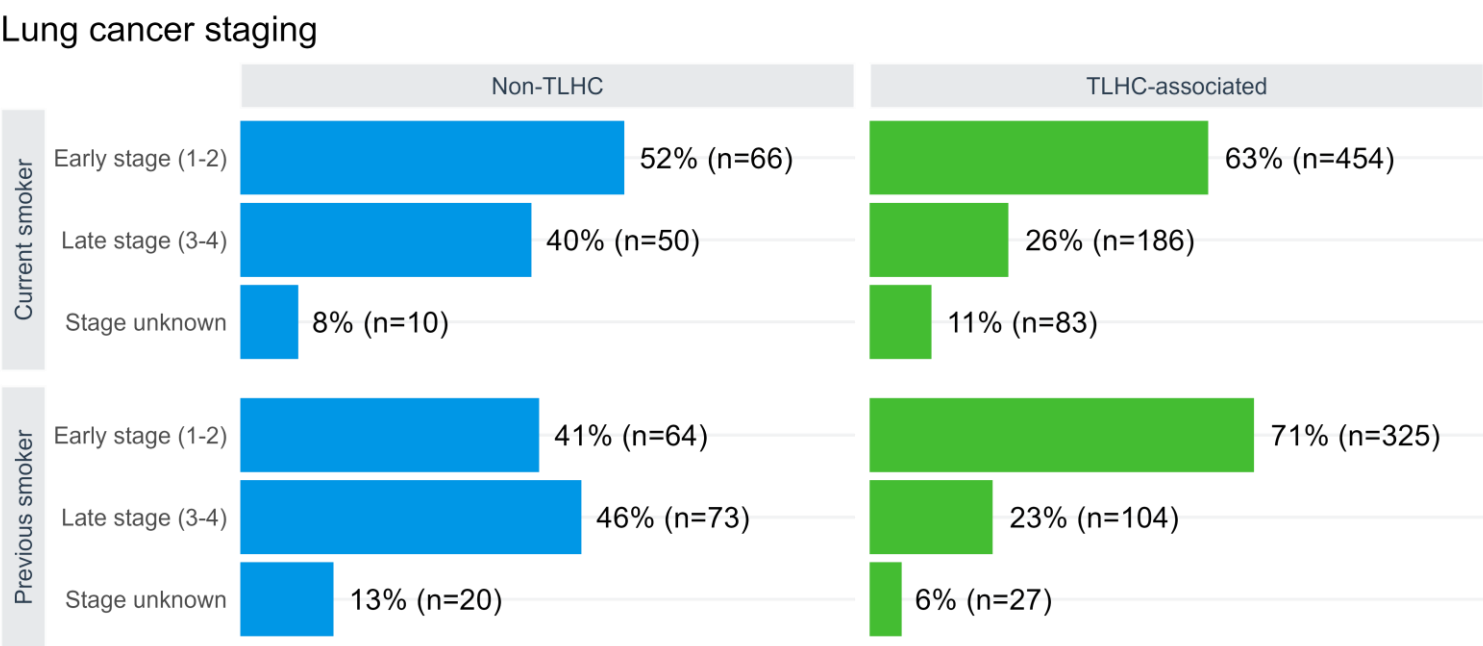
Most TLHC-associated lung cancers are early stage (63% Current smokers, 71% Previous smokers).

Lung cancers detected elsewhere also have a high proportion of early-stage diagnoses (52% Current smokers, 41% Previous smokers).

The likelihood of lung cancer diagnosis being unstaged is approximately the same, regardless of smoking status or TLHC involvement (11%, 6%, 8%, 13%)

The differences in these distributions are statistically significant.

NB, it is likely that these breakdowns will always show that TLHC-associated lung cancers are different to the non-TLHC associated group due to large differences at the population level.



Pearson's Chi-squared test
Current smoker: p = 0.005
Previous smoker: p < 0.001

⚠️ Data quality issues - current smoking status is confirmed at LHC, so this is unknown for many people who did not engage with the TLHC programme.



05.

Combined analysis

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Introduction to section

The “combined analysis” looks at the interaction between participant demographics and intervention model. The report focuses on two key areas where we have observed differences in participant flows e.g. lower LHC uptake and lower CT scan conversion. This includes:

- Most deprived quintile, by implementation model (compared to less deprived groups); ⚠
- Younger age group, by implementation model (compared to older age group). ⚠

Combined analyses will be useful for the programme team and Cancer Alliances, in improving understanding about the optimal way to deliver the TLHC pathway for different local populations.

Most deprived quintile by implementation model

Opt-in models result in slightly higher rates of lung cancer diagnosis and are associated with greater equity of representation of people regardless of the deprivation of the area they live in.

⚠ Deprivation is related to the selection of areas to pilot the TLHC programme, which means there is over-representation of higher deprivation areas in the data.

Younger age group by implementation model

Opt-out invite models result in more people attending LHC, regardless of age. Opt-in models are slightly more likely to result in lung cancer diagnosis.

⚠ Age is a factor used in the risk assessments carried out at the LHC with older participants being considered at higher risk of developing lung cancer; ([LLPv3](#) and [PLCOm2012](#)).

Opt-in models result in slightly higher rates of lung cancer diagnosis and are associated with greater equity of representation of people regardless of the deprivation of the area they live in ⚠️

Invitees who ...	Invite model	Most deprived	Less deprived
attend LHC	Opt-in	40.5%	44.8%
	Opt-out	40.9%	43.3%
are assessed as high risk	Opt-in	23.6%	22.9%
	Opt-out	21.7%	17.2%
receive at least one CT scan	Opt-in	20.8%	21.9%
	Opt-out	17.3%	14.3%
receive a TLHC-associated lung cancer diagnosis	Opt-in	0.4%	0.4%
	Opt-out	0.4%	0.3%
receive an early-stage TLHC-associated lung cancer diagnosis	Opt-in	0.3%	0.3%
	Opt-out	0.2%	0.2%

Opt-in versus *Opt-out* model appears to make little difference to the likelihood of participants attending LHC, regardless of the deprivation of their local area.

Opt-in models result in a higher proportion of invitees being assessed as high risk, regardless of deprivation, compared with *Opt-out* models.

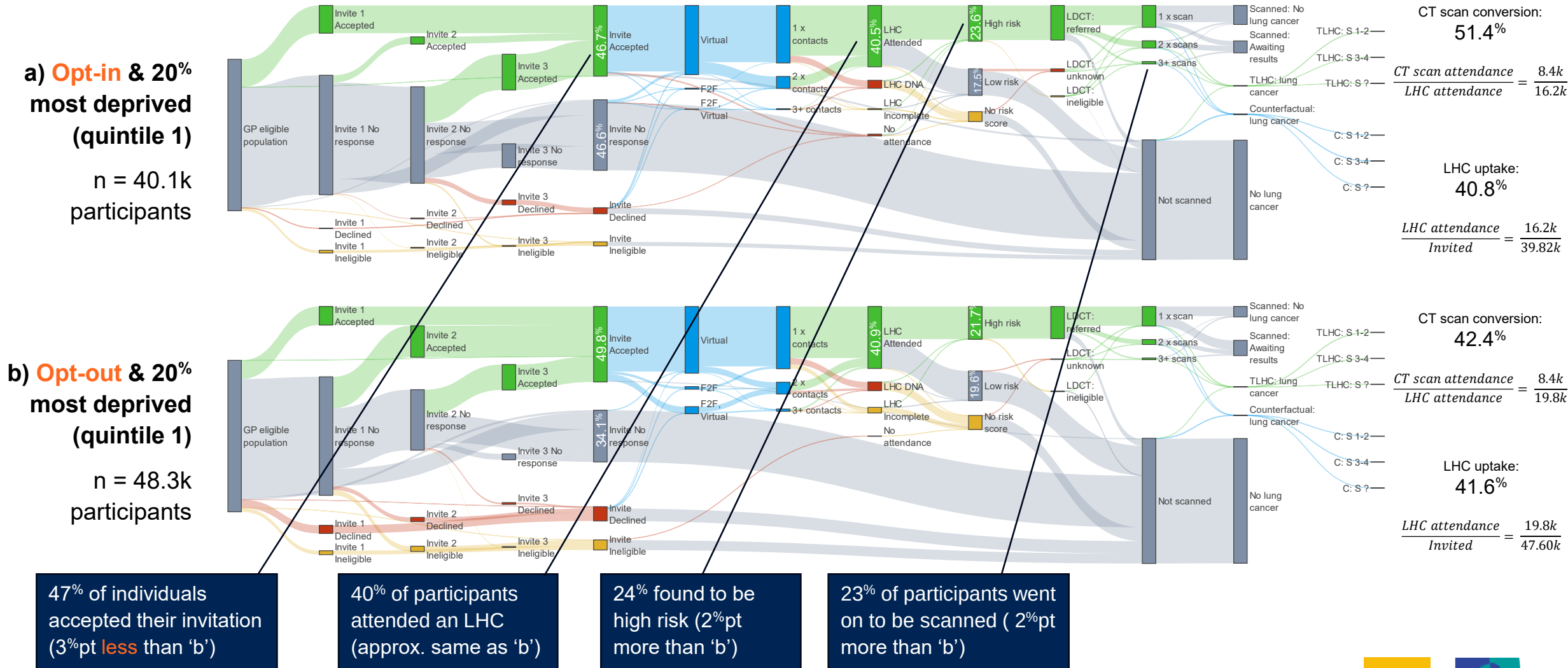
Opt-in models result in the larger proportion of invitees going on to receive a CT scan, which is more pronounced in invitees living in less deprived areas. In contrast, *Opt-out* models result in more people living in the most deprived areas going on to receive a scan.

The likelihood of a TLHC-associated lung cancer diagnosis is more alike between groups, though *Opt-in* models result in slightly higher rates overall, a trend that holds for lung cancers detected at an early stage.

⚠️ Deprivation was a factor in the selection of areas to pilot the TLHC programme, which means there is over-representation of higher deprivation areas in the data.

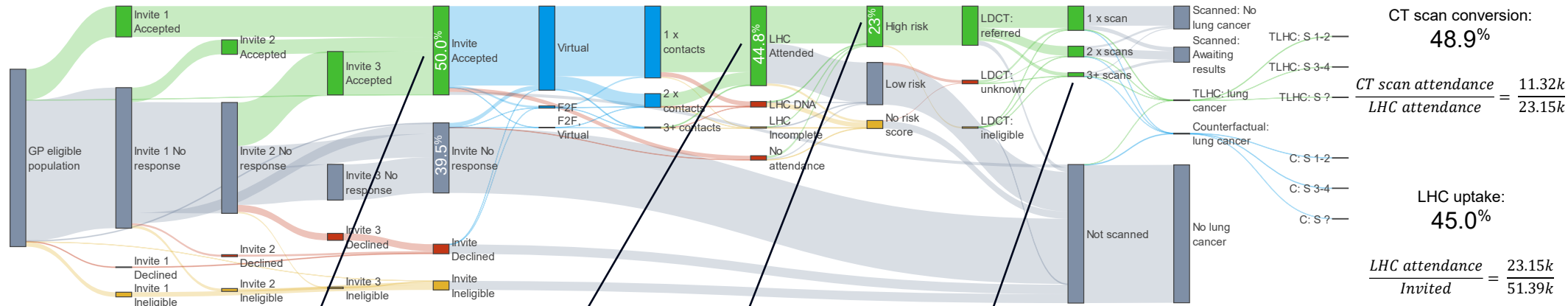


Both models have a similar LHC attendance rate (~41%), but Opt-in models are associated with 2% higher risk score for people living in areas of high deprivation, resulting in a 9%pt higher CT conversion rate.

