Lung cancer remains the leading cause of cancer death in the US, largely because most patients have advanced, incurable disease at the time of diagnosis. Lung cancer screening with low-dose computed tomography (LDCT) therefore has the potential to improve lung cancer outcomes through early detection. In 2013, the US Preventive Services Task Force (USPSTF) recommended lung cancer screening with LDCT annually for adults aged 55 to 80 years who have a smoking history of 30 pack-years or more, and who currently smoke or formerly smoked but quit within the past 15 years. This recommendation was primarily informed by the results of the National Lung Screening Trial, which demonstrated a 20% reduction in lung cancer mortality among participants aged 55 to 74 years, who underwent 3 rounds of annual screening with LDCT vs chest radiograph. In March 2021, the USPSTF extended the recommendation to include adults aged 50 to 80 years with a 20 pack-year smoking history. The new recommendation is expected to improve access and equity in lung cancer screening. Approximately 8.3 to 13.3 million US residents met the 2013 criteria, representing 8.3% to 13.4% of 50 to 80 year-old individuals in the US population, and approximately 17.5 million US residents are expected to meet the expanded criteria.

It is in this context that a population-based study by Liu et al in the current issue of JAMA Network Open makes an important contribution to the literature by estimating the uptake and appropriateness of lung cancer screening with LDCT according to adherence to the 2013 USPSTF criteria. Using cross-sectional data from the 2019 Behavioral Risk Factor Surveillance System (BRFSS) survey, the study reported 2 important findings. First, the uptake of lung cancer screening was only 13% among survey respondents who met the criteria. Second, among those who reported they were screened, only 21% met all 3 criteria for screening, while 20% of respondents did not meet any 1 of the criteria. This study is unique in pointing to the dual conundrum, principally, how do we reach a target population that is most likely to benefit from screening while minimizing screening among those who are unlikely to benefit?

To be clear, the USPSTF criteria define a target population for screening that strikes a reasonable balance between effectiveness (reducing deaths from lung cancer), efficiency (maximizing the ratio of deaths averted to scans performed) and the equitable distribution of deaths averted across segments of the at-risk population. As such, we view them not so much as guides to eligibility but rather to who is most likely to benefit. Thus, at the patient level, we do not view screening of an individual who does not meet criteria as inappropriate, so long as this individual has been adequately informed about the possible benefits and harms of screening. The real problem with screening individuals who do not meet criteria manifests at the population level. If we accept the results of the analysis of Liu et al of BRFSS data at face value, then more than three-quarters of screening LDCT scans are being performed in individuals who are unlikely to derive benefit, which is a wasteful and inefficient use of resources in a health care system that is struggling to improve quality and affordability.

The BRFSS data have some important limitations, as acknowledged by the authors. For example, there is concern regarding the generalizability of the findings due to limited participation from the southeastern states that have a disproportionately high burden of lung cancer and associated risk factors. More importantly, the BRFSS definition of screening is derived from self-report, making it difficult to distinguish between a screening LDCT scan and a diagnostic CT scan that was ordered to evaluate symptom(s). Thus, their estimates of both screening uptake in the target population and screening among those unlikely to benefit are likely to be inflated. In particular, their...
estimate that 79% of screening was performed in individuals who did not meet all 3 of the 2013 USPSTF criteria seems implausible and is inconsistent with data reported to the national Lung Cancer Screening Registry of the American College of Radiology (ACR), in which 87.4% of more than 1.2 million cases reported in 2015 to 2019 were found to meet these criteria. The true percentage of screening outside of criteria probably falls somewhere between these extreme values—the completeness of reporting to the ACR registry is uncertain, and it is possible that some screening programs may selectively report cases that meet criteria.

According to limited information about comorbid conditions presented in the present study by Liu et al,5 individuals who did not undergo screening despite meeting USPSTF criteria appeared to have fewer comorbid conditions than those who were screened by self-report, although substantial numbers in both groups reported a history of chronic obstructive pulmonary disease (>30%), depression (>25%), diabetes (>20%), and myocardial infarction (>15%). Prior analyses of the 2017 to 2019 BRFSS data observed that, among participants who reported undergoing lung cancer screening, 28% had 3 or more chronic comorbid conditions.7 Surprisingly, the presence of comorbid conditions was associated with a higher likelihood of undergoing lung cancer screening with LDCT.7

Crucially, there is a paucity of information regarding racial and ethnic differences in the uptake and appropriateness of lung cancer screening. In the study by Liu et al,5 non-Hispanic white people comprised almost 90% of the respondents who met the USPSTF 2013 criteria, but only 73% of those who did not meet criteria, illustrating the structural barrier to equitable screening that the updated recommendations from 2021 were partly designed to address. Indeed, a modeling study from the Cancer Intervention and Simulation Network conducted by Meza and colleagues8 showed that the 2021 USPSTF criteria would lead to greater increases in eligibility for Black, Hispanic, American Indian, and Alaska Native populations relative to White and Asian populations.8 Comparing the 2021 and 2013 USPSTF criteria in their sample of BRFSS survey respondents, Liu et al found that the proportion of those who met all criteria increased from 20.9% to 31.1%.

Health systems must overcome multilevel structural and reimbursement challenges to reach individuals who are most likely to benefit from lung cancer screening and to provide equitable access. For example, Medicare reimbursement requires submitting information to the ACR registry, which may be more challenging for facilities in low-resource settings that serve marginalized populations. Furthermore, rural populations may not have convenient access to lung cancer screening facilities despite the higher prevalence of tobacco use in their communities. Lastly, smoking history is incompletely and inaccurately documented in electronic health records, and this may compromise effective outreach in both privileged and underserved settings. Ideally, electronic health record systems could increase lung cancer screening uptake by enabling complete documentation of smoking history and automated identification of the target population according to the USPSTF criteria.9

The effective, efficient, and equitable implementation of lung cancer screening requires a concerted effort that extends beyond adherence to the USPSTF recommendations. System-level change is needed to achieve this goal, led by patient and clinician groups, and supported by necessary investments in personnel, information technology and other equipment. Decisions about screening should be informed by the best available evidence, tailored to patients’ unique circumstances, and consistent with their values. BRFSS and other population-based studies have the potential to inform relevant stakeholders regarding the diffusion of lung cancer screening as this landscape continues to evolve.
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Conflict of Interest Disclosures: Dr Gould reported receiving grants from National Cancer Institute Research through his institution during the conduct of the study; grants from Medial EarlySign Research through his institution, personal fees from UpToDate Royalties, and personal fees from American Thoracic Society outside the submitted work. No other disclosures were reported.

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