

# Skin Cancer Prevention Among Hispanics: a Review of the Literature

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Published online: 24 June 2017  
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## Abstract

**Purpose of Review** We review the existing scientific literature regarding skin cancer in Hispanics to aid in formulating a research agenda for prevention targeted to this at-risk population. **Recent Findings** Hispanics are a diverse population with a rising incidence of both melanoma and non-melanoma skin cancer. Compared with non-Hispanic whites, Hispanics have poorer disease outcomes and higher rates of acral lentiginous melanoma, an aggressive subtype. Hispanics practice suboptimal sun protection and skin surveillance behaviors and experience rates of sunburn comparable with non-Hispanic whites. Despite these risk behaviors, little skin cancer education and prevention has been targeted to this population.

**Summary** Further research is warranted to understand the interplay of biological, psychosocial, cultural, and health care factors influencing skin cancer prevention behaviors and outcomes in Hispanics. We recommend future investigation into the

histological, sociocultural, and health care differences and disparities among Hispanics and within subpopulations to develop tailored, culturally informed prevention strategies.

**Keywords** Skin cancer · Melanoma · Hispanics · Latinos · Primary prevention · Secondary prevention

## Introduction

Skin cancer is a serious public health concern with recent calls for increased national control and prevention efforts [1]. Non-melanoma skin cancer (NMSC) is the most common cancer, with five million people diagnosed every year in the USA. The incidence of melanoma, the most lethal form of skin cancer, has been steadily rising in the USA and globally over the past

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This article is part of the Topical Collection on *Epidemiology*

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30 years [2]. Despite epidemic rates, skin cancer is a highly preventable disease, with primary and secondary prevention measures that reduce risk, such as avoiding excessive exposure to ultraviolet (UV) radiation, the major environmental cause of skin cancer, and skin screening to detect skin cancer at an early and more curable stage.

Despite common misconceptions, both melanoma and NMSC affect people with skin of color, including Hispanics. By definition, “Hispanic” includes any persons of Spanish origin; it is, however, a heterogeneous ethnicity with great national, cultural, and genetic diversity. In the USA, based on rising rates of melanoma among this population and disparities in disease profiles, researchers have identified the need for greater focus on research and skin cancer prevention targeted to Hispanic communities [3–5]. Shifts in US demographics, with a rapidly increasing Hispanic population, heighten the public health importance of the issue, as the burden of disease in this population may be considerable.

While emerging research has begun to focus on the issue of skin cancer among Hispanics, prevention among this population remains complex due to the paucity of etiologic and epidemiological research, variability in types of skin cancer, and the ethnic and cultural diversity of the “Hispanic” population itself. The purpose of this review is to synthesize the existing literature available on skin cancer research among people of Hispanic heritage to describe clinical disease characteristics, the prevention context (both primary and secondary prevention), and preventive strategies conducted in this population to date. The goal, overall, is to shed light on pertinent findings and aid in formulating a future research agenda for skin cancer prevention targeted to Hispanics.

## Methods

PubMed was searched between 1 January and 1 March 2017, to identify relevant articles. Search terms included “Hispanic”, “Latino,” “skin cancer,” “melanoma,” “non-melanoma,” “squamous cell carcinoma,” “basal cell carcinoma,” “primary prevention,” “secondary prevention,” “sun protection,” “intervention,” “ethnic,” and “minority.” Only peer-reviewed papers published in English were considered.

## Results

### Clinical Characteristics of Melanoma Among Hispanics

The age-adjusted incidence rate (per 100,000) of melanoma among Hispanics ranges from 2.3 to 4.73 in the USA [6, 7–10] and from 1.6 to 4.9 in Latin America [11]. Although these rates are lower than those in non-Hispanic whites (NHWs), incidence of melanoma has been rapidly rising over time among

Hispanics, especially for invasive disease [12]. Regional variation also exists with regard to incidence, with higher rates found in the Western USA and in states with large Hispanic populations such as Florida, California, New Mexico, Arizona, and Puerto Rico [12–17]. The impact of migration and acculturation is less clear; at least one study found that Puerto Ricans living within mainland USA had higher rates of melanoma compared with those living in Puerto Rico [16].

