Letters

RESEARCH LETTER

Race/Ethnicity and Age Distribution of Breast Cancer Diagnosis in the United States

The US Preventive Services Task Force (USPSTF) currently recommends initiating breast cancer screening at 50 years of age in patients at average risk.[1] However, we hypothesize that these guidelines may not be sensitive to racial differences and may be inappropriately extrapolating data from largely white populations for use in racially diverse populations. This process could result in underscreening of nonwhite female patients. These concerns are similar to broader discussions regarding sex bias in the clinical research process, leading to recent policy changes at the National Institutes of Health and the US Food and Drug Administration.[2] The goal of this study is to assess the age distribution of breast cancer diagnosis across race/ethnicity in the United States.

Methods | We analyzed the Surveillance, Epidemiology, and End Results (SEER) Program database from January 1, 1973, through December 31, 2010. Female patients aged 40 to 75 years with malignant breast neoplasms were included. The primary end point was age and stage at breast cancer diagnosis across racial groups. Institutional review board approval was not required because these data are publicly available.

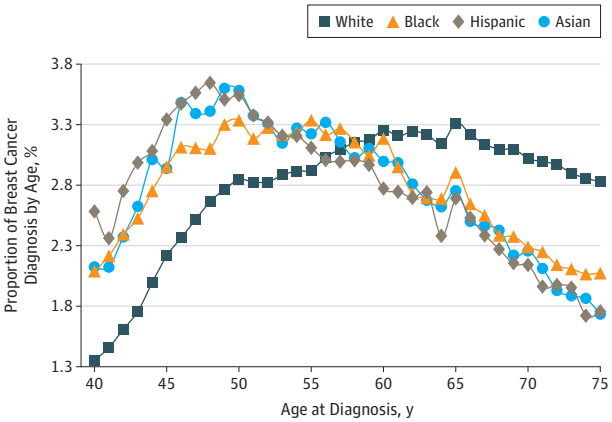
Results | The analysis included 747 763 female patients. Median age at diagnosis was 58.0 years (interquartile range [IQR], 50.0-67.0 years). The racial/ethnic composition of the cohort included 77.0% white, 9.3% black, 7.0% Hispanic, and 6.2% Asian women.

Median age at diagnosis was 59 years for white (IQR, 51-67 years), 56 years for black (IQR, 49-65 years), 55 years for Hispanic (IQR, 48-64 years), and 56 years for Asian patients (IQR, 48-64 years) (**Figure 1**). A higher proportion of patients with breast cancer were diagnosed at younger than 50 years among nonwhite patients (31.0% among black, 34.9% among Hispanic, and 32.8% among Asian) than among white patients (23.6%; $P < .001$ for all). If we were to achieve a similar capture rate for nonwhite patients as current guidelines do for white patients at 50 years of age, screening ages would need to decrease to 47 years for black, 46 years for Hispanic, and 47 years for Asian patients (**Figure 2**). A higher proportion of black and Hispanic patients present with advanced (regional or distant) disease (46.6% and 42.9%, respectively) than do white or Asian patients (37.1% and 35.6%, respectively; $P < .001$ for all).

Discussion | In our study of US cancer registries, we found 2 distinct distribution patterns of age at diagnosis for female breast cancers: white patients peak in their 60s, whereas nonwhite patients peak in their 40s. Compared with white patients, a higher proportion of nonwhite patients presents with more advanced breast cancers at the time of diagnosis. Our finding challenges established norms with regard to screening practices and provides empirical evidence that race-based screening should be considered. Several studies[3-5] have evaluated breast cancer incidence by age in non-European countries and found similar variations.

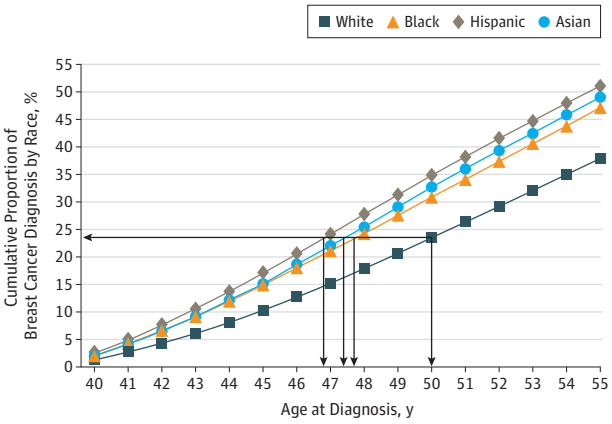
A common belief is that lowering the screening age may lead to overdiagnosis and overtreatment. However, better diagnostic modalities and evolving technology will enhance

Figure 1. Distribution of Age at Diagnosis for Women With Breast Cancer



The peak age of each race represents the mode. Using peaks in white patients to set screening guidelines will disadvantage a disproportionate number of non-European patients.

Figure 2. Cumulative Distribution of Age at Diagnosis for Female Breast Cancers



The horizontal black line represents the cumulative proportion of breast cancer diagnosed for white patients by 50 years of age as indicated by the vertical line to the far right. The 3 vertical black lines on the left represent the ages at which nonwhite patients achieve a cumulative distribution that is equivalent to what white patients would achieve by 50 years of age.

diagnostic specificity and accuracy to reduce overdiagnosis; improved practice guidelines will reduce overtreatment. In addition, some may argue that lowering screening ages would lead to increased screening cost. However, we recommend selective increases in screening among nonwhite persons, not blanket increases across the entire population.

