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Evaluating Eligibility of US Black Women Under USPSTF Lung Cancer Screening Guidelines

The 2021 US Preventive Services Task Force (USPSTF) lung cancer screening guidelines¹ have increased the number of smokers eligible for screening by lowering the age eligibility from 55 to 50 years and reducing the requisite pack-years of smoking from 30 to 20. While these changes should increase the proportion of Black individuals eligible for screening,² it is possible that many high-risk Black women will continue to be ineligible.^{3,4} In this quality improvement study, we evaluate lung cancer screening eligibility among US Black women under the 2013 and 2021 USPSTF guidelines.

Methods | Participants of the Black Women’s Health Study (BWHS), which includes self-identified Black women from across the US (n = 58 973), were enrolled in 1995 by completing a health questionnaire with detailed information on cigarette smoking and other exposures; information was updated by biennial questionnaires.⁵ The study was approved by the

Boston University Medical Campus Institutional Review Board. Incident lung cancers were identified by self-report and annual linkages with state cancer registries and the National Death Index. We evaluated the proportion of women diagnosed with lung cancer who would have been eligible under the 2013 vs 2021 USPSTF lung cancer screening guidelines. We also estimated the sensitivity and specificity of the USPSTF guidelines and alternative guidelines based on different criteria for pack-year smoking history and years since quitting (YSQ). Analyses were conducted using SAS, version 9.4 (SAS Institute).

Results | During follow-up of 58 973 BWHS participants from July 1995 through December 2017, 559 women were diagnosed with lung cancer, with mean (SD) age at diagnosis of 64.0 (10.9) years (median [IQR], 65.0 [57.0-72.0] years); 43% were current smokers, 42% were former smokers, and 15% were never smokers. Mean (SD) number of pack-years were 27.6 (15.7) (median [IQR], 18.3 [11.0-32.0]) and 23.0 (17.3) (median [IQR], 17.0 [11.0-32.0]) among current and former smokers, respectively; among former smokers, mean (SD) YSQ was 22.4 (9.7) years (median [IQR], 25.5 [14.0-32.0] years).

Under 2013 USPSTF guidelines, 28.4% of BWHS participants with lung cancer who had a smoking history would have been eligible for lung cancer screening. Under the new 2021 guidelines, the proportion of women eligible for screening increased to 40.2%, representing a 41.5% increase in eligibility (McNemar test, *P* < .001). Among the 284 smokers who would not have been eligible for screening under the 2021 guidelines, 75.0% were ineligible because they had fewer than 20 pack-years smoking history, and 29.6% were ineligible because they quit smoking more than 15 years ago (Table 1).

Sensitivity and specificity of the 2021 guidelines among the 21 604 BWHS participants who were ever smokers were 40.2% and 86.5%, respectively (Table 2). Removing the requirement that former smokers must have quit smoking within the past 15 years was associated with an increase in sensitivity, to 48.2%, and a decrease in specificity, to 78.9%. Reducing the required number of pack-years to 15 or 10 years was associated with further increased sensitivity and decreased specificity.

Discussion | In the present analysis, the proportion of Black women diagnosed with lung cancer who would have been

Table 1. Reasons for Ineligibility Under 2013 and 2021 USPSTF Guidelines Among Black Women’s Health Study Participants With Lung Cancer Who Were Current or Former Smokers

	2013 USPSTF guidelines	2021 USPSTF guidelines
Total cases ineligible for screening	340	284
Reason for ineligibility, No. (%) ^a		
Age <55 y (2013) or <50 y (2021)	94 (27.6)	50 (17.6)
Age >80 y	15 (4.4)	15 (5.3)
Pack-years <30 (2013) or <20 (2021)	283 (83.2)	213 (75.0)
Years since quitting >15	86 (25.3)	86 (29.6)

Abbreviation: USPSTF, US Preventive Services Task Force.
^a Categories are not mutually exclusive.