Among Hispanics, melanoma is an aggressive disease, with thicker primary lesions, higher rates of ulceration, and more advanced stage at diagnosis [7, 13, 14, 18, 19]. Hispanics have 5-year disease-specific survival rates ranging from 69.7 to 86.5%, lower than those of NHWs, which range from 79.3 to 90.2% [6, 7, 8, 19]. In Latin America, 5-year survival rates are as low as 40–67% [20, 21, 22–24]. The anatomic distribution of primary melanoma tumors differs between Hispanics and NHWs, with 25–47.8% of primary tumors occurring on the lower extremity among Hispanics, compared with 9–20% in NHWs [7, 8, 13, 14, 19, 25]. Risk factors that predispose towards melanoma among Hispanics include older age, fair-skin phenotype, and low SES, similar to NHWs [13, 16, 26].

Differences in anatomic site may be related to differences in histology among Hispanics with melanoma. Superficial spreading melanoma (SSM) is the most common histological subtype among NHWs and is associated with UV exposure, pre-existing nevi, and BRAF V600 mutations [27–29]. Among Hispanics, SSM is the most common histology, and affected patients may experience similar disease characteristics and outcomes as NHWs, including tumor thickness, ulceration, stage, and survival [6, 30]. However, Hispanics have disproportionately higher rates of primary tumors found on acral sites (palms, soles, and nailbeds) [14, 19] and, in concordance with this distribution, higher rates of acral lentiginous melanoma (ALM) histology compared with NHWs [7, 8, 13, 14, 19, 30, 31]. ALM is a less common melanoma subtype but may account for nearly 10% of cutaneous melanoma among Hispanics [6, 11, 19]. ALM does not appear to be directly related to UV exposure, and genetic studies show that ALM is characterized by lower rates of BRAF mutations [32, 33]. ALM has very poor survival, particularly among Hispanics: when comparing 5-year survival rates of metastatic melanoma across race/ethnicity and histology, Hispanics with ALM have the lowest survival rates [30].

Given that Hispanics are prone to developing primary melanomas on non-sun exposed and acral sites, the role of UV exposure in melanoma among Hispanics remains unclear. While recent studies show overlapping melanoma risk factors between NHWs and Hispanics including sun-sensitive phototype and UV exposure [34–36], other ecological studies have found no association between greater UV exposure and melanoma incidence in ethnic minority populations [9]. The role of somatic BRAF mutations, which are associated with sunlight exposure and found in approximately 50% of NHWs [29, 37, 38], is not well defined in Hispanics. Limited data

suggests that the frequency of BRAF mutations may be as low as 6–10% among Hispanics [39, 40]. However, the relationship between histology and driver mutations is yet to be determined in this population, as there are no large genomic studies available.

Thus, differentiating between histological subtypes of melanoma, their risk factors, and factors affecting their outcomes will be critical towards developing effective future prevention strategies for Hispanics.

### Clinical Characteristics of Non-melanoma Skin Cancer Among Hispanics

NMSC, including squamous cell carcinoma (SCC) and basal cell carcinoma (BCC), is the most common type of skin cancer and often cured by surgery. However, NMSC can cause significant morbidity [41]. The major risk factor for NMSC is UV exposure, and the disease has primarily affected NHWs and fair-skinned populations [42, 43].

Because NMSC is not a reportable cancer and therefore not described by population-based cancer registries, there is a dearth of information regarding rates of disease, particularly among Hispanics. Among the limited clinical data available, rates of NMSC among Hispanics are lower than those compared with NHWs; however, rates are rising over time [44, 45]. In regions with significant Hispanic populations, more than 35% of NMSC cases occur among Hispanics [45, 46].

