



Consideration of Occupational and Environmental Lung Carcinogen Exposures for Lung Cancer Screening Using Low-Dose Chest CT

To the Editor:

We read with great interest the American College of Chest Physicians' guidelines for lung cancer screening¹ and the excellent Point and Counterpoint editorials by Drs Wood and Mazzone²⁻⁵ in *CHEST* (June 2018) addressing the important issue of how to approach persons at high risk for lung cancer who don't meet the guidelines' core criteria for lung cancer screening. In his final rebuttal, Dr Mazzone⁵ states that the guidelines "...recommend that the cohort that does not meet our core eligibility criteria, but is at elevated risk for lung cancer based on risk calculators, should not be 'routinely' screened. We remark under this recommendation that although we do not recommend 'routinely' screening this cohort, we recognize that some individuals within this high-risk cohort will be healthy enough to consider screening."

We agree that lung cancer screening should be considered for high-risk individuals, in whom the benefits of screening are likely to exceed harms, and urge practitioners to take occupational and environmental histories from their patients and consider associated exposures to carcinogens when deciding about whether to enter into shared decision-making about screening. Exposure to occupational and environmental carcinogens is a well-established lung cancer risk factor, as noted in a recent update of the National Comprehensive Cancer Network (NCCN) guidelines, of which Drs Wood and Mazzone are both authors.⁶ Consideration of exposure to occupational and environmental lung carcinogens is especially important because they can synergize with smoking history to increase risk in a greater-than-additive fashion.⁷ Also, there is potential for benefit, as documented in a recent systematic review of lung cancer screening after asbestos exposure published in this journal.⁸

Unfortunately, exposures to most known occupational and environmental carcinogens are not considered by currently available risk calculators. In view of this, we support consideration of lung cancer screening in those who meet NCCN group 2 criteria, are aged 50 or older

study. As recommended by the Cochrane handbook,² the purpose of those subgroups with a single study was to clarify whether the effect in a specific situation was similar to that in the main analysis.

5. The quality assessment is presented in the article's e-Figure 1 and e-Table 1.
6. Heterogeneity > 50% was presented in Figure 5 (the analysis of drainage duration). A sensitivity analysis was conducted to explore the source of heterogeneity in e-Figure 4. Furthermore, we found that heterogeneity did not influence the result of drainage duration.
7. See number 6.
8. Thoracic drainage has been regarded as the standard treatment for pneumothorax since the late 1950s.⁵ The technique of intercostal drain has not changed significantly over the years. Therefore, we specified a priori to collect data from inception through October 9, 2017.
9. The original studies did not provide the results stratified according to sex in comparisons of pigtail catheter and chest tube. It is not appropriate to combine results from studies without addressing the same research question. In addition, individual participant data were not available. Thus, we were unable to conduct a subgroup analysis according to sex.

Hsin-Yi Chiu, MD
Yi-No Kang, MA
Taipei, Taiwan

AFFILIATIONS: From the Division of Thoracic Surgery, Department of Surgery, Taipei Medical University Hospital.

FINANCIAL/NONFINANCIAL DISCLOSURES: See earlier cited article for author conflicts of interest.

CORRESPONDENCE TO: Hsin-Yi Chiu, MD, Division of Thoracic Surgery, Department of Surgery, Taipei Medical University Hospital No. 252, Wuxing St, Xinyi District, Taipei, 110 Taiwan; e-mail: chibinmaruko1111@gmail.com

Copyright © 2018 American College of Chest Physicians. Published by Elsevier Inc. All rights reserved.

DOI: <https://doi.org/10.1016/j.chest.2018.07.003>

References

1. Chang SH, Kang YN, Chiu HY, Chiu YH. A systematic review and meta-analysis comparing pigtail catheter and chest tube as the initial treatment for pneumothorax. *Chest*. 2018;153(5):1201-1212.
2. Higgins JP, Green S. *Cochrane Handbook for Systematic Reviews of Interventions Version 5.1.0*, Vol 4. Hoboken, NJ: John Wiley & Sons; 2011.
3. Bothwell LE, Greene JA, Podolsky SH, Jones DS. Assessing the gold standard—lessons from the history of RCTs. *N Engl J Med*. 2016;374(22):2175-2181.
4. Shrier I, Boivin JF, Steele RJ, et al. Should meta-analyses of interventions include observational studies in addition to randomized controlled trials? A critical examination of underlying principles. *Am J Epidemiol*. 2007;166(10):1203-1209.
5. Monaghan SF, Swan KG. Tube thoracostomy: the struggle to the "standard of care." *Ann Thorac Surg*. 2008;86(6):2019-2022.

with a ≥ 20 pack-year history of smoking tobacco, and with one additional risk factor (in this case, personal history of exposure to radon or occupational carcinogens).⁶ In the case of occupational carcinogens, a French workgroup has suggested 10 years of exposure as a pragmatic threshold for consideration of screening.⁷ We urge that all such screening be done within the context of comprehensive screening programs and that, in the United States, data be reported to the national lung cancer screening registry operated by the American College of Radiology.

