PERSPECTIVE

The screening imperative

Lung cancer kills more people than any other malignancy. Let's not delay in implementing a screening programme, says **John K. Field**.

Roughly every two minutes during 2012, someone in the European Union (EU) died of lung cancer. Those 268,000 lung-cancer fatalities represented more than one-fifth of all EU cancer deaths. The good news is that screening for lung cancer using low-dose computed tomography (CT) could reduce this enormous burden of mortality through early detection and treatment that improves survival[1]. Nearly 75% of lung-cancer patients present with late-stage disease, when effective treatment is unlikely to succeed. However, if the disease is treated at an early stage, more than 70% of patients survive another five years. Lung-cancer CT screening makes early detection possible, and so could add many years to many lives.

Unfortunately, there are major barriers obstructing the implementation of life-saving screening. The lung-cancer community has evidence for a mortality benefit from CT screening from a massive study in the United States: the National Lung Screening Trial (NLST). This randomized trial of more than 55,000 individuals — current and former smokers aged 55–74 — was stopped early when it became clear that low-dose CT screening resulted in a 20% decrease in lung-cancer mortality over screening with standard chest X-rays[2]. Based on these results, five clinical professional groups in the US support the implementation of CT screening, as does the US Preventive Services Task Force — although Medicare, the federal agency that insures Americans aged over 65, has not yet approved coverage.

Despite the clear findings of the NLST, European health authorities have decided not to go ahead with lung-cancer screening. Instead, officials are awaiting the outcome of the NELSON trial[3] in the Netherlands and Belgium and the pooling of data from smaller EU trials, due in the next two years, which will provide European mortality and cost-effectiveness data[4].

This delay is a mistake. Now is the time to start planning to implement lung-cancer screening in Europe. The major stumbling block is uncertainty over screening's cost-effectiveness. In the US, lung-cancer screening is estimated to cost anywhere from US$19,000 to $160,000 per quality-adjusted life year (a standard method used to assess medical treatments by taking into account a person's quality of life after a medical intervention). But these figures are based on a health-care system that is very different from those that exist in Europe. Modelling in Britain, before the UK Lung Cancer Screening (UKLS) trial, provided an estimate of only £14,000 ($24,000) per quality-adjusted life year — a figure much more likely to be acceptable to a cost-conscious health-care system.

Clearing the cost hurdle is necessary but not sufficient for low-dose CT to be ready for widespread lung-cancer screening. Another issue relates to the criteria for interpreting the image produced by the scan. There are two schools of thought. One is to judge the nodule by its diameter, as measured by callipers on the radiograph. This is the approach used by the NLST. But diameter is not always accurate or consistent: nodules tend to be highly irregular. Thus a small nodule might show up as large if it is measured along its greatest dimension, creating a false-positive result, and vice versa for a large nodule measured along its shortest axis. That is why it's better to use the volume of a nodule to judge the risk it poses, which was what both the NELSON and UKLS trials did. This radiological approach has gained acceptance in Europe and is highly likely to reduce the number of false positives.

The next question to ask is: 'Who should be screened?' The US Preventive Services Task Force recommends that CT screening should be undertaken in past or present smokers aged 55–80 who meet the NLST entry criteria[5]. Evidence from the UKLS trial[6] — using the Liverpool Lung Project risk prediction model (people with a 5% risk of developing lung cancer in the next five years) however, shows that a screening programme will be more cost-effective if it is limited to the highest-risk segment of that population, which is those aged 60–75. Drawing a line like this will, of course, have life-and-death consequences; withholding screening from 55–59 year olds will result in a small number of lung cancers being missed. Such are the decisions that any preventative health programme must confront.

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Likewise, there is no consensus on how often to screen. The largest evidence base is from the US trial, which involved annual scans. But modelling that uses the UKLS selection criteria and the NLST mortality data has shown that after an initial scan, the most cost-effective programme would involve not annual but biennial screening. According to this model, biennial scans would save 20% fewer lives than annual ones, but the predictions suggest that mortality benefit would still be substantial and cost effective[7].

The existence of unanswered questions about lung-cancer screening does not argue for inaction. The additional data that will flow out of the NELSON and pooled EU trials is necessary, but there is no need to wait before taking concrete steps towards planning to implement a widespread lung-cancer screening programme among the highest-risk populations. Every year we delay could needlessly sacrifice tens of thousands of lives to the world's biggest cancer killer. ■

John K. Field *is a clinical professor at the University of Liverpool Cancer Research Center, UK, and is the chief investigator for the UK Lung Cancer Screening trial.*
e-mail: J.K.Field@liv.ac.uk

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