As with NHWs, the most common type of NMSC among Hispanics is BCC followed by SCC [15, 44–46]. Incidence rates for BCC among Hispanics range from 50 to 171 per 100,000 [15, 44, 45], while rates for SCC range from 13.8 to 62.8 per 100,000 [15, 44, 45]. Similar to NHWs, the most common anatomic site for NMSC among Hispanics is the head and neck [15, 44–47]; male gender and older age are also positively associated with NMSC [15, 44–47]. An examination of NMSC in Latin America reveals similar trends. The head and neck region is again the most common anatomic site for NMSC in Colombia and Brazil [48–52], and older age is associated with higher incidence [49, 51–54]. Differences have been reported by skin phenotype, with fair-skinned individuals prone to higher incidence of NMSC across Brazil, Chile, Mexico, and Colombia [48–50, 52, 53, 55–57]. Non-white populations in these countries are also affected, although to a lesser extent [48, 50]. In addition to UV exposure, environmental exposures such as arsenic may play a role in the development of skin cancer in some Latin American nations [58, 59]. (It should be noted, however, that many Latin American countries have ethnically and racially heterogeneous populations, and that Brazil, where Portuguese is the official language, is not considered a “Hispanic” country.)

## Primary Prevention Among Hispanic Populations

### UV-Related Prevention Behaviors Among Hispanics

Primary prevention of skin cancer aims to prevent the initiation of disease through the reduction of exposure to UV radiation via protective behaviors, including the use of sunscreen with SPF 15 or higher, the use of protective clothing and hats, seeking shade, avoiding sun during midday or “peak hours,” and avoidance of tanning [60].

Hispanics report high rates of sunburn comparable with or exceeding NHWs, with 46% of Hispanics reporting at least one sunburn in the past year compared with 36% of NHWs [61]. While percentages vary, studies have found lower rates of sunscreen use in Hispanic adults compared with NHW adults, ranging from 9.5 to 29.9% of Hispanics reporting frequent use compared with 16.5–35.9% of NHWs [62]. Among youth, sunscreen use is also lower in Hispanics, with one study estimating 35.3% of Hispanic adolescents using sunscreen compared with 51.3% of NHWs [63, 64].

Low use of barrier methods of sun protection, such as protective clothing, hats, and shade/sun avoidance, has also been found among Hispanics. In a national sample, 60% of Hispanic adults reported “rarely” or “never” using sun protective clothing [3]. A study of high school students found that Hispanics were more than twice as likely to never or rarely wear protective clothing in comparison with NHWs [65].

Despite low overall sun protection, acculturation has emerged as a potentially important factor influencing skin cancer primary prevention behaviors among Hispanics. Acculturation, the process by which a cultural group is brought into contact with and adopts the beliefs and behaviors of another culture [66, 67], has been shown to significantly influence the method and frequency of use of sun protective behaviors in this population. Generally, studies have found that more US-acclimated Hispanics report greater sunscreen use, higher perceived benefits of UV exposure, and greater sunbathing and indoor tanning behaviors compared with less US-acclimated Hispanics [68–70]. By contrast, less US-acclimated Hispanics report greater use of protective clothing and shade seeking [68, 69]. These findings suggest that as Hispanics acculturate, they adopt US norms of UV behaviors, as sunscreen is the most common method of sun protection in the USA and sunbathing and tanning are more frequent among NHWs [71]. In contrast, less-acclimated Hispanics use methods of sun protection (shade, clothing, and hats), which may originate from traditional behaviors by heritage or country of origin. Studies have also begun to explore the sun protection behaviors of bicultural Hispanics, who report similar sun protection and tanning behaviors as US-acclimated Hispanics [69, 70].

Studies assessing the role of acculturation among Hispanic children have not found the same pattern of greater skin cancer

risk behaviors associated with higher US acculturation. Among Hispanic elementary school children residing in a high-UV environment, Miller et al. [72, 73] found no association between level of acculturation and sun protection practices. However, the authors note that sun protection differences due to acculturation may not be present at younger ages, as acculturation is a dynamic and temporal process.

Accessibility of resources may also influence skin cancer primary prevention practices among Hispanics. Hernandez et al. [4] found substantially less sunscreen availability in retail outlets in predominantly Hispanic compared with NHW neighborhoods in Chicago, IL. However, no difference was found in sunscreen availability in Hispanic compared with NHW neighborhoods in a study conducted in Los Angeles, suggesting that climate and UV level may influence these relationships [74]. In addition, financial factors may act as a barrier to sunscreen use among Hispanics, who have significantly lower socioeconomic status than NHWs [75].