Rafael E. de la Hoz, MD, FCCP

New York, NY

David N. Weissman, MD, FCCP

Morgantown, WV

AFFILIATIONS: From the Departments of Environmental Medicine and Public Health, and Medicine, Icahn School of Medicine at Mount Sinai (Dr de la Hoz); and Respiratory Health Division, National Institute for Occupational Safety and Health, Centers for Disease Control and Prevention (Dr Weissman).

FINANCIAL/NONFINANCIAL DISCLOSURES: R. E. D. was supported in part by grant U01-OH010401 from the CDC/NIOSH. None declared (D. N. W.).

OTHER CONTRIBUTIONS: The findings and conclusions in this report are those of the authors and do not necessarily represent the views of the National Institute for Occupational Safety and Health.

CORRESPONDENCE TO: Rafael E. de la Hoz, MD, FCCP, Departments of Environmental Medicine and Public Health, and Medicine, Icahn School of Medicine at Mount Sinai, WTC MMTP Box 1059, One Gustave L. Levy Place, New York, NY 10029; e-mail: Rafael.deHoz@mssm.edu

Copyright © 2018 American College of Chest Physicians. Published by Elsevier Inc. All rights reserved.

DOI: <https://doi.org/10.1016/j.chest.2018.07.023>

References

1. Mazzone PJ, Silvestri GA, Patel S, et al. Screening for lung cancer: CHEST Guideline and Expert Panel Report. *Chest*. 2018;153(4):954-985.
2. Wood DE. Point: Should lung cancer screening be expanded to persons who don't currently meet accepted criteria set forth by the CHEST Guidelines on Lung Cancer Screening? Yes. *Chest*. 2018;153(6):1299-1302.
3. Mazzone PJ. Counterpoint: Should lung cancer screening be expanded to persons who don't currently meet accepted criteria set forth by the CHEST Guidelines on Lung Cancer Screening? No. *Chest*. 2018;153(6):1303-1305.
4. Wood DE. Rebuttal from Dr Wood. *Chest*. 2018;153(6):1305-1306.
5. Mazzone PJ. Rebuttal from Dr Mazzone. *Chest*. 2018;153(6):1306-1308.
6. Wood DE, Kazerooni EA, Baum SL, et al. Lung cancer screening, version 3.2018, NCCN Clinical Practice Guidelines in Oncology. *J Natl Compr Canc Netw*. 2018;16(4):412-441.
7. Delva F, Margery J, Laurent F, et al. Medical follow-up of workers exposed to lung carcinogens: French evidence-based and pragmatic recommendations. *BMC Public Health*. 2017;14(17):191.
8. Ollier M, Chamoux A, Naughton G, Pereira B, Dutheil F. Chest CT scan screening for lung cancer in asbestos occupational exposure: a systematic review and meta-analysis. *Chest*. 2014;145(6):1339-1346.

Response



To the Editor:

To foster understanding and facilitate implementation, we were able to include remarks with each recommendation or statement of the updated *CHEST* lung cancer screening guidelines.¹ The intention of our remarks under the recommendation against routinely screening a cohort of high-risk individuals who do not meet our core eligibility criteria was to allow thoughtful clinicians to make informed judgments about whether an individual at high risk for developing lung cancer should be offered low-dose CT screening. Assessing occupational and environmental exposures as risk factors in addition to those used in the core eligibility criteria fits squarely with this remark.

There are challenges to consider before including occupational and environmental exposure histories in the selection of individuals or cohorts to screen. These include how to identify and quantify the exposure, translate the combination of exposure history and other risk factors into a total risk, and determine whether the exposure has led to competing risks that diminish the benefit of lung cancer screening. Unfortunately, the strength of evidence to address these challenges remains weak.

The French workgroup described many assumptions when estimating exposure related risk. It did not recommend screening this cohort, but instead to study screening in this group.² The systematic review in *CHEST* assessed the prevalence of lung cancer in seven heterogeneous cohort studies. Most of the cancers identified were in smokers, and pack-years of smoking was not described.³ The National Comprehensive Cancer Network guidelines do not specify how to quantify exposures.⁴ In the Bach risk prediction model,⁵ to be classified as having a history of asbestos exposure, the first exposure had to occur ≥ 15 years ago and there had to be a minimum duration of 5 years spent in a trade at high risk of occupational exposure. Using this model, a 52-year-old man who smoked a pack of cigarettes per day for 25 years, quit smoking 5 years ago, and had asbestos exposure would be estimated to have a 0.33% 6-year probability of a lung cancer diagnosis, with a number needed to screen to avert a lung cancer death of 1,521. This is far lower than the 1.51% estimated 6-year probability of lung cancer suggested as a high-risk threshold in our guideline remarks.