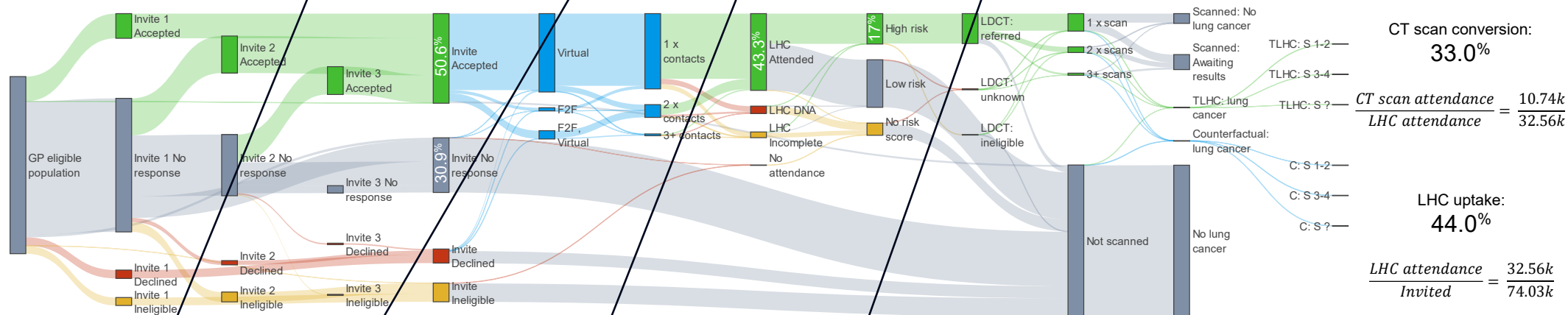


Individuals living in areas of less deprivation are 6%pt more likely to be found at high risk and 7%pt more likely to undergo at least one CT scan under the Opt-in model (16%pt higher CT scan conversion)

a) **Opt-in & less deprived (quintiles 2-5)**
n = 51.6k participants



b) **Opt-out & less deprived (quintiles 2-5)**
n = 75.1k participants



50% of individuals accepted their invitation (approx. same as 'b')

45% of participants attended an LHC (2%pt more than 'b')

23% found to be high risk (6%pt more than 'b')

22% of individuals went on to be scanned (7%pt more than 'b')

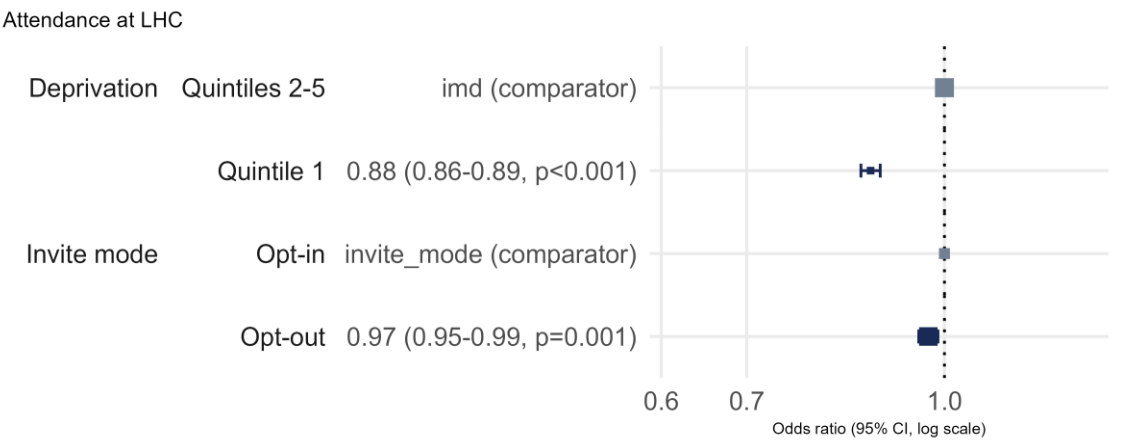


Invitees less likely to attend LHC or receive CT scan in Opt-out models, regardless of deprivation

Attendance at LHC

The odds of an invitee attending LHC are:

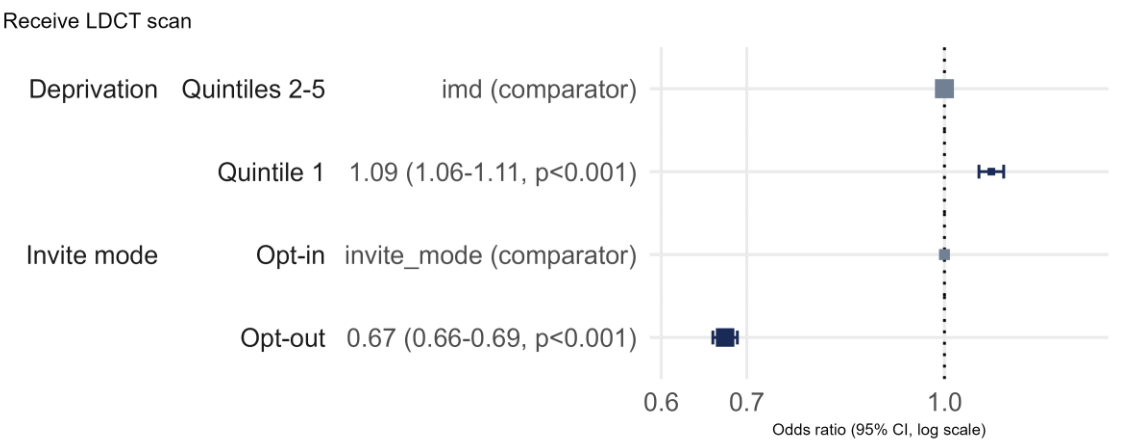
- decreased by **12% (OR 0.88)** if they live in an area of high deprivation when adjusted for invite model, this effect is statistically significant.
- decreased by **3% (OR 0.97)** from an **Opt-out model** when adjusted for deprivation, this effect is statistically significant.



LDCT

The odds of an invitee receiving a CT scan are:

- increased by **9% (OR 1.09)** if they live in an area of high deprivation when adjusted for invite model, this effect is statistically significant.
- decreased by **33% (OR 0.67)** from an **Opt-out model** when adjusted for deprivation, this effect is statistically significant.



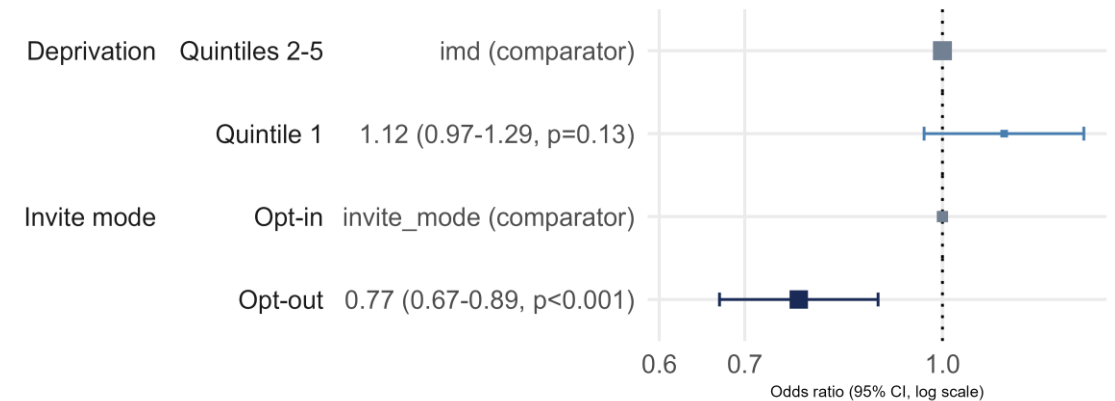
People invited to opt-in models are more likely to receive a cancer diagnosis which is early stage, regardless of deprivation

Lung Cancer Diagnosis

The odds of an invitee receiving a TLHC-associated lung cancer diagnosis are:

- unaffected by the deprivation of the area they live in, when adjusted for invite model, (not statistically significant).
- decreased by **23% (OR 0.77) from an Opt-out model** when adjusted for deprivation, this effect is statistically significant.

TLHC lung cancer outcome

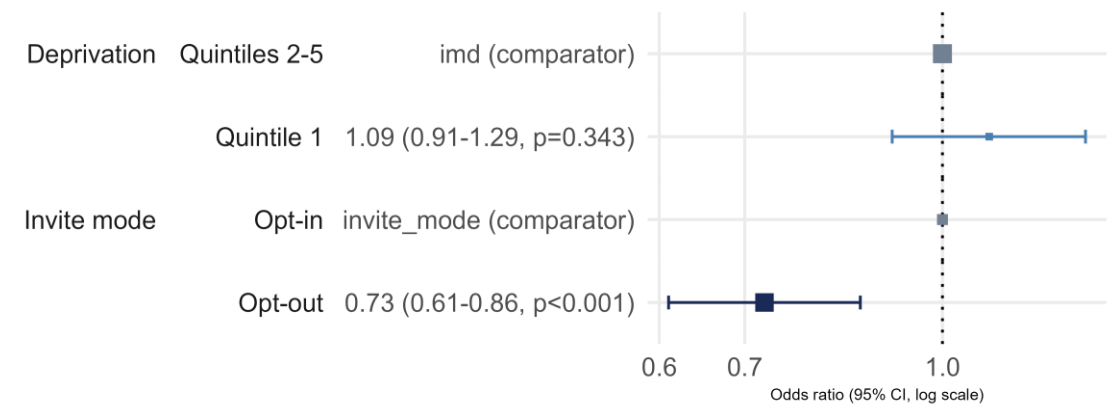


Early-stage lung cancer diagnosis

The odds of an invitee receiving a TLHC-associated lung cancer diagnosis which is either stage 1 or 2 are:

- unaffected by the deprivation of the area they live in, when adjusted for invite model, (not statistically significant).
- decreased by **27% (OR 0.73) from an Opt-out model** when adjusted for deprivation, this effect is statistically significant.

TLHC lung cancer stage 1 or 2



Opt-out invite models result in more people attending LHC, regardless of age. Opt-in models are slightly more likely to result in lung cancer diagnosis. ⚠️

Invitees who ...	Invite model	55-64 years	65-74 years
attend LHC	Opt-in	32.1%	40.0%
	Opt-out	40.7%	45.8%
are assessed as high risk	Opt-in	15.6%	28.7%
	Opt-out	18.1%	29.9%
receive at least one CT scan	Opt-in	13.4%	25.2%
	Opt-out	16.0%	28.0%
receive a TLHC-associated lung cancer diagnosis	Opt-in	0.2%	0.5%
	Opt-out	0.1%	0.3%
receive an early-stage TLHC-associated lung cancer diagnosis	Opt-in	0.1%	0.4%
	Opt-out	0.1%	0.2%

Opt-out models result in a larger proportion of invitees attending LHC, being assessed as high risk and going on to receive a CT scan. The effect is more pronounced in the older age group (65-74 years).

Conversely, *Opt-in* models are more likely to result in an invitee receiving a TLHC-associated lung cancer diagnosis.

Early-stage lung cancers (stages 1 or 2) are more likely to be detected in Opt-in models for the older age group (65-74 years).