Our study is limited by the fact that the National Cancer Institute's SEER Program, despite being the largest cancer database in the United States, still does not capture 100% of the US population. Nevertheless, its large sample size, coupled with its heterogeneity, supports the validity of our findings.

Our study has important implications. Age-based screening guidelines that do not account for race may adversely affect nonwhite populations in the United States. We should consider lowering the screening age for nonwhite groups in the United States. Caution should also be exercised in non-US and non-European countries when adopting practice guidelines based on US and European data. Future clinical research should incorporate analytic techniques that will determine generalizability across population groups.

Current USPSTF breast cancer screening recommendations do not reflect age-specific patterns based on race. Moreover, by 2050 most of the United States will be composed of what are now considered to be racial/ethnic minority populations.[6] With this change in population distribution, consideration should be given to adjusting breast cancer screening guidelines. Lastly, culturally sensitive care begins with culturally sensitive science, and we should constantly examine whether scientific findings can be generalized from the majority population to minority populations.

Sahael M. Stapleton, MD
Tawakalitu O. Oseni, MD
Yanik J. Bababekov, MD, MPH
Ya-Ching Hung, MD, MPH
David C. Chang, PhD, MBA, MPH

Author Affiliations: Department of Surgery, Massachusetts General Hospital, Harvard Medical School, Boston.

Accepted for Publication: December 28, 2017.

Corresponding Author: David C. Chang, PhD, MBA, MPH, Department of Surgery, Massachusetts General Hospital, 165 Cambridge St, Ste 403, Boston, MA 02114 (dchang8@mgh.harvard.edu).

Published Online: March 7, 2018. doi:10.1001/jamasurg.2018.0035

Author Contributions: Drs Stapleton and Tawakalitu are co-first authors. Drs Chang and Stapleton had full access to all the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis.
Study concept and design: All authors.
Acquisition, analysis, or interpretation of data: All authors.
Drafting of the manuscript: All authors.
Critical revision of the manuscript for important intellectual content: All authors.
Statistical analysis: Stapleton, Bababekov, Hung, Chang.
Administrative, technical, or material support: Oseni, Hung.
Study supervision: Oseni, Chang.

Conflict of Interest Disclosures: Dr Stapleton reports receiving support from the Massachusetts General Hospital Department of Surgery Earnest A. Codman Research Fellowship and by the Massachusetts General Hospital Physicians Organization Torchiana Fellowship in Health Policy and Management. No other disclosures were reported.

1. Siu AL; US Preventive Services Task Force. Screening for breast cancer: US Preventive Services Task Force recommendation statement. *Ann Intern Med*. 2016;164(4):279-296.

2. Mansukhani NA, Yoon DY, Teter KA, et al. Determining if sex bias exists in human surgical clinical research. *JAMA Surg*. 2016;151(11):1022-1030.

3. Bray F, McCarron P, Parkin DM. The changing global patterns of female breast cancer incidence and mortality. *Breast Cancer Res*. 2004;6(6):229-239.

4. Saika K, Sobue T. Epidemiology of breast cancer in Japan and the US. *Japan Med Assoc J*. 2009;52(1):39-44.

5. Zuo TT, Zheng RS, Zeng HM, Zhang SW, Chen WQ. Female breast cancer incidence and mortality in China, 2013. *Thorac Cancer*. 2017;8(3):214-218.

6. Colby SL, Ortman JM. *Projections of the Size and Composition of the US Population: 2014 to 2060*. Washington, DC: US Census Bureau; 2015. Report P25-1143.

COMMENT & RESPONSE

Questioning the Benefits of Private Vehicle Transportation vs Emergency Medical Services Transportation

To the Editor I read with great interest and applaud the efforts of Wandling et al[1] in their trauma system–level analysis of the association of private vehicle transportation vs ground emergency medical services (EMS) transportation with mortality. Demetriades et al[2] and Zafar et al[3] published articles coming to similar conclusions. In studies comparing 2 groups for the effect of another variable, given the state of the art, injury severity analysis is always somewhat problematic. It is possible the private vehicle transportation group was in fact different from the EMS transportation group in this regard, but I think the number of patients across many urban areas lessens that possibility in the study by Wandling et al.[1] Mean Injury Severity Score being significantly lower in the private vehicle transportation group is worrisome and may suggest there were differences.

Assuming the authors' results are valid and correct, this brings up the obvious question of why a decreased mortality is achieved with private vehicle transportation for patient cohorts that are similar. Were harmful things done to the patients in the ground EMS transportation group, like fluid administration, intubation, or immobilization? Was this looked at during the data analysis and not included in the study or were these data not extracted for this study? Alternatively, did the ground EMS transportation simply result in longer transportation times? Was this looked at? If there was a prolonged time from incident to definitive intervention, was it because of how long it took the ground EMS transportation to arrive or something else? If the authors believe that private vehicle transportation may achieve a shorter time between incident and time to definitive intervention (operating room, intensive care unit, or resuscitation area), why was this not measured?

When I served as the Medical Director for the Chicago Department of Health, the triage criteria changed from closest trauma center to the closest regional trauma center, where artificially larger catchment areas were created for some centers in response to trauma center attrition. All centers were level I trauma centers. A retrospective study was conducted after the field triage criteria were changed and looked at all EMS transport mortalities within our revised expanded region, and surprisingly, we found no deaths caused by prolonged transport (data not shown).