Is targeted lung cancer screening an opportune time to address cardiovascular risk?

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Lung cancer and cardiovascular disease (CVD) are both leading causes of mortality and morbidity in the UK and worldwide.[1 2] Every day in the UK, approximately 130 people learn that they have lung cancer, and nearly 100 die because of it.[3] For CVD, the numbers are even greater; on average, 460 people die each day due to it.[4] These are pause for thought statistics that are a call to action for evidence-based public health initiatives that make a difference.

In early 2019, NHS England rolled out its targeted screening programme for lung cancer with low-radiation dose CT. At an estimated cost of £70 million, 10 regional community lung health check projects are planned, starting in areas with greatest lung cancer death rates and targeting high-risk individuals.[5 6] Central to this initiative was the Macmillan funded Manchester study, which targeted these hard to reach individuals in the community as opposed to established healthcare settings. Health economics analysis indicated this approach was cost-effective, with high rates of early-stage lung cancer detection, which were amenable to radical treatments.[7 8] There is ongoing debate, however, about the relative merits of a national targeted lung cancer screening project, particularly in the setting of an already overstretched NHS.[9] To this end, rigorous audit and governance of the programme are crucial.[5] Interestingly, alongside lung cancer detection, several lung cancer screening studies have also shown their study cohorts are at high risk of CVD.[10–12]

In this issue of the journal, Ruparel and colleagues consider the opportunity to address cardiovascular risk as part of a lung health check programme.[13] Given that lung cancer and CVD are major killers

in the UK, this may be a highly effective approach to improve public health. The Lung Screen Uptake Trial (LSUT), from which analysis presented in this issue came from, was primarily designed to test if targeted invitation materials designed to engage socioeconomically deprived smokers, compared with standard invite, improved uptake of lung cancer screening.[14] The cross-sectional data presented in this issue includes coronary artery calcification (CAC) scoring the trial's baseline low-dose CT thorax scans and QRISK2 scores calculated from baseline variables collected as part of the trial. The main aim of this analysis was to evaluate cardiovascular risk in individuals without known CVD, enrolled in the LSUT trial, using CAC scoring (defined as none, mild, moderate or heavy) and the QRISK2 score, the latter of which is recommended by theNational Institute for Health and Care Excellence (NICE) for assessment of cardiovascular risk.[15] The analysis also explored factors associated with self-reported statin use.

Unsurprisingly, this cohort group are at high risk of CVD, and the majority (62%) had evidence of coronary artery disease, determined by CAC, despite being asymptomatic. By virtue of their smoking history and age, almost the entire cohort (98%) qualified for statin therapy. However, out of those who did qualify for statins as primary prevention, nearly two-thirds had no self-reported history of statin use.

The study has important public health implications, and there are a few points that merit further consideration. First, this study adds to the literature that heavy smokers who are participants in lung cancer screening cohorts are implicitly at high risk of CVD.[10] Indeed, CVD was the most common cause of death in the CT arm of the National Lung Screening Trial.[16] Second, the study by Ruparel et al exemplifies the contrast between the relative ease of a systematic assessment of risk using QRISK2 for a study population compared with the implications of calculating risk and managing on an individual basis.

Despite robust evidence from clinical trials that statins reduce the risk of cardiovascular

events[17] and have a good safety and tolerability profile,[18] in real-world clinical practice, initiation of statins and subsequent adherence to therapy is notoriously low.[19] The authors consider that CAC scores may motivate individuals' behavioural modification and medication adherence, as highlighted in a systematic review of 15 mainly observational studies on CAC screening.[20] Clearly, such intervention needs to go hand in hand with smoking cessation endeavours. Whether acceptance of primary prevention measures would improve if cardiovascular risk is addressed at the time of a lung health check is unknown. It takes time, health partnership and a personalised approach to discuss the implications of cardiovascular risk results and to provide health education to best support behavioural changes needed, primarily smoking cessation, and shared decision making regarding statin therapy.

Another salient result from the study was that, although there were convincing ORs of having a higher CAC grade for increasing QRISK2 score, the wide confidence intervals of the association highlight that CAC alone should not be used to predict cardiovascular risk in these participants. Indeed, 30% of those with a QRISK2 of >20% and nearly 55% of those with a QRISK2 of 10%–20% had no evidence of CAC.

The study also raises key questions about the cost effectiveness and clinical value of CAC scoring in these individuals, compared with the calculated QRISK2 score, given 98% of the cohort were deemed to be at high cardiovascular risk. Data from other lung cancer screening studies showed that CAC predicted cardiovascular events and cardiovascular deaths,[10 11] but whether QRISK2 or CAC best predicts future cardiovascular events here is not known. QRISK2 may overestimate risk in this group, or CAC scoring may additionally refine risk stratification, which in turn may dictate more intensified preventive therapies. These are important topics to evaluate CAC scoring as an intervention compared with calculated cardiovascular risk scores. Crucially, any score assessment needs to be combined with action to address risk, including smoking cessation importantly, in this group.

The take home messages are that participants in lung cancer screening studies have high cardiovascular risk, which can be assessed at the time of the screening. It is promising that lung health checks may provide an opportunity to address cardiovascular risk in these high-risk individuals and are also likely pertinent to those

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attending the checks but do not qualify for a CT (as well as the 50% who do not take up the offer of a lung health check in first place). However, there remain unanswered questions, before the prospect of commissioning such a service is realistic; namely, what is the relative value of CAC versus QRISK2 or their combination in discriminative ability to predict risk in these participants? and fundamentally, can such interventions nested in a lung cancer screening programme influence primary prevention strategy uptake, such as smoking cessation or statin use? Further key gaps in knowledge of cardiovascular risk assessment in lung health checks are, notably, evaluation of the cost effectiveness of adding it to the targeted screening programme (including recognition that funding for smoking cessation and primary care input are integral to instigating primary prevention) and its impact on longitudinal outcomes. Armed with this information, incorporation of cardiovascular risk assessment into lung health check programmes, which by their very nature target high-risk participants, could provide a valuable public health initiative to address a further leading cause of mortality.

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