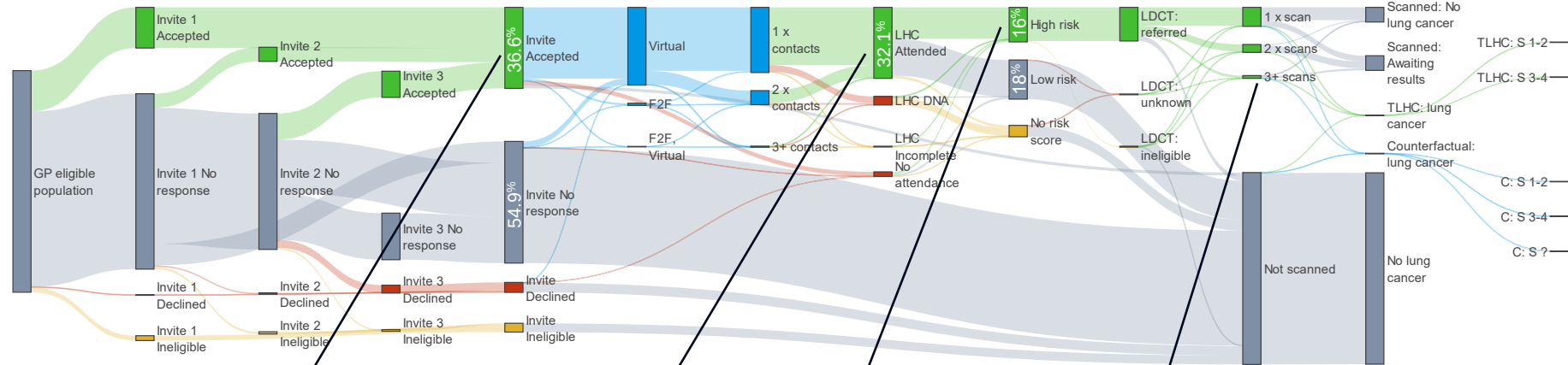
Age group is a stronger predictor than invite model on the likelihood of an invitee being assessed as high risk, undergoing a CT scan and receiving a lung cancer diagnosis.

⚠️ Age is a factor used in the risk assessments carried out at the LHC; ([LLPv3](#) and [PLCOm2012](#)), with older participants being considered at higher risk of developing lung cancer.

Opt-out models are associated with 9%pt greater invitee attendance at LHC and 3%pt more invitees more undergoing CT scan (2.6%pt greater CT scan conversion)

a) Opt-in & 55-64 years

n = 41.8k participants



CT scan conversion:
41.8%

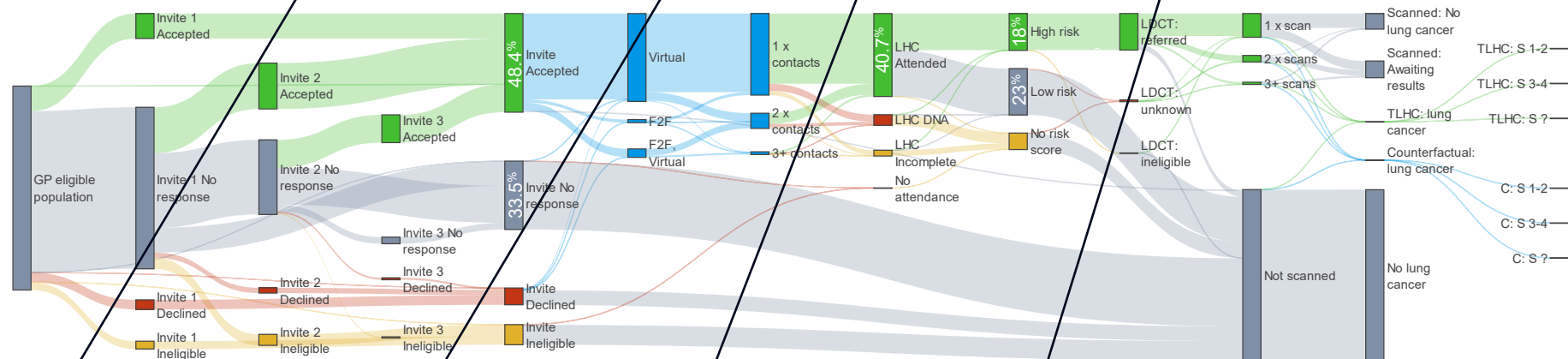
$$\frac{\text{CT scan attendance}}{\text{LHC attendance}} = \frac{5.6k}{13.4k}$$

LHC uptake:
32.1%

$$\frac{\text{LHC attendance}}{\text{Invited}} = \frac{13.4k}{41.8k}$$

b) Opt-out & 55-64 years

n = 63.0k participants



CT scan conversion:
39.2%

$$\frac{\text{CT scan attendance}}{\text{LHC attendance}} = \frac{10.1k}{25.6k}$$

LHC uptake:
40.7%

$$\frac{\text{LHC attendance}}{\text{Invited}} = \frac{25.6k}{62.97k}$$

37% of individuals accepted their invitation (12%pt less than 'b')

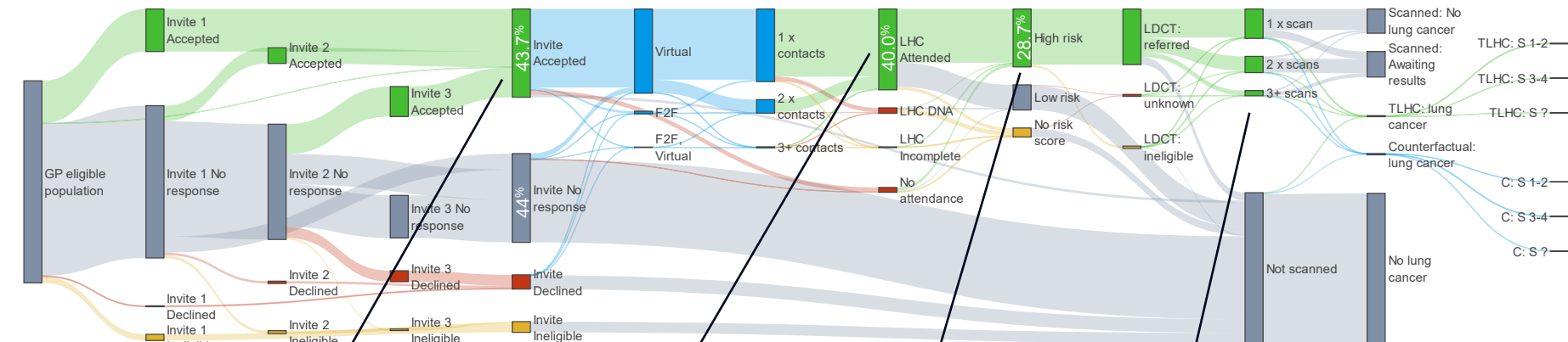
32% of participants attended an LHC (9%pt less than 'b')

16% found to be High risk (2%pt less than 'b')

13% of participants went on to be scanned (3%pt less than 'b')

Opt-out models are associated with 6%pt greater attendance at LHC and a modest 1%pt more invitees being assessed as high risk (1.9%pt higher CT scan conversion)

a) **Opt-in & 65-74 years**
n = 32.4k participants



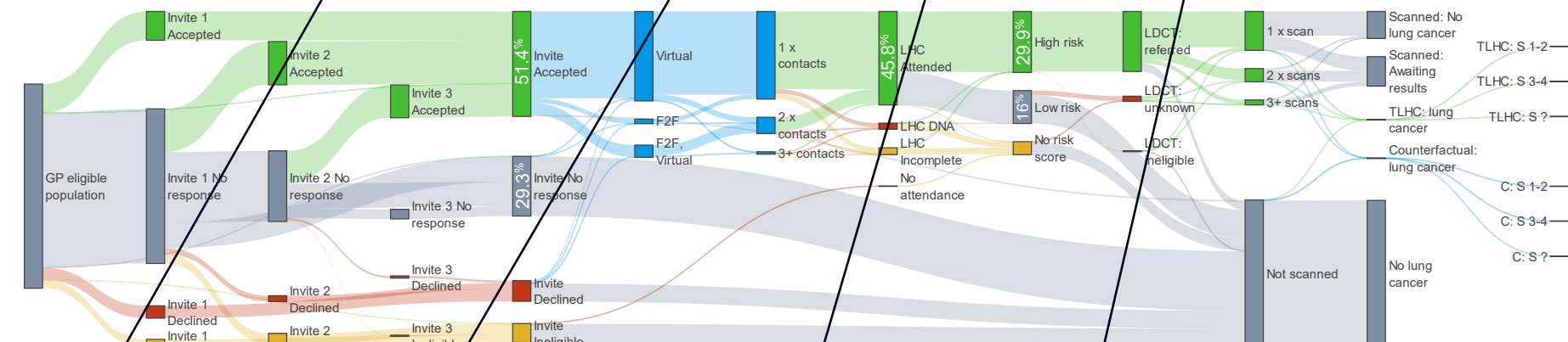
CT scan conversion: 63%

$$\frac{CT\ scan\ attendance}{LHC\ attendance} = \frac{8.2k}{12.9k}$$

LHC uptake: 40%

$$\frac{LHC\ attendance}{Invited} = \frac{12.9k}{32.4k}$$

b) **Opt-out & 65-74 years**
n = 52.7k participants



CT scan conversion: 61.1%

$$\frac{CT\ scan\ attendance}{LHC\ attendance} = \frac{14.8k}{24.1k}$$

LHC uptake: 45.8%

$$\frac{LHC\ attendance}{Invited} = \frac{24.1k}{52.7k}$$

44% of individuals accepted their invitation (7%pt less than 'b')

40% of participants attended an LHC (6%pt less than 'b')

29% found to be High risk (1%pt less than 'b')

25% of participants went on to be scanned (3%pt less than 'b')



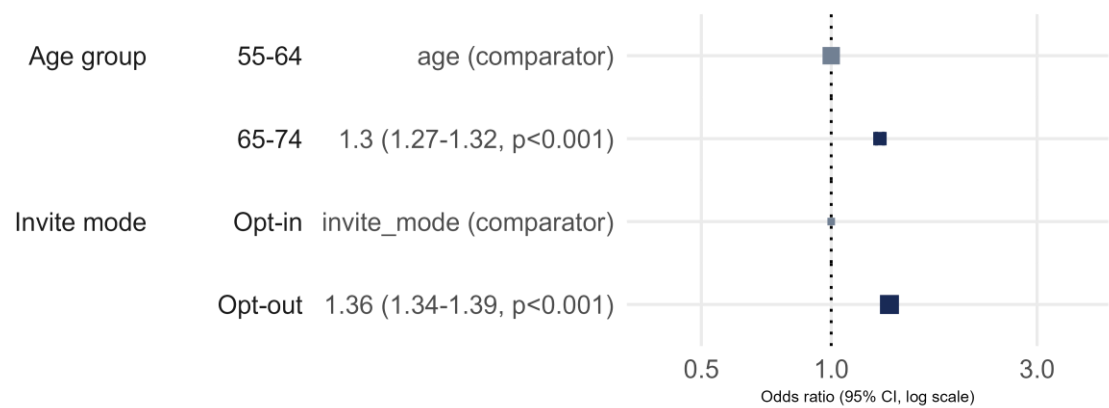
Invitees more likely to attend LHC and receive CT scan in Opt-out models regardless of age group

Attendance at LHC

The odds of an invitee attending LHC are:

- increased by **30% (OR 1.3)** if they are aged **65-74 years** when adjusted for invite model, this effect is statistically significant.
- increased by **36% (OR 1.36)** from an **Opt-out model** when adjusted for age, this effect is statistically significant.

