Lung Cancer Screening with Low Dose Computerized Tomography (LDCT):

Harms and Considerations for Screening Asbestos Exposed Individuals

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Potential harms from LDCT Screening include:

- Hazard from the test
- False reassurance from false negative test
- Large numbers of false positive tests (low specificity)
- Complications from investigation of false positive tests
- Earlier experience of “life with cancer” from true positive detection without extension of lifespan (lead time and over-diagnosis) together with:
  - Complications of unnecessarily early therapy
  - Costs of unnecessary screening, diagnostic tests and treatment
  - Opportunity costs

Hazard from the test: LDCT involves substantially more radiation than chest X-rays, repeat (diagnostic) CT will add to the radiation dose in those positive to the test, and there is a possibility of a multiplicative interaction between smoking and radiation in the induction of lung cancer

Over-diagnosis is defined as: *The detection by screening of a cancer that was not destined to present clinically in that individual in his or her lifetime*

This does not mean that the cancer is not a true cancer – it may be histologically indistinguishable from other cancers, but competing causes of death kill the patient before the cancer can.

We have estimated that 18% of the LDCT lung cancers in NLST were over-diagnosed. That is identical to an estimate recently published by the NLST investigators.

It is important to consider the opportunity costs of LDCT screening. The resources used could reduce those available for diagnosis and management of symptomatic patients, while new funds required for a screening program could divert funds from primary prevention, especially smoking cessation in current smokers.

There is some room for further consideration of the eligibility criteria for lung screening. The NLST criteria are somewhat out of phase with the probability of developing lung cancer in the next three years, in that a higher proportion of younger people are recruited, and a lower proportion of older people. In the lung working group of the Cancer Risk Management (CRM) initiative of the Canadian
Partnership against Cancer (CPAC) we are evaluating various criteria for eligibility for screening to determine the most cost-effective approach.

By modeling various scenarios for potentially screening asbestos-exposed workers we have concluded that:

- Individuals who have accumulated 30 pack-years of cigarette smoking are eligible for LDCT screening once they have reached the age of 55, irrespective of their degree of asbestos exposure. If they have stopped smoking, cessation should be no more than 15 years ago.
- Asbestos-exposed individuals with an estimated two-fold or more risk of lung cancer from asbestos-exposure are eligible for LDCT screening at all ages from 55 to 74 if they have a history of 15 pack-years or more of cigarette smoking.
- Asbestos-exposed individuals who are lifelong non-smokers are eligible for LDCT screening at all ages from 55 to 74 if they have accumulated a degree of asbestos exposure resulting in a relative risk of lung cancer of 10 or more.

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