

# Screening for Lung Cancer

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## Objective

To assess whether screening methods of the chest (sputum examinations, chest radiography, or computed tomography [CT] scanning) are effective in reducing lung cancer mortality.

## Type of Review

This systematic review contains eight randomized, controlled trials (RCTs) and one controlled trial. The current review is a major update of the original review first published in 1999 and updated in 2004 and 2010. Meta-analysis was undertaken where possible.

## Relevance for Nursing

Lung cancer is the most common type of cancer and cause of cancer-related death. The majority of lung cancers do not present in the early stage of disease; therefore, screening may be warranted. Detection methods include sputum examinations, chest radiography, and CT scanning of the chest. Nurses are often involved in the care of patients with lung cancer, so they must know which screening methods are effective in reducing mortality.

## Characteristics of the Evidence

The review included nine studies involving 453,965 participants. Participants were adults from all backgrounds, of either gender, who could be smokers, nonsmokers, or former smokers. Interventions were sputum examinations (cytology or other), chest radiography, or chest CT. They could be given alone or in any combination or frequency. The primary outcome was disease-specific mortality. A number of other outcomes were considered, including all-cause mortality and five-year survival, with reviewers noting they would include

any outcome presented in the primary studies. The methodologic quality of the included studies varied. In five trials, intervention and control groups were well matched for baseline characteristics. Six of the nine trials used some method of blinding to assess the cause of death, but blinding was not described in the remaining three studies. Allocation concealment was at a low risk of bias in three studies, with the remaining studies unclear or inadequate. Meta-analysis was undertaken where possible.

## Summary of Key Evidence

A meta-analysis of four studies showed participants that underwent more frequent (not explicitly defined) chest x-ray screening, compared with less frequent (not explicitly defined) screening, resulted in an 11% relative increase in mortality from lung cancer (relative risk [RR] = 1.11, 95% confidence interval [CI] [1, 1.23]). However, the authors noted that some trials had methodologic limitations.

One study indicated that chest x-ray screening, compared to usual care (no screening), resulted in no reduction in lung cancer mortality.

One study comparing annual low-dose CT with annual chest x-ray screening (three rounds) in high-risk smokers and former smokers resulted in significantly reduced mortality in the low-dose CT group (RR = 0.8, 95% CI [0.7, 0.92]). Low-dose CT screening also reduced all-cause mortality (RR = 0.94, 95% CI [0.88, 1]).

Two studies comparing chest x-ray screening plus sputum cytology with chest x-ray screening alone showed a

reduction in death from lung cancer. However, this result was nonsignificant.

## Best Practice Recommendations

The review suggests that chest radiography screening and sputum cytology are not currently supported as screening methods for lung cancer with regard to reducing lung cancer mortality. Results from one large study suggested that annual low-dose CT scanning of the chest (three rounds) is associated with a significant reduction in lung cancer mortality in high-risk smokers and former smokers. The review suggested that clinicians discuss the risks and benefits of screening with those at high risk for lung cancer prior to recommending screening.

## Research Recommendations

Future research should focus on developing strategies to target high-risk populations for CT screening, cost effectiveness of screening, and harms and benefits of screening.

## Reference

Manser, R., Lethaby, A., Irving, L.B., Stone, C., Byrnes, G., Abramson, M.J., & Campbell, D. (2013). Screening for lung cancer. *Cochrane Database of Systematic Reviews*, 21, CD001991. doi:10.1002/14651858.CD001991.pub3

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