Attendance at LHC

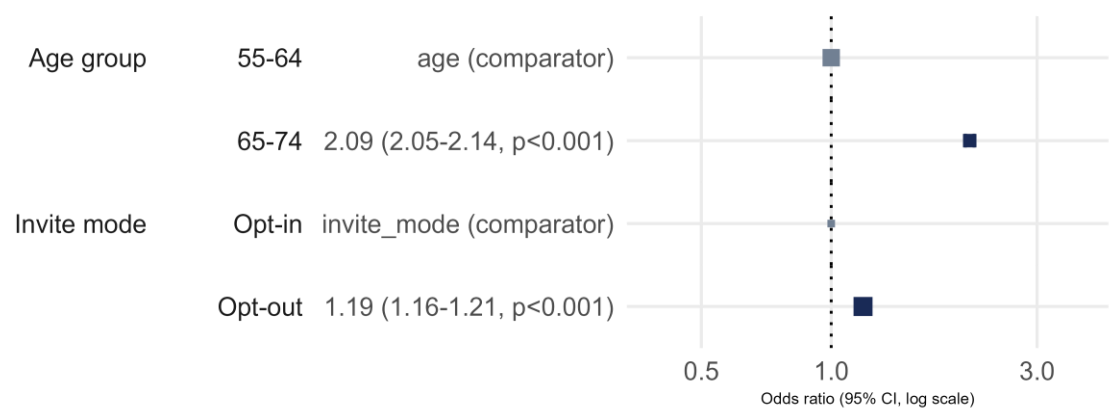


LDCT

The odds of an invitee receiving a CT scan are:

- increased by **109% (OR 2.09)** if they are aged **65-74 years** when adjusted for invite model, this effect is statistically significant.
- increased by **19% (OR 1.19)** from an **Opt-out model** when adjusted for age, this effect is statistically significant.

Receive LDCT scan

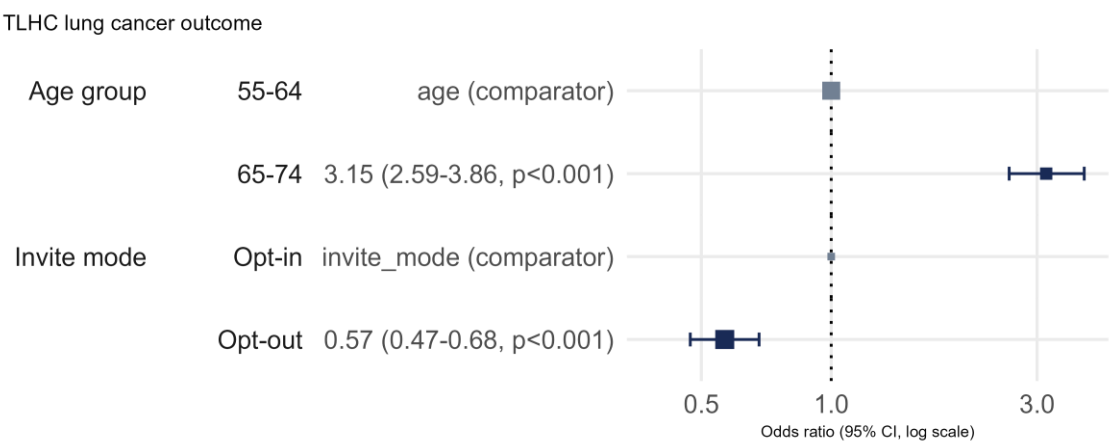


People invited to opt-in models are more likely to receive a cancer diagnosis which is early stage, regardless of age group

Lung Cancer Diagnosis

The odds of an invitee receiving a TLHC-associated lung cancer diagnosis are:

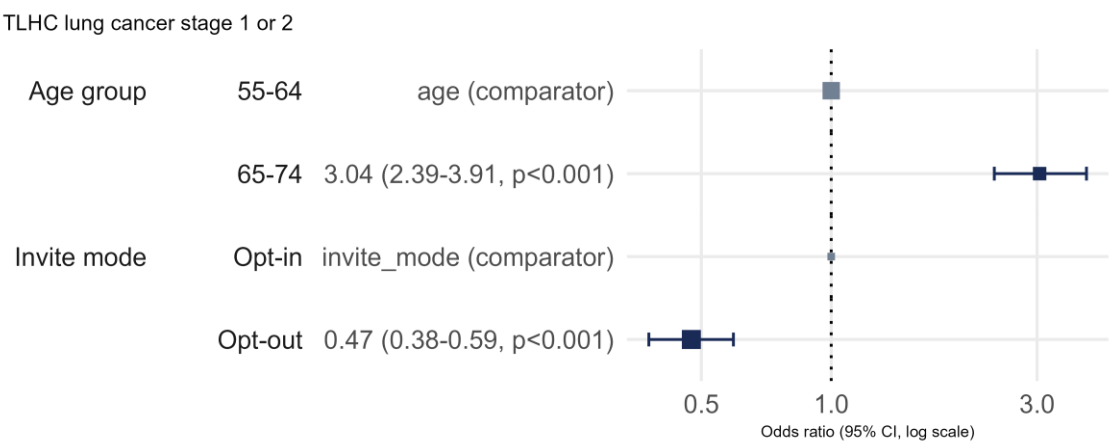
- increased by **215% (OR 3.15)** if they are aged **65-74 years** when adjusted for invite model, this effect is statistically significant.
- decreased by **43% (OR 0.57)** from an **Opt-out model** when adjusted for age, this effect is statistically significant.



Early-stage lung cancer diagnosis

The odds of an invitee receiving a TLHC-associated lung cancer diagnosis which is either stage 1 or 2 are:

- increased by **204% (OR 3.04)** if they are aged **65-74 years** when adjusted for invite model, this effect is statistically significant.
- decreased by **53% (OR 0.47)** from an **Opt-out model** when adjusted for age, this effect is statistically significant.



06.

Complex interactions

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Looking at complex interactions between demographic and implementation model factors

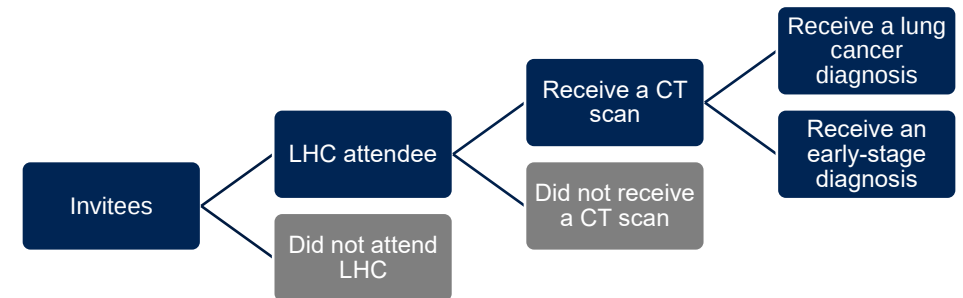
So far in this report we have examined the association between implementation model or demographic details on the likelihood of an eligible person attending LHC, receiving a scan and subsequently a lung cancer diagnosis.

This has been mostly for a single factors, for example comparing *in-house* and *outsourced* administrative models, and for intersections between two factors, such as *deprivation* and *implementation model*.

This section highlights some net effects of including *multiple* demographic and implementation models together in analysis of:

- an invitee's likelihood of attendance at LHC,
- an LHC attendee's likelihood of receiving a CT scan,
- a CT scan recipient's likelihood of receiving a TLHC-associated lung cancer diagnosis, and
- a CT scan recipient's likelihood of an early-stage TLHC-associated lung cancer diagnosis.

The result shows which factors remain significant after adjusting for each of the others. The benefit of this is to see which factors have the strongest associations with each of the four outcomes.



Outsourced administration and Triage models are associated with greater LHC attendance. Triage and Hybrid LHC delivery models are associated with higher CT scan rates.

Attendance at LHC

Outsourced administrative models and *Triage* models are strongly associated with whether an invitee attends their LHC.

Smoking status is very strongly associated with LHC attendance, though this is confounded by smoking status being confirmed at LHC.

Hybrid and *Face-to-Face* LHC delivery models are also strongly associated, though these models are provided by few TLHC projects, which raises questions about their generalisability.

People of *Other than White* ethnicity and whose ethnicity is not known were significantly less likely to attend an LHC.

Opt-in models are also associated with fewer invitees attending LHC.

Receiving a CT scan

Triage models and *Hybrid* LHC delivery models are associated with a greater likelihood of an LHC attendee going on to receive a CT scan.

LHC attendees in older age groups (65-74), or those whose age is '*Other*' (i.e. were younger than 55 or older than 75 years), were strongly associated with a greater likelihood to go on to receive a CT scan, though this is confounded by age being a factor in the risk scoring systems used at LHC, with older age groups considered at greater risk.

Female LHC attendees were less likely than Male attendees to go on to receive a CT scan.

Opt-in and *Opt-out* were associated with

decreased likelihood for their LHC attendees to go onto a CT scan when compared with *Combined* models.

Other factors are associated with a reduced likelihood of going on to CT scan but have caveats regarding their generalisability, including:

- *Face-to-Face* LHC delivery models,
- Age is *Not known*,
- LHC attendees living in areas of less deprivation (Q2-5)

(NB, F2F LHC model was offered by only one project. Age and ethnicity are part of the risk assessment tools used at the LHC. Deprivation was a factor in the choice of areas to pilot the TLHC programme).

F2F and Hybrid LHC models associated with higher rate of lung cancer diagnosis. Women, current smokers and older age groups also associated with higher lung cancer detection.

Receiving a TLHC-associated lung cancer diagnosis

Face-to-Face and *Hybrid* LHC models are associated with CT scan recipients receiving a lung cancer diagnosis.

Triage models are also associated with greater likelihood of CT scan recipients receiving a lung cancer diagnosis.

To a lesser extent, *Opt-out* invite methods were more likely to result in a lung cancer diagnosis.

The reason for these implementation models being associated with higher rates of TLHC-associated lung cancer diagnoses is unclear.

Women were more likely to receive a lung cancer diagnosis, despite being less likely than men to receive a CT scan.

Current smokers were more likely than *previous smokers* and people whose smoking status is *unknown* to receive a lung cancer diagnosis.

Older age groups and CT scan recipients whose age is *Not known* were strongly associated with a lung cancer diagnosis.

Receiving an early-stage TLHC-associated lung cancer diagnosis

Only one adjusted factor remains significant to the likelihood of a CT scan recipient receiving an early-stage lung cancer diagnosis.

Age group of *Not known* is weakly associated with a greater likelihood of receiving an early-stage lung cancer diagnosis. The reason for this association remains unclear.