While Hispanics comprise 25% of the landscaping and farming jobs in the USA and are thus occupationally more prone to high-risk UV exposure [76], Hispanic workers in these fields show low rates of sunscreen use, with 69% reporting “never” or “rarely” wearing sunscreen while working outdoors [77, 78]. Among Hispanic farmworkers, greater than 70% “rarely” or “never” wearing wide-brimmed hats, protective gear around face (i.e., handkerchief or bandana), or sunglasses [79].

### Demographic and Psychosocial Correlates of UV-Related Behaviors Among Hispanics

Demographic correlates associated with UV-related behaviors among Hispanic populations include heritage background, age, gender, educational level, and type of health insurance. Coups et al. [3] found that frequency of sunburn was lower in Hispanics with Central/South America and Cuba ancestry compared with Hispanics of Mexican or Puerto Rican background, while Hispanics of Mexican origin reported greater use of sun protective clothing compared with Hispanics from Central/South American, Puerto Rican, or Cuban heritage. Older Hispanics reported lower frequency of sunburns and greater use of shade and protective clothing, while greater sunscreen use was found among younger Hispanics [3]. Female gender has also been associated with more frequent use of sunscreen compared with males among Hispanics, while males report greater use of sun protective clothing, patterns also found among NHW populations [3]. Both higher education and having private health insurance have been associated with greater sunscreen use among Hispanics [3].

While the majority of research regarding the psychological factors motivating skin cancer prevention behaviors has been conducted among NHW populations, several studies have examined psychosocial correlates of UV-related practices in

Hispanic populations [80]. Studies have found low knowledge and awareness of skin cancer among both Hispanic children and adults compared with NHWs [78, 81–83]. In addition, Hispanics report lower levels of perceived risk of skin cancer than NHWs, with Hispanics reporting they are “below average risk” for skin cancer [4, 65, 83–86].

As with NHWs, benefits of and barriers to sun protection play an important role in promoting or inhibiting sun protection behaviors among Hispanics. Avoiding sunburn is the most frequently reported benefit motivating use of sun protection among Hispanics [70], while barriers include neighborhood unavailability of sunscreen [4] and the difficulty and inconvenience of sun protection behaviors [3]. Despite lower prevalence of tanning among Hispanics, perception of greater benefits to having a tan has been associated with suboptimal sun protection [3]. Among Hispanic children, fewer barriers to use of sun protective clothing and sunscreen (e.g., discomfort or expense) has been associated with greater use of those methods for sun protection [73].

Few studies have examined culturally specific psychosocial correlates of sun protection among this population. In an in-depth study among Hispanic adults, Coups et al. [84] examined skin color preference, perceived natural skin protection (e.g., the belief that having darker pigmented skin affords natural protection from skin cancer), and skin cancer fatalism as variables of particular salience to Hispanic populations. While skin color preference was not associated with sunscreen use or shade seeking, individuals who preferred darker skin were less likely to use sun protective clothing. In addition, perceived natural skin protection was negatively associated with sun protection behaviors, as were more fatalistic beliefs about skin cancer.

Among Hispanic adolescents, psychosocial correlates associated with greater use of sun protection include parental receipt of physician sun protection counseling [87], family use of sun protection for children [72, 73], and exposure to media and school-based prevention messages [87], correlates which overlap with those found among NHW youth.

## Secondary Prevention Among Hispanic Populations

### Skin Screening Among Hispanics

Secondary prevention of skin cancer, e.g., skin screening to detect disease at an earlier and more curable state, has traditionally targeted people who are more susceptible to skin cancer due to risk factors such as phenotype, family history, age, and history of UV exposure. Screening can occur by physician by clinical skin examination (CSE) and/or by the patients themselves by skin self-examination (SSE).

As noted, melanoma presents at a more advanced stage among Hispanics than other ethnic groups [88•]. This

disparity potentially stems from delayed diagnosis that may arise from suboptimal screening, both by health care professionals and individuals due to perceptions of lower skin cancer risk for Hispanics. Rates of both CSE and SSE are lower among Hispanics than NHWs [65, 83, 89–93]; however, wide variability has been reported in rates for both populations, with reported rates among Hispanics ranging from 7 to 17% for CSE and 14 to 50% for SSE [89]. Comparatively for NHWs, CSE has been estimated in the range of 24–36% [91, 94] while the prevalence of SSE has ranged between 7 and 60.5% [95].