Table 2. Sensitivity and Specificity of Varying Guidelines for Lung Cancer Screening, Based on 22 079 Ever Smokers in the Black Women’s Health Study

Possible guidelines	No. eligible among 475 women with lung cancer	Sensitivity, % (95% CI)	No. ineligible among 21 604 women without lung cancer	Specificity, % (95% CI)
2013 Guidelines: age 55-80 y and ≥30 pack-years and current smoker or quit <15 y ago	135	28.4 (24.4-32.7)	20 100	93.0 (92.7-93.3)
2021 Guidelines: age 50-80 y and ≥20 pack-years and current smoker or quit <15 y ago	191	40.2 (35.8-44.8)	18 697	86.5 (86.0-87.0)
≥20 Pack-years and age 50-80 y	229	48.2 (43.7-52.7)	17 050	78.9 (78.4-79.4)
≥15 Pack-years and age 50-80 y	294	61.9 (57.5-66.3)	14 964	69.3 (68.7-69.9)
≥10 Pack-years and age 50-80 y	348	73.3 (69.3-77.3)	12 330	57.1 (56.4-57.8)
≥15 Pack-years and age 50-80 y, and <15 y since quit	242	50.9 (46.4-55.5)	17 386	80.5 (80.0-81.0)
≥10 Pack-years and age 50-80 y, and <15 y since quit	281	59.2 (54.6-63.6)	16 008	74.1 (73.5-74.7)

eligible for screening increased by 41.5% under 2021 USPSTF screening guidelines compared with 2013 guidelines, yet 60% of the patients with lung cancer still would have been ineligible for screening. We found that revising the new USPSTF guidelines by removing the 15 YSQ requirement for former smokers would increase the proportion of Black women eligible for screening from 40.2% to 48.2%, with a small reduction in specificity. The 2021 USPSTF relaxation of age and pack-years requirements was prompted in part by the need to increase the proportion of Black individuals eligible for screening given their younger age at diagnosis of lung cancer and higher risk of lung cancer associated with fewer smoking pack-years compared with White individuals.^{2,6}

Our findings suggest that removing the 15 YSQ criteria in the current USPSTF guidelines may be beneficial for Black women. Further research should be prioritized to determine if there is a need for sex and/or race and ethnicity differentiation in future revisions to the guidelines. A limitation of the current study was the lack of data on the use of lung cancer screening by eligible individuals in our cohort during the study period. Such information may be available in future studies.

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SARS-CoV-2 Spike-Specific T-Cell Responses in Patients With B-Cell Depletion Who Received Chimeric Antigen Receptor T-Cell Treatments

Two messenger RNA (mRNA)-based vaccines, BNT162b2 and mRNA-1273, are currently available for SARS-CoV-2. Both vaccines have been shown to induce protective immunity against SARS-CoV-2 for most healthy individuals.¹ Recent studies have demonstrated a substantially lower rate of antibody induction by both SARS-CoV-2 mRNA vaccines among patients with immunosuppression, including individuals with cancer.²⁻⁵ However, the immunogenicity of SARS-CoV-2 mRNA vaccines among patients with selective B-cell deficiency is not well known.

Studies are ongoing to assess vaccine-induced antibody and T-cell responses among patients treated with chimeric antigen receptor (CAR) T cells that lead to substantial B-cell depletion in humans.

Chimeric antigen receptor T-cell therapies targeting B-cell lineage antigens, most notably CD19 and CD22, have demonstrated remarkable success in inducing the remission of advanced B-cell-derived cancers and have been administered to more than 10 000 patients globally. A successful response to these therapies is often accompanied by substantial B-cell depletion lasting for months to years.⁶ We previously showed that despite persistent B-cell depletion, some patients maintain preexisting protective humoral immunity.⁶ However, to our knowledge, their ability to mount new antibody responses and T-cell immunity has not yet been reported. Here, we determined whether patients with hematologic cancers treated with CAR T cells targeting the CD19 and/or CD22 B-cell lineage antigens can mount antibody and T-cell responses to SARS-CoV-2 vaccines.

Methods | For this cohort study, written informed consent for participation was obtained from all patients or their guardians according to the Declaration of Helsinki, and the protocols were