Attendance at LHC

Adjusting for all factors, the following are associated with **increased** likelihood of an invitee attending their LHC:

- *Face-to-Face* and *Hybrid* LHC models (OR 1.88 & 14.08), ⚠
- *Outsourced* administrative models (OR 7.46),
- *Triage* models (OR 3.1)
- *Current* or *Previous* smoker (OR 58.2 & 40.02) ⚠

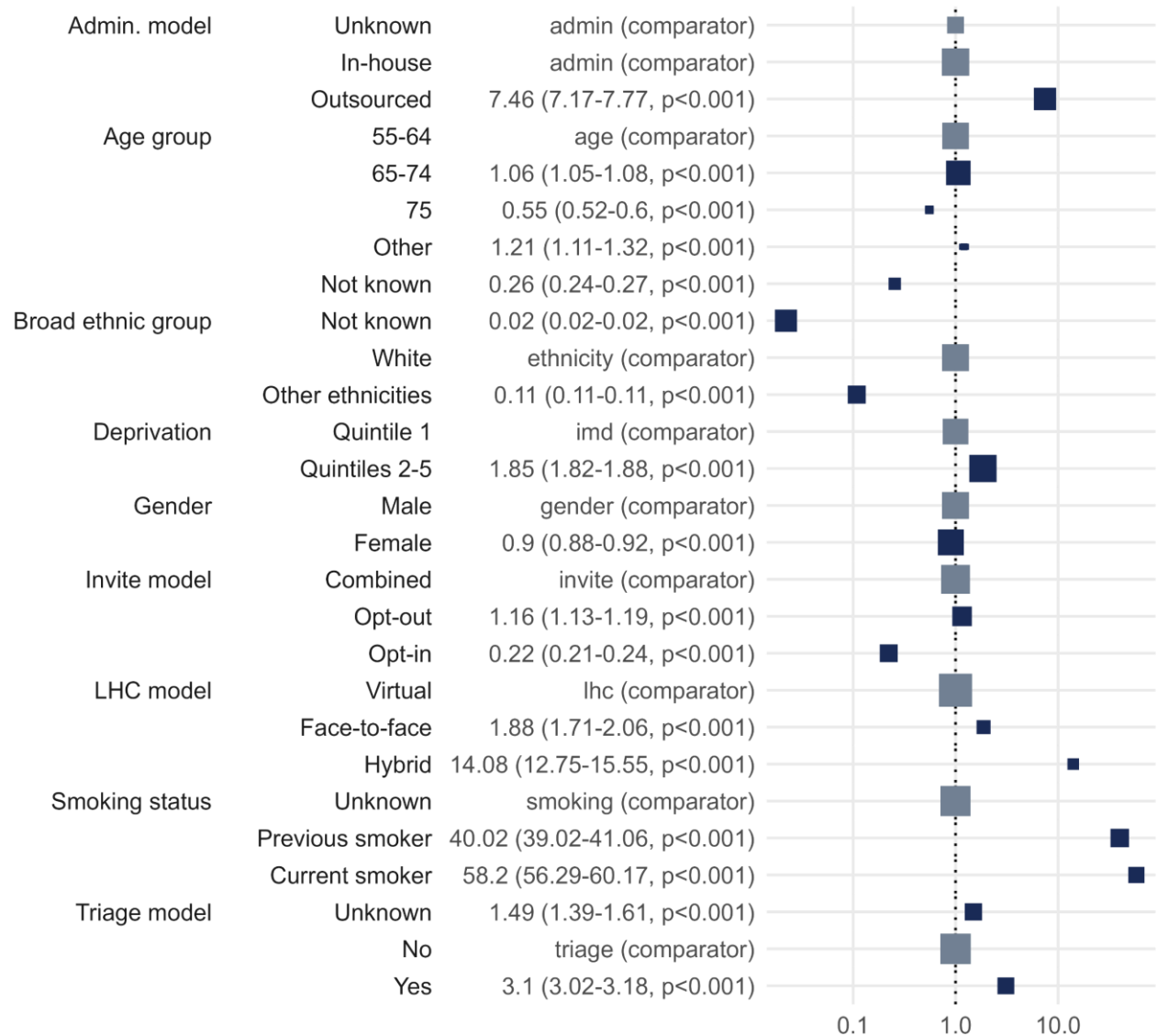
The following are associated with **decreased** likelihood of an invitee attending their LHC:

- *Other-than-white* ethnic backgrounds and people of *Unknown* ethnicity (OR 0.11 & 0.02),
- Age is *Not known* or *75 yrs* (OR 0.26 & 0.55),
- *Opt-in* invite models (OR 0.22)

⚠ Risk of confounding

Attendance at LHC

Odds Ratio (OR) plot with 95% Confidence Interval (CI)



No issues with multicollinearity – all Generalised Variance Inflation Factor values below 3 – except Admin. Model (Unknown), which was excluded from model

Odds ratio (95% CI, log scale)
AIC: 335,798

Receiving a CT scan

Adjusting for all factors, the following are associated with **increased** likelihood of an LHC *attendee* receiving a CT scan:

- *Triage* model or unknown *Triage* model (OR 2.06 & 9.97),
- *Current* or *Previous* smoker (OR 6.3 & 1.4), ⚠️
- *Hybrid* LHC model (OR 4.76),
- Aged 65-74, 75, or age *Unknown* (OR 3.01, 5.86 & 6.07), ⚠️

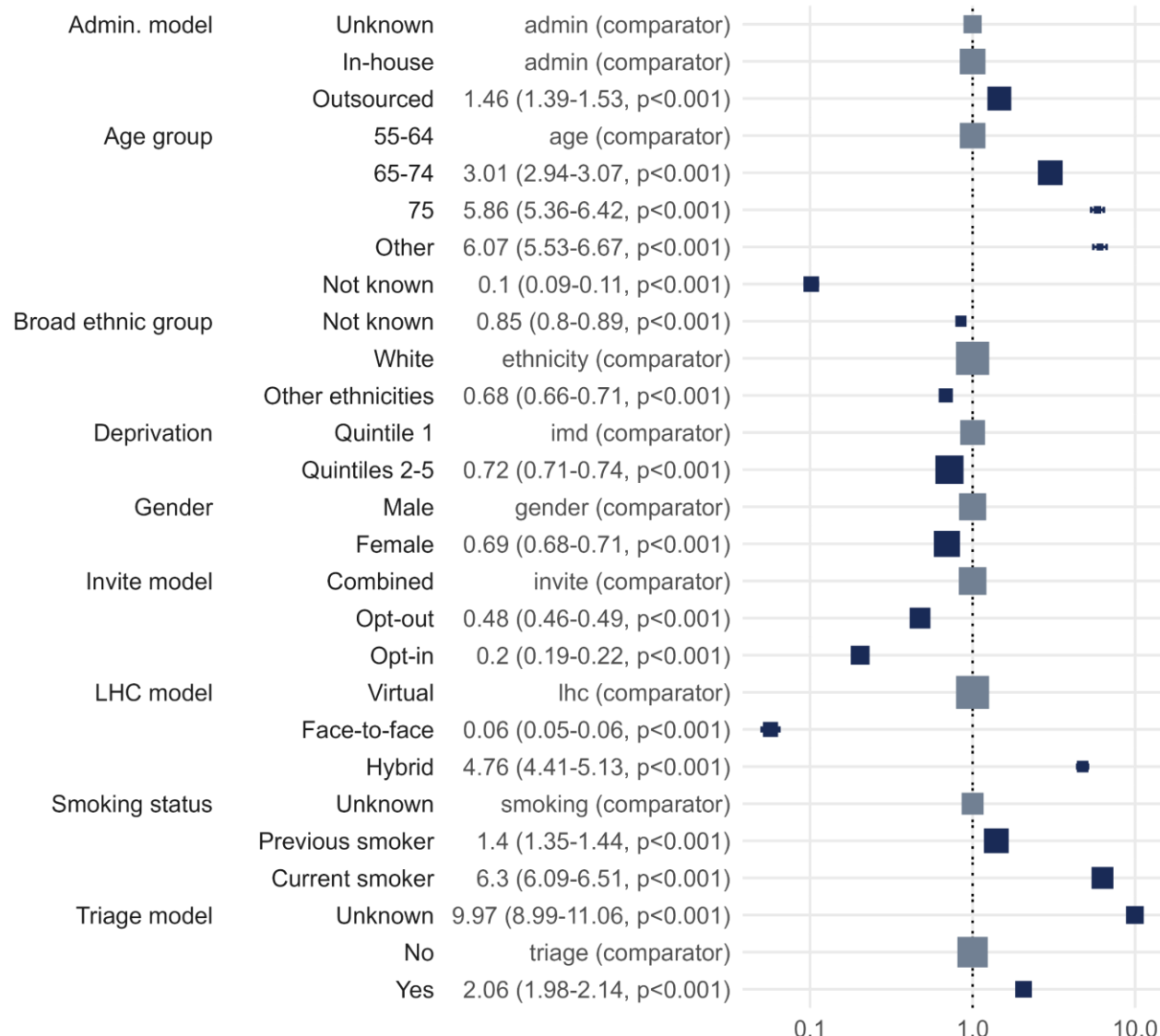
The following are associated with **decreased** likelihood of an LHC *attendee* receiving a CT scan :

- *Face-to-Face* LHC delivery (OR 0.06) ⚠️
- *Opt-in* and *Opt-out* invite models (OR 0.2 & 0.48),
- Age is *Not known* (OR 0.1), ⚠️
- *Other-than-white* ethnic backgrounds and people of unknown ethnicity (OR 0.2 & 0.07), ⚠️
- *Women* (OR 0.69),
- People living in deprivation *Quintiles 2-5* (OR 0.72) ⚠️

⚠️ Risk of confounding

Receive LDCT scan

Odds Ratio (OR) plot with 95% Confidence Interval (CI)



No issues with multicollinearity – all Generalised Variance Inflation Factor values below 5 – except Admin. Model (Unknown), which was excluded from model

Odds ratio (95% CI, log scale)
AIC: 241,778

Receiving a TLHC-associated lung cancer diagnosis

Adjusting for all factors, the following are associated with **increased** likelihood of a *CT scan recipient* receiving a TLHC-associated lung cancer diagnosis:

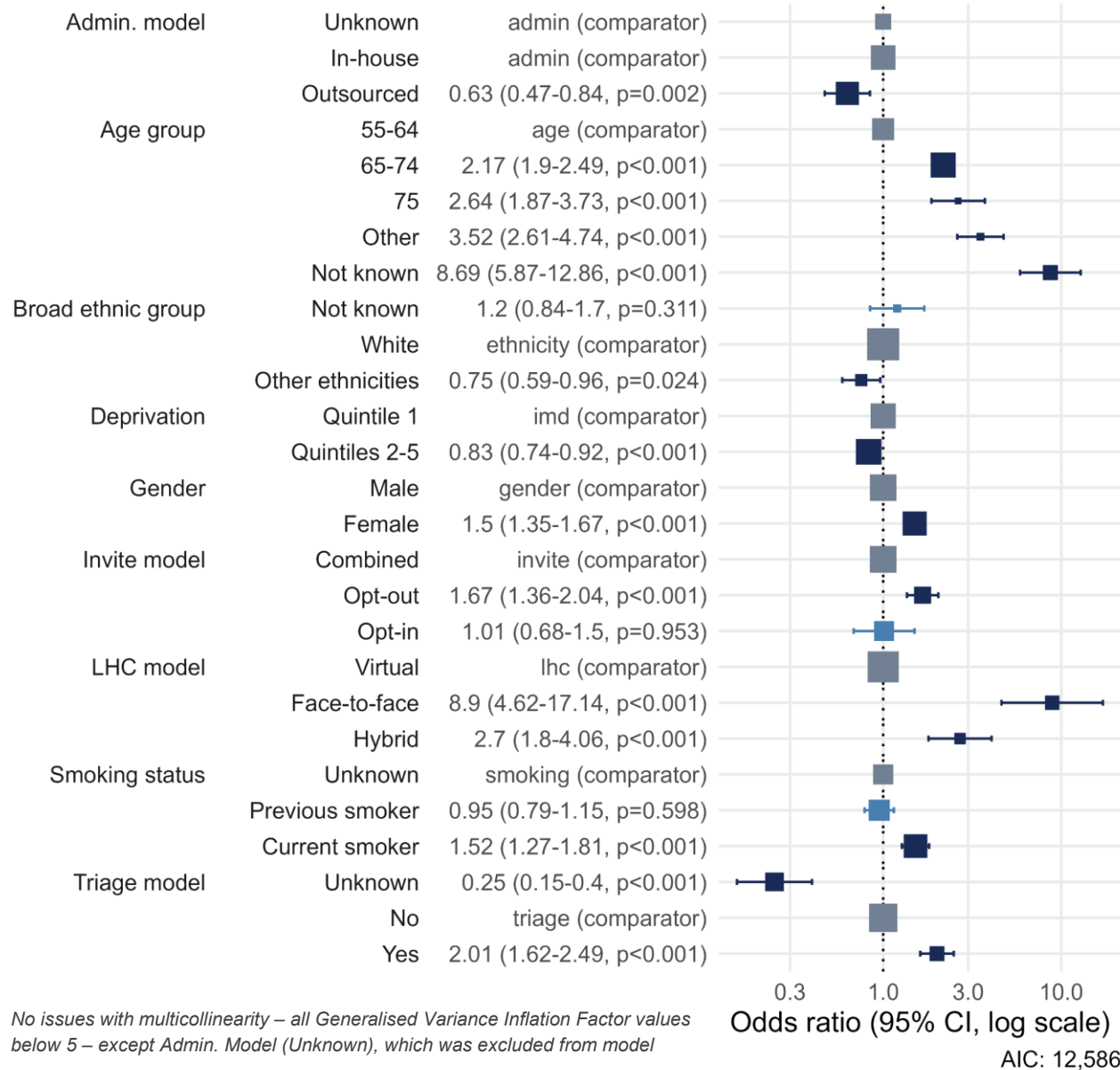
- *F2F* or *Hybrid* LHC model (OR 8.9 & 2.7),
- Aged 65-74, 75 or age *Unknown* (OR 2.17, 2.64 & 8.69), ⚠️
- *Triage* model (OR 2.01),
- *Current* smoker (OR 2.01),
- Opt-out invite model (OR 1.67),
- Women (OR 1.5)

