ORIGINAL ARTICLE

# Mucosal melanomas in the racially diverse population of California

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***Background:*** Mucosal melanomas are rare, poorly understood neoplasms without a consensus standard of care.

***Objective:*** We sought to define mucosal melanoma tumor characteristics and the racial/ethnic attributes of patients with mucosal melanomas.

***Methods:*** We analyzed 130,920 cutaneous melanomas and 1919 mucosal melanomas recorded in the population-based California Cancer Registry from 1988 to 2013.

***Results:*** Although only 1% of melanomas occurring in nonHispanic whites were mucosal, other racial/ethnic groups had a higher proportion of mucosal melanomas (15% for Asian/Pacific Islanders, 9% for nonHispanic blacks, and 4% for Hispanics). Anorectal mucosal melanomas were most common in female Asian/Pacific Islanders, whereas genitourinary mucosal melanomas were highest in nonHispanic whites, and head and neck tumors were most common among Hispanics. Stage at presentation was not uniform among racial/ethnic groups, with Asian/Pacific Islanders having the highest rates of metastasis.

***Limitations:*** The lack of a standardized staging system for mucosal melanomas confounds classification and knowledge regarding metastasis. Small sample size limits comparative analysis across race, stage, site, and depth.

***Conclusion:*** Mucosal melanomas differ by race/ethnicity with regard to anatomic site, stage, and depth. Because early detection offers the best chance of increased survival, greater awareness will aid clinicians who care for patients at risk for these aggressive tumors. (J Am Acad Dermatol http://dx.doi.org/10.1016/j.jaad.2016.08.007.)

***Key words:*** California; extracutaneous melanoma; melanoma; melanoma detection; mucosal melanoma; population-based database; race/ethnicity; screening.

Mucosal melanomas arise from melanocytes located in mucosal membranes lining the respiratory, gastrointestinal, and urogenital tract. They are rare and represent only about 1.4% of all melanomas,[1] but they are known to behave more aggressively and have a less favorable prognosis compared with other melanoma subtypes. Although mucosal melanomas share similar histologic characteristics with cutaneous melanomas, they confer a worse prognosis. Few population-based studies (eg, from geographic regions or national databases) have described the tumor characteristics

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Dr Cockburn was supported in part by the National Cancer Institute's Surveillance, Epidemiology, and End Results Program under contract HHSN261201000140C awarded to the Cancer Prevention Institute of California, contract HHSN261201000035C awarded to the University of Southern California, and contract HHSN261201000034C awarded to the Public Health Institute; and the Centers for Disease Control and Prevention's National Program of Cancer Registries, under agreement U58DP003862-01 awarded to the California Department of Public Health.

Conflicts of interest: None declared.

Accepted for publication August 2, 2016.

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Published online October 11, 2016.

0190-9622/$36.00



http://dx.doi.org/10.1016/j.jaad.2016.08.007

and the characteristics of patients with mucosal melanomas, and even less is known about the incidence of mucosal melanomas among various racial/ethnic groups.

Although population-based studies found that the incidence of mucosal melanomas is higher among nonHispanic white than nonHispanic black individuals,[1,2] data on other racial/ethnic groups are more limited. Detailed tumor characteristics for mucosal melanomas were provided by Koomen et al,[3] who presented differing anatomic site distributions of mucosal melanomas, but only occurring in Holland's white population. Previous reports have suggested that nonHispanic black and Hispanic individuals are given a diagnosis of mucosal melanomas more often than cutaneous, ocular, or unknown primary melanomas.[4] From 1988 to 2010, the rate of mucosal melanomas showed no significant difference between nonHispanic white, Hispanic, nonHispanic black, and Asian/Pacific Islander groups, but the number of cases was too small to reliably analyze racial differences between specific mucosal locations.[2]

**CAPSULE SUMMARY**

- Population-based data regarding mucosal melanoma in racial/ethnic groups other than nonHispanic whites and blacks are sparse.
- The incidence of mucosal melanomas varies by anatomic site and race/ethnicity.
- Clinicians should have a low threshold for performing biopsies on suspicious mucosal lesions, to reduce the burden of late mucosal melanoma diagnoses.

California has among the highest rates of melanoma in the world,[5,6] and has a variety of racial/ethnic groups, all of whom get melanoma. Recently, the Hispanic population became the majority ethnic group in California,[7] and Asian/Pacific Islander subpopulations currently comprise 15% of California's population.[8] As a result, the occurrence and characteristics of melanoma, especially mucosal melanomas, in all racial/ethnic groups other than nonHispanic whites is of great interest. The objective of our study was to contribute to the very limited information on a population level regarding the incidence, anatomic site, stage at diagnosis, and thickness of mucosal melanomas in racially diverse populations. We present data on the occurrence of mucosal melanoma in nonHispanic white, nonHispanic black, Hispanic, and Asian/Pacific Islander populations in California from 1988 to 2013, focusing on patient and tumor characteristics, to provide clues for targeted cancer control efforts.

## METHODS

### Source of data

Data were obtained from the California Cancer Registry (CCR) (www.ccrcal.org). Since 1988, statewide cancer data have been reported in a uniform way. This population-based cancer surveillance system represents a cooperative relationship among hospitals and other cancer diagnostic or treatment facilities, regional registries, and the California Department of Health Services. It comprises 10 regional registries that report cancer incidence data to the Cancer Surveillance Section of the California Department of Health Services.

Cancer incidence data were based on new cases of cancer that were first diagnosed among California residents from January 1, 1988, to December 31, 2012, and were reported to the CCR as of November 2013. Data on histologic type and tumor thickness were abstracted from the patient's medical records and pathology reports. Coding of histologic type and tumor thickness were completed according to the *International Classification of Diseases*.

### Tumor characteristics

We categorized melanomas into cutaneous, mucosal, and ocular, following the methods of McLaughlin et al.[1] Ocular melanomas are not presented in these results, but are used in the calculation of proportions of mucosal melanomas among all melanomas. Only invasive melanomas were considered here, and were classified by their Breslow depth (thickness in millimeters), anatomic site, and histologic type. Thickness was categorized in the same groups typically found in survival analyses and representing the levels most commonly used to describe the changing incidence of melanoma (<1 mm, 1-<2 mm, 2-<4 mm, and ≥4 mm). Morphology was restricted to codes 8720 through 8790 from the *International Classification of Diseases for Oncology, Third Edition*.

Anatomic site was identified from *International Classification of Diseases for Oncology, Second Edition* topography codes, in which the skin of the anus and perianal skin are considered to be cutaneous. Cutaneous melanomas (*International Classification of Diseases for Oncology, Second Edition* code C44.0-C44.9) excluded the skin of the vulva, penis, and scrotum, which are instead included with mucosal melanomas. Melanomas