

US lung cancer screening linked to earlier diagnosis and better survival

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The introduction of lung cancer screening in the US in December 2013 is associated with more patients being diagnosed at an earlier stage and

improved survival, finds a study published by *The BMJ* today.

The findings show a 3.9% per year increase in early (stage I) detection of non-[small cell lung cancer](#) (NSCLC) and an average 11.9% per year increase in median all cause survival from 2014 and 2018. Increases in the early detection of lung [cancer](#) in the US between 2014 and 2018 are estimated to have saved 10,100 lives.

However, these benefits did not appear to extend to patients living in economically deprived areas or to racial or ethnic minority groups, illustrating the need for efforts to increase access to screening in the US.

Lung cancer remains the world's leading cause of death due to cancer, largely because most cases are diagnosed at an advanced and incurable stage.

Randomized trials have shown that screening high risk populations with low dose computed tomography (CT) scans results in a shift to earlier stages of disease identified and a reduction in lung cancer deaths.

As such, the US introduced CT lung cancer screening for people at high risk (over age 55 with a history of smoking) in December 2013, but the benefits of this "[real world](#)" screening are still largely unknown.

To address this, a team of US researchers analyzed data from two large cancer registries and identified 763,474 patients aged 45-80 years diagnosed with NSCLC between 1 January 2010 and 31 December 2018.

They then used this data to estimate annual changes in the percentage of NSCLC diagnosed at stage I among patients aged 45-54 (ineligible for screening) and 55-80 (potentially eligible for screening) alongside changes in median all cause survival, and trends in cases of NSCLC

diagnosed by stage from 2010 to 2018.

They found that the percentage of stage I NSCLC diagnosed among patients aged 55-80 did not significantly increase from 2010 to 2013 (from 27.8% to 29.4%) but then significantly increased at 3.9% per year from 2014 to 2018 (from 30.2% to 35.5%).

Further analysis taking account of potentially influential factors showed that the increase in the odds per year of a patient having one lung cancer stage lower at diagnosis (for example, stage I instead of stage II, stage II instead of stage III, or stage III instead of stage IV) from 2014 to 2018 was 6.2% higher than the increase in the odds per year from 2010 to 2013.

Similarly, the median all cause survival of patients aged 55-80 did not significantly increase from 2010 to 2013 (from 15.8 to 18.1 months), but it then tripled to 11.9% per year from 2014 to 2018 (from 19.7 to 28.2 months), resulting in an estimated 10,100 averted deaths.

By 2018, stage I NSCLC was the predominant diagnosis among non-Hispanic [white people](#) and those living in the highest income or best educated regions. However, non-white people and those living in [lower income](#) or less educated regions remained more likely to have stage IV disease at diagnosis.

They also investigated whether factors other than lung cancer screening could explain their findings.

They evaluated whether increases in the overdiagnosis of lung cancer, improvements in the accuracy of clinical staging information over time, increases in the use of non-screening related diagnostic imaging, or the implementation of major provisions of the Affordable Care Act in January 2014 could have led to the observed stage shift toward stage I

lung cancer.

However, they found that none of these factors could explain the accelerated shift towards earlier stages of disease identified, further supporting that the introduction of lung cancer screening in the US resulted in a beneficial stage shift and improvement in survival at the [population level](#).

This is an observational study, so the authors cannot establish cause, and the researchers point to several limitations, including a lack of information on patients' smoking history and the possibility that their results could be explained by factors other than the introduction of lung cancer screening, although the authors did perform several analyses to exclude the possibility that other reasons could explain their findings.

They also acknowledge that the adoption of lung cancer screening has been slow and screening rates have remained extremely low nationally, but say their findings "indicate the beneficial effect that even a small amount of screening can have on lung cancer stage shifts and survival at the population level."

The newest United States Preventive Services Task Force lung cancer screening guidelines expand screening eligibility for an additional 6.5 million Americans, with the greatest increases in eligibility occurring among women and racial minorities. They say these new guidelines present an opportunity to "reduce disparities in the early detection of lung cancer."

And they say that efforts to increase screening by national leaders and community organizations "should be prioritized to ensure equitable access to screening and prevent widening disparities in the stage of lung cancer diagnosed and the survival among different patient populations with lung cancer."

Despite the poor state of implementation, this fresh evidence suggests real world benefits of [lung cancer screening](#) in people at high risk, say researchers Anne Melzer and Matthew Triplette in a linked editorial.

It should also be a call to arms for all stakeholders to ensure more equitable access to screening that reduces health disparities, they add.

They urge researchers and [policy makers](#) to analyze not just how many people are being screened but also the "mismatch" between who is screened and who bears the greatest burden of disease related to lung cancer. "Through such targeted interventions, [screening](#) can realize its full potential for everyone at high risk for [lung](#) cancer," they conclude.

More information: Association of computed tomography screening with lung cancer stage shift and survival in United States: quasi-experimental study, *The BMJ* (2022). [DOI: 10.1136/bmj-2021-069008](https://doi.org/10.1136/bmj-2021-069008)

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