The following are associated with **decreased** likelihood of *CT scan recipient* receiving a TLHC-associated lung cancer diagnosis:

- *Unknown* triage model (OR 0.25),
- *Outsourced* admin. Model (OR 0.63),
- Age is *Not known* (OR 0.1),
- People living in deprivation *Quintiles 2-5* (OR 0.83) ⚠️

⚠️ Risk of confounding

TLHC lung cancer outcome
Odds Ratio (OR) plot with 95% Confidence Interval (CI)



Receiving an early-stage lung cancer diagnosis

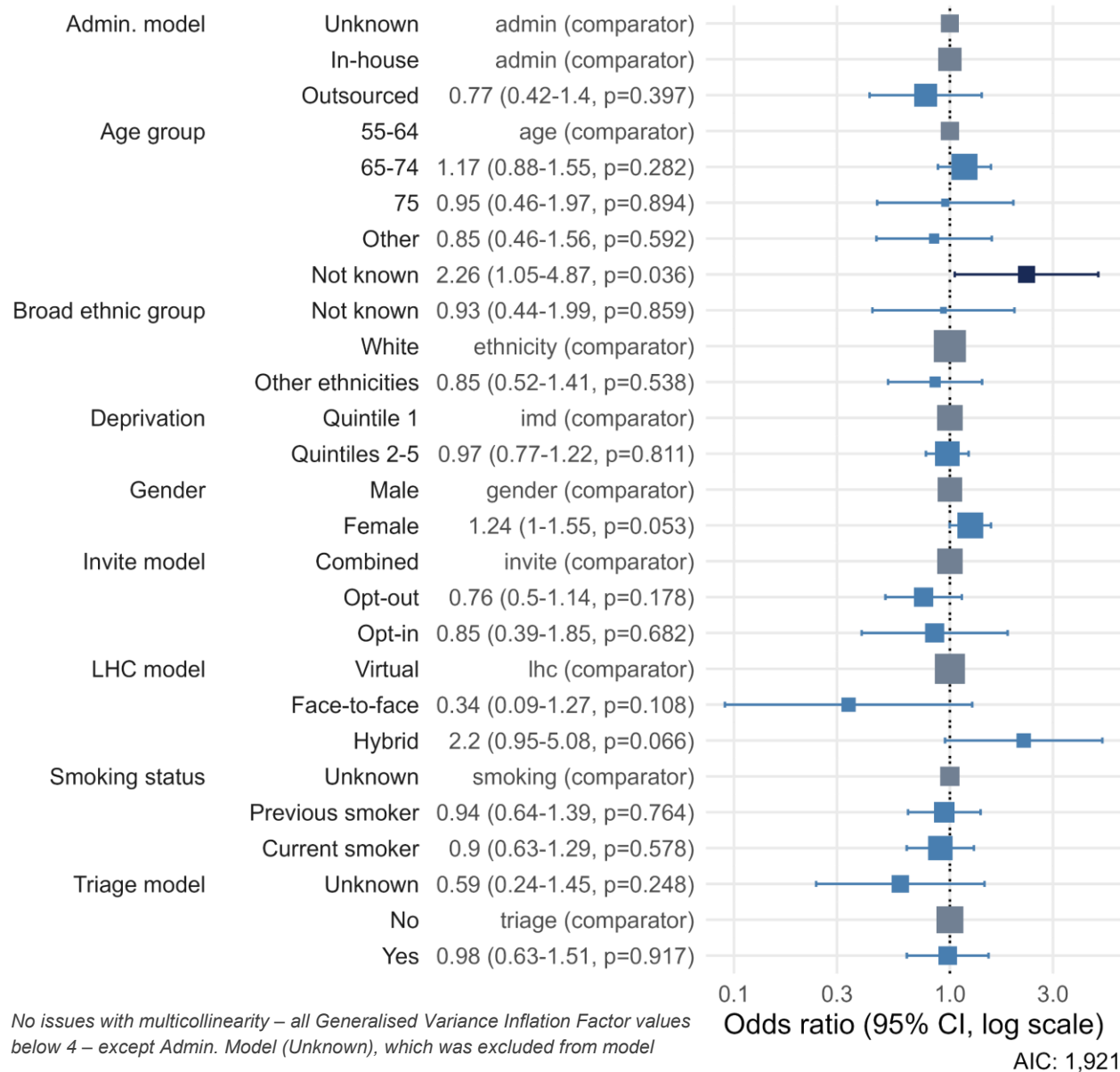
Adjusting for all factors, the following are associated with **increased** likelihood of a person with a TLHC-associated lung cancer diagnosis being diagnosed at an early stage (either stage 1 or stage 2):

- Age group is *Not known* (OR 2.26). ⚠️

No other factor is associated. This is possibly due to greater uncertainty caused by the smaller number of people in this cohort resulting in larger confidence intervals larger which are therefore more likely to cross the dotted line.

273 people with an unknown age received a lung cancer diagnosis. Age was supplied by participating projects as a numeric value, and where this is unknown it is because no value was provided for these people.

TLHC lung cancer stage 1 or 2
Odds Ratio (OR) plot with 95% Confidence Interval (CI)



07.

Appendix

◀ Back to contents

Summary tables of report findings

Attendance at LHC

Factor	Feature	LHC uptake	Net effect (Odds Ratio)
Invite model	Opt-in	43%	0.22
	Opt-out	46%	1.16
	Combined	33%	1.00
Triage	Triage	40%	3.10
	No Triage	37%	1.00
LHC method ⚠️	Face-to-face	48%	1.88
	Virtual	37%	1.00
	Hybrid	37%	14.08
Administration	In-house	32%	1.00
	Outsourced	47%	7.46
Deprivation ⚠️	Quintile 1	34%	1.00
	Quintiles 2-5	40%	1.85
Age group	55-64	33%	1.00
	65-74	39%	1.06
	75	35%	0.55
Gender	Male	38%	1.00
	Female	38%	0.90
Ethnicity	White	64%	1.00
	Other ethnicities	31%	0.11
Smoking status ⚠️	Current smoker	88%	58.20
	Previous smoker	85%	40.02
	Unknown	16%	1.00

Receiving a CT scan

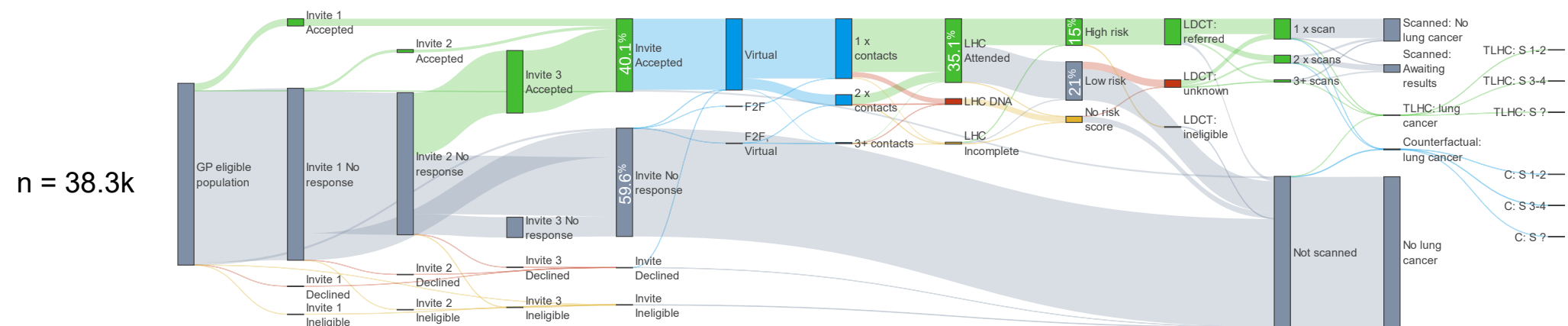
Factor	Feature	CT scan conversion (realised)	Eligible population (%)	Net effect on LHC attendees (Odds Ratio)
Invite model	Opt-in	51%	22%	0.22
	Opt-out	45%	20%	1.16
	Combined	58%	19%	1.00
Triage	Triage	55%	21%	2.06
	No Triage	54%	19%	1.00
LHC method ⚠️	Face-to-face	49%	23%	0.06
	Virtual	53%	19%	1.00
	Hybrid	62%	23%	4.76
Administration	In-house	59%	18%	1.00
	Outsourced	47%	21%	1.46
Deprivation ⚠️	Quintile 1	57%	19%	1.00
	Quintiles 2-5	47%	18%	0.72
Age group ⚠️	55-64	43%	14%	1.00
	65-74	66%	25%	3.01
	75	84%	29%	6.07
Gender	Male	57%	21%	1.00
	Female	48%	18%	0.69
Ethnicity ⚠️	White	51%	32%	1.00
	Other ethnicities	49%	15%	0.68
Smoking status ⚠️	Current smoker	69%	60%	6.30
	Previous smoker	46%	39%	1.40
	Unknown	46%	7%	1.00

Summary tables of report findings

Diagnosed with lung cancer

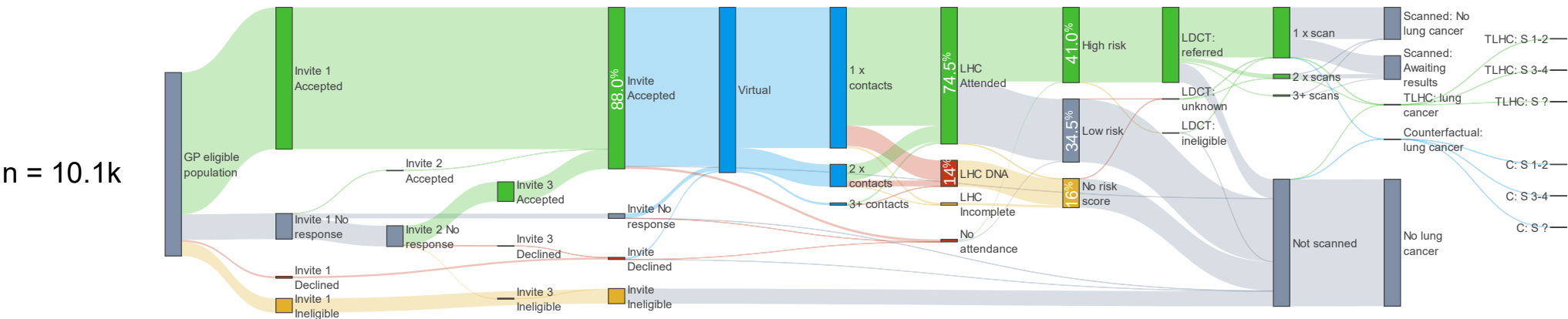
Factor	Feature	Eligible population (%)	Net effect on CT recipients (Odds Ratio)
Invite model	Opt-in	0.4%	1.01
	Opt-out	0.3%	1.67
	Combined	0.2%	1.00
Triage	Triage	0.4%	2.01
	No Triage	0.2%	1.00
LHC method ⚠️	Face-to-face	0.4%	8.90
	Virtual	0.2%	1.00
	Hybrid	0.7%	2.70
Administration	In-house	0.2%	1.00
	Outsourced	0.3%	0.63
Deprivation ⚠️	Quintile 1	0.3%	1.00
	Quintiles 2-5	0.2%	0.83
Age group ⚠️	55-64	0.1%	1.00
	65-74	0.4%	2.17
	75	0.4%	2.64
Gender	Male	0.2%	1.00
	Female	0.3%	1.50
Ethnicity ⚠️	White	0.5%	1.00
	Other ethnicities	0.1%	0.75
Smoking status ⚠️	Current smoker	1.0%	1.52
	Previous smoker	0.4%	0.95
	Unknown	0.1%	1.00