An important barrier to secondary prevention among Hispanics may be less-frequent physician recommendations for CSE and less patient education and counseling about SSE [93, 96]. Roman et al. [96] found that 91% of Hispanic patients did not receive regular skin examinations from providers, with a majority reporting that they did not know how to ask for a skin examination from their doctors. Seventy-eight percent of study participants did not perform SSE annually. However, performing both types of screening has been associated with greater physician recommendation among Hispanics [97], consistent with the general literature regarding the influential role of physician recommendation on patient receipt and acceptance of cancer screening [98]. Thus, physician awareness and patient education regarding skin cancer secondary prevention for Hispanic patients may improve rates of both CSE and SSE in this population.

### Demographic and Psychosocial Correlates of Secondary Prevention Among Hispanics

Although few studies have extensively examined correlates and predictors of skin screening among Hispanic populations, Coups et al. [69] reviewed the skin surveillance behaviors of Hispanic adults, finding that individuals were more likely to report having had a CSE if they were older, had a greater number of melanoma risk factors, or had ever tanned indoors. With regard to psychosocial factors, individuals were more likely to have had CSE if they reported higher skin cancer knowledge, greater perceived severity of skin cancer, lower skin cancer-related worry, receipt of physician screening recommendation, and fewer barriers to skin screening. These variables were also associated with greater likelihood of performing SSE. As with primary prevention, acculturation was found to modify surveillance behaviors, with English language-acclimated Hispanics more likely to report CSE and SSE compared with Spanish language-acclimated or bi-cultural individuals [97].

Current guidelines for skin screening do not distinguish between ethnicity and histology [99], despite histological and anatomical differences as previously noted [7, 19•]. Duarte et al. [20] have recommended that Hispanic patients actively perform SSE of their palms, soles, and nailbeds.

However, secondary prevention strategies have largely focused on changes to nevi and may not be optimal for Hispanics if they do not emphasize acral areas given the higher proportion of melanoma on these sites and of ALM subtype in this population [100].

### Interventions: Improving Skin Cancer Outcomes Among Hispanics

While the majority of skin cancer prevention interventions have been targeted to NHW populations [80], a growing number of interventions have been directed to Hispanics as awareness of skin cancer as a public health concern for this population increases.

Several primary prevention interventions have been conducted among Hispanics to raise awareness of the role of UV exposure in development of skin cancer and to increase perceived susceptibility of skin cancer in this population. Hernandez et al. [101] developed short Spanish language films targeted to female Hispanics emphasizing the photo-aging and skin cancer prevention benefits of sun protection. Eighty female Hispanic participants were recruited from beauty salons located in predominantly Hispanic neighborhoods in Chicago to watch the videos and complete surveys regarding UV-related knowledge, attitudes, and behaviors. Significant increases were found in the number of participants who believed that Hispanics were at risk for skin cancer as well as in those who intended to use sunscreen at posttest.

In a multi-ethnic population of kidney transplant patients, a subgroup at high risk of developing skin cancer due to immunosuppression, Guevara et al. [85] developed a sun protection education workbook aimed at increasing sun safety behavior and knowledge of skin cancer risk. For ethnic minority participants including Hispanics, numeric risk estimates regarding skin cancer after kidney transplant were not as effective as visual depictions of skin cancer occurring on skin of color in heightening perceived risk of negative consequences from UV overexposure.

Among Hispanic adolescents residing in a high UV environment, Miller et al. [91] conducted a school-based skin cancer prevention intervention to increase knowledge, attitudes, and behaviors regarding sun protection. The study found significant improvements in knowledge of and attitudes regarding sun protection and self-efficacy to wear sunscreen, but no changes in sun protective behaviors.

Several secondary prevention interventions have also been implemented among Hispanics. Among ethnic minority patients including Hispanics attending a skin disorder clinic, Kundu et al. [102] conducted an educational intervention consisting of an in-person teaching session for identifying melanoma based on the “ABCDE rule” to increase early detection of melanoma. Participants were assessed on

knowledge, attitudes, and behaviors regarding skin screening at baseline, immediately following, and 3 months after the session. The study found that knowledge of skin screening increased among all ethnic minorities immediately following intervention, but this increase was not sustained at 3 months.

