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# Sequential screening for lung cancer in a high-risk group: randomised controlled trial

LungSEARCH: a randomised controlled trial of Surveillance using sputum and imaging for the EARly detection of lung Cancer in a High-risk group

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ABSTRACT

**Background:** Low-dose computed tomography (LDCT) screening detects early-stage lung cancer and reduces mortality. We proposed a sequential approach targeted to a high-risk group as a potentially efficient screening strategy.

**Methods:** LungSEARCH was a national multicentre randomised trial. Current/ex-smokers with mild/

moderate chronic obstructive pulmonary disease (COPD) were allocated (1:1) to have 5 years surveillance or not. Screened participants provided annual sputum samples for cytology and cytometry, and if abnormal were offered annual LDCT and autofluorescence bronchoscopy (AFB). Those with normal sputum provided annual samples. The primary end-point was the percentage of lung cancers diagnosed at stage I/II (nonsmall cell) or limited disease (small cell).

**Results:** 1568 participants were randomised during 2007–2011 from 10 UK centres. 85.2% of those screened provided an adequate baseline sputum sample. There were 42 lung cancers among 785 screened individuals and 36 lung cancers among 783 controls. 54.8% (23 out of 42) of screened individuals *versus* 45.2% (14 out of 31) of controls with known staging were diagnosed with early-stage disease (one-sided p=0.24). Relative risk was 1.21 (95% CI 0.75–1.95) or 0.82 (95% CI 0.52–1.31) for early-stage or advanced cancers, respectively. Overall sensitivity for sputum (in those randomised to surveillance) was low (40.5%) with a cumulative false-positive rate (FPR) of 32.8%. 55% of cancers had normal sputum results throughout. Among sputum-positive individuals who had AFB, sensitivity was 45.5% and cumulative FPR was 39.5%; the corresponding measures for those who had LDCT were 100% and 16.1%, respectively.

**Conclusions:** Our sequential strategy, using sputum cytology/cytometry to select high-risk individuals for AFB and LDCT, did not lead to a clear stage shift and did not improve the efficiency of lung cancer screening.