Blackburn, Darwen and Blackpool



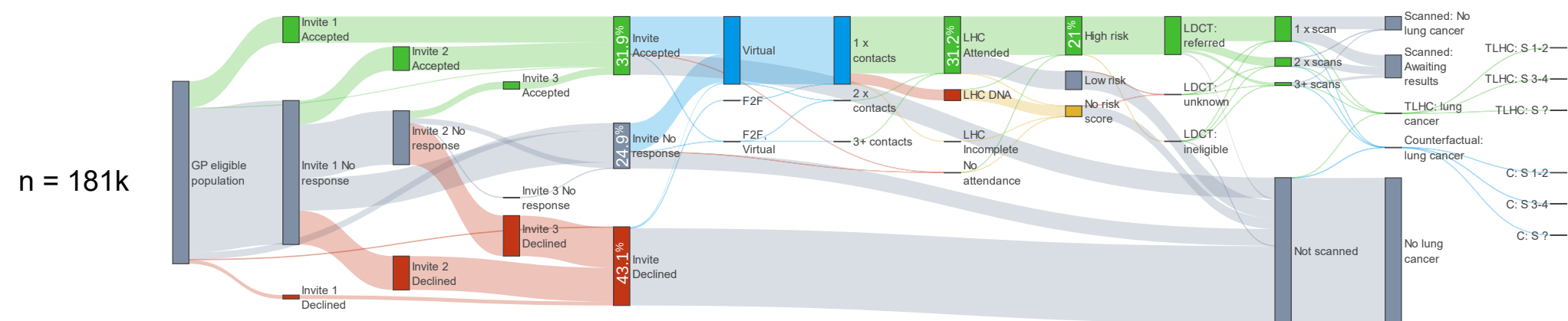
Cancer Alliance	Phase	Invite mode	Triage before risk assessment
Lancashire and South Cumbria	Original	Opt-in	Unknown

Bradford



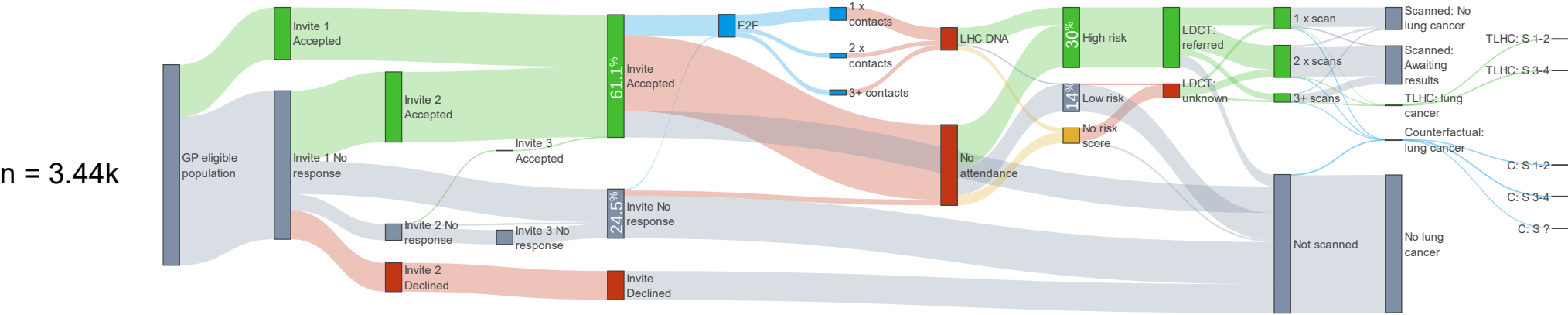
Cancer Alliance	Phase	Invite mode	Triage before risk assessment
West Yorkshire and Harrogate	Onboarded	Opt-in	No

Cheshire and Merseyside



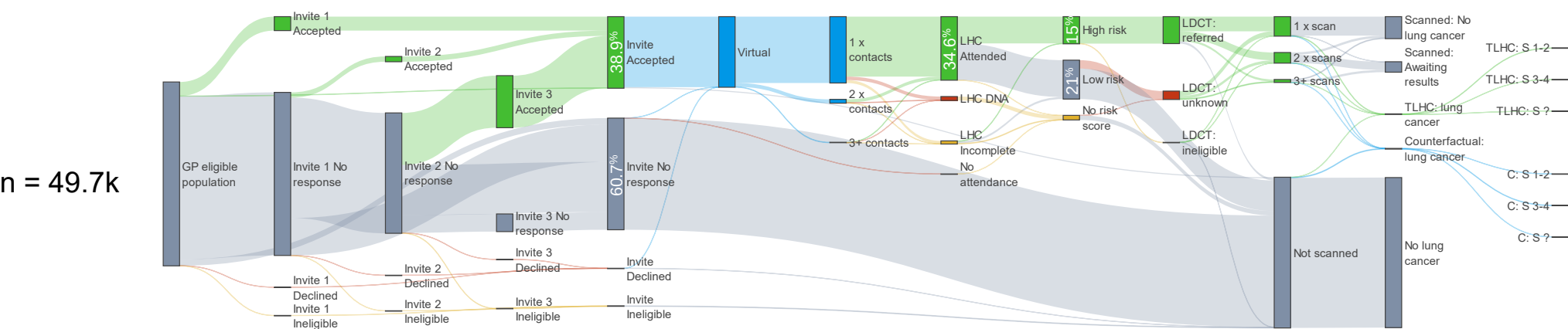
Cancer Alliance	Phase	Invite mode	Triage before risk assessment
Cheshire and Merseyside	Onboarded	Combined	No

Corby

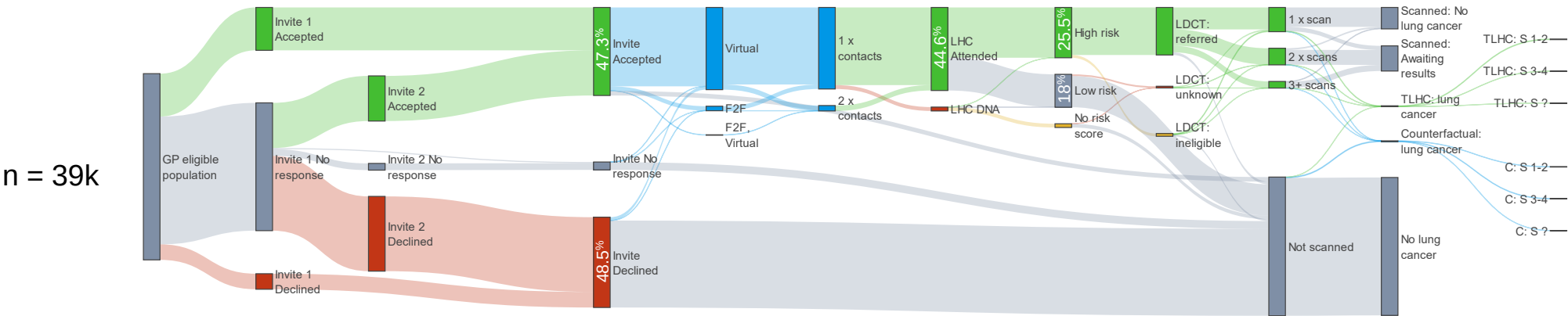


Cancer Alliance	Phase	Invite mode	Triage before risk assessment
East Midlands	Original	Opt-in	Unknown

Doncaster

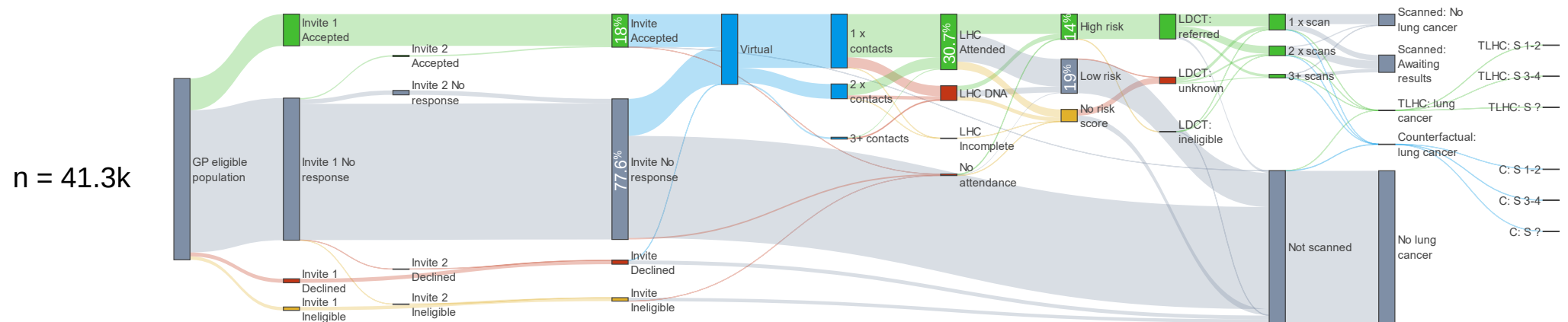


Cancer Alliance	Phase	Invite mode	Triage before risk assessment
South Yorkshire and Bassetlaw	Original	Opt-out	Yes



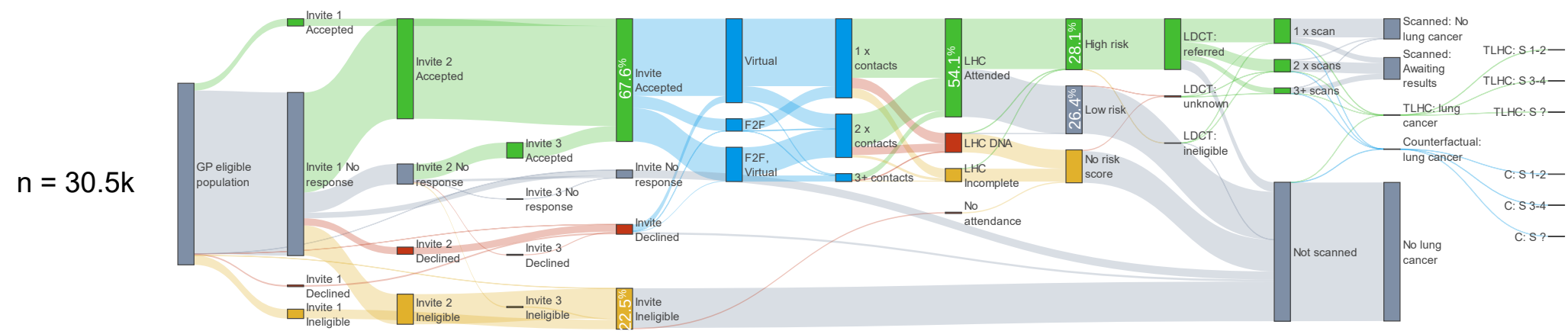
Cancer Alliance	Phase	Invite mode	Triage before risk assessment
Humber, Coast and Vale	Original	Combined	Yes