Hernandez et al. [93] piloted a program using Spanish-speaking lay health workers to educate underserved Hispanic communities in Chicago about skin cancer, perform focused skin examinations, and encourage community members to attend physician skin screenings. The screening program was designed to address the specific barriers facing Hispanics including language and communication, cultural differences, lack of health insurance to gain initial access to care, and fear of discrimination. The study found promise in the approach, as lay health workers with minimal training were willing to perform focused screening of high-risk body sites and able to encourage individuals to attend physician screenings.

Chung et al. [103] recruited participants from a rural Hispanic community in California and provided melanoma prevention and screening information at a local community health fair. The intervention consisted of a 10- to 15-min information and discussion session on melanoma-risk factors and included a demonstration of SSE techniques. Analyses of pre- and postintervention evaluation surveys indicated significant increases in knowledge and awareness of melanoma risk, knowledge of self-surveillance, and self-efficacy for self-screening.

Roman et al. [104] conducted a web-based intervention including a 5-min online video about melanoma-risk factors, prevention, and SSE. Hispanics were recruited from social networking sites, advocacy groups, radio stations, and local fliers. Greater knowledge of melanoma was found for participants immediately after viewing, with an additional increase in the number of participants who reported performing SSE and incorporating melanoma prevention into their lives at 1 month follow-up.

Thus, some evidence for intervention efficacy has been found among this population; however, more tailored and targeted interventions for both primary and secondary preventions are needed.

## Conclusion

In this review of the literature, we aimed to describe the current research regarding skin cancer among Hispanics. Our findings attest to the complex interactions between behavioral, genetic, cultural, and health care system factors influencing etiology and prevention in this population. These issues are further complicated by the heterogeneity of the category “Hispanic.” Effective skin cancer prevention among Hispanics, therefore, while critically needed to reduce rising rates of melanoma and NMSC,

will undoubtedly require greater understanding of the etiology and epidemiology of the disease in this diverse group [105]. Based on the findings of this review, we propose the following recommendations for a future research agenda to improve skin cancer prevention and outcomes among Hispanic populations:

**A Focus on Differences by Histology** Cancer disparities experienced by Hispanics underscore differences in susceptibility among this vulnerable population. However, such differences are complicated by histological differences between Hispanics and NHWs. The biology of ALM subtype among Hispanics is poorly understood, for example, despite the more aggressive behavior and worse outcomes of this histology. *We therefore propose further investigation into the etiology and histology of melanoma among Hispanics, as the disease may have distinct biological features in this population requiring different prevention strategies and interventions.*

Current prevention efforts for skin cancer are targeted to risk factors for SSM alone. As such, primary prevention strategies for melanoma may not be applicable to Hispanics who are at greater risk for ALM, while secondary prevention strategies may also not be optimal if they focus primarily on changes to nevi and do not emphasize acral areas [100]. Melanoma may be overlooked or missed due to its atypical location on acral areas by both patients *and* physicians, contributing to the poorer outcomes observed.

Thus, research into the biological mechanisms of melanoma, and subsequent increased awareness and education of acral-based lesions and ALM among Hispanics and health care providers may be key to improving prevention among an at-risk population [102, 106, 107•].

**A Focus on Culturally Informed Research** While there is growing interest in improving skin cancer prevention and outcomes among Hispanics, particular attention must be paid to the specific values, beliefs, and behaviors of this population, and, moreover, its diversity beyond a single ethnic category [86, 105, 108]. Increasingly, research is emphasizing cultural variables such as acculturation, skin cancer fatalism, and skin color preference that influence specific prevention behaviors among Hispanics [84]. Qualitative research is emerging regarding the neighborhood level and financial barriers to UV protection in Hispanics [4]. *We therefore propose further investigation into the sociocultural factors that influence, facilitate, or act as barriers to skin cancer prevention among Hispanics, with attention to differences by heritage subgroups.*

Future research might include the investigation of additional cultural values that have been shown to influence general health and health care outcomes among Hispanics including constructs such as *familismo*, the high value placed on and loyalty within families, and *respeto*, the high value placed

on authority figures such as physicians. Additional research into the role of acculturation, migration, and the