Luton & South Bedfordshire



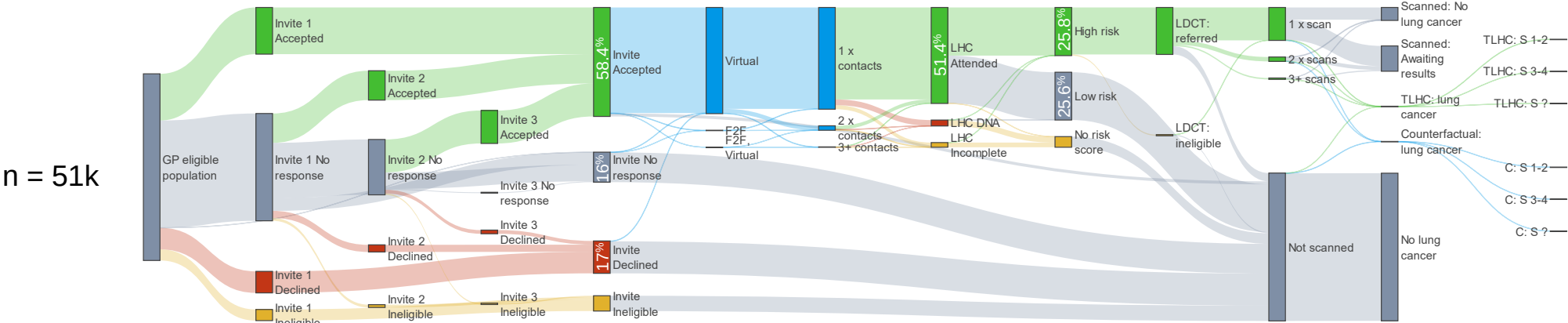
Cancer Alliance	Phase	Invite mode	Triage before risk assessment
East of England – South	Original	Combined	No

Mansfield and Ashfield



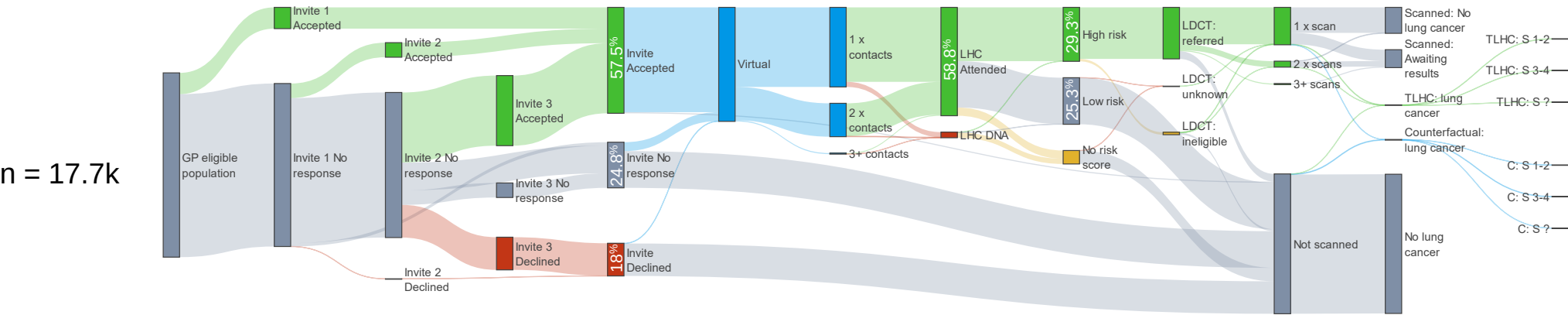
Cancer Alliance	Phase	Invite mode	Triage before risk assessment
East Midlands	Original	Opt-out	No

Newcastle Gateshead



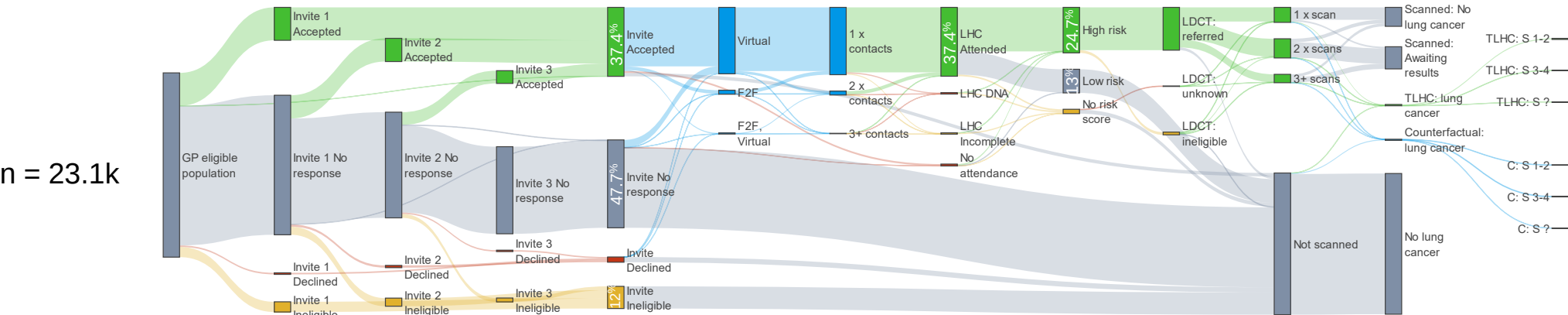
Cancer Alliance	Phase	Invite mode	Triage before risk assessment
Northern	Original	Opt-out	No

North Kirklees



Cancer Alliance	Phase	Invite mode	Triage before risk assessment
West Yorkshire and Harrogate	Original	Opt-in	No

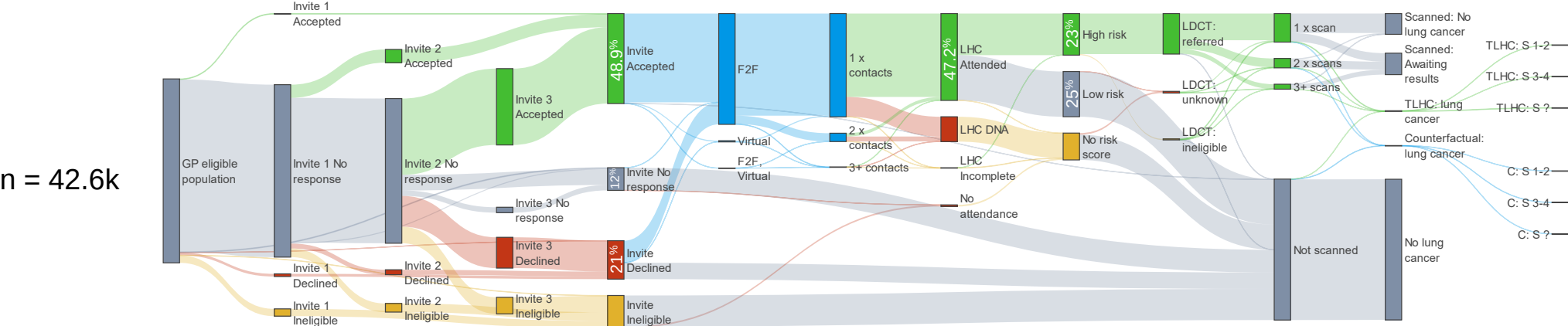
Southampton



Cancer Alliance	Phase	Invite mode	Triage before risk assessment
Wessex	Original	Opt-in	No

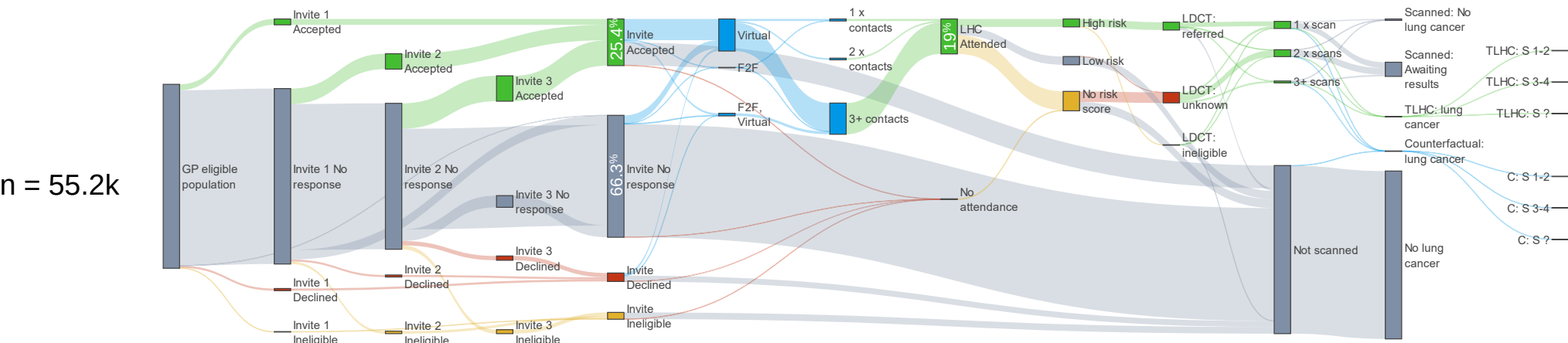


Tameside and Glossop



Cancer Alliance	Phase	Invite mode	Triage before risk assessment
Greater Manchester	Original	Combined	Unknown

Thurrock



Cancer Alliance	Phase	Invite mode	Triage before risk assessment
East of England – South	Original	Combined	No

Ipsos Standards & Accreditations

Ipsos's standards & accreditations provide our clients with the peace of mind that they can always depend on us to deliver reliable, sustainable findings. Moreover, our focus on quality and continuous improvement means we have embedded a 'right first time' approach throughout our organisation.



ISO 20252 – is the international market research specific standard that supersedes BS 7911 / MRQSA & incorporates IQCS (Interviewer Quality Control Scheme); it covers the 5 stages of a Market Research project. Ipsos UK was the first company in the world to gain this accreditation.



MRS Company Partnership – By being an MRS Company Partner, Ipsos UK endorse and support the core MRS brand values of professionalism, research excellence and business effectiveness, and commit to comply with the MRS Code of Conduct throughout the organisation & we were the first company to sign our organisation up to the requirements & self regulation of the MRS Code; more than 350 companies have followed our lead.



ISO 9001 – International general company standard with a focus on continual improvement through quality management systems. In 1994 we became one of the early adopters of the ISO 9001 business standard.



ISO 27001 – International standard for information security designed to ensure the selection of adequate and proportionate security controls. Ipsos UK was the first research company in the UK to be awarded this in August 2008.



The UK General Data Protection Regulation (UK GDPR) & the UK Data Protection Act 2018 (DPA) – Ipsos UK is required to comply with the UK General Data Protection Regulation and the UK Data Protection Act; it covers the processing of personal data and the protection of privacy.



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Fair Data – Ipsos UK is signed up as a 'Fair Data' Company by agreeing to adhere to ten core principles. The principles support and complement other standards such as ISOs, and the requirements of Data Protection legislation.

This work was carried out in accordance with the requirements of the international quality standard for market research, ISO 20252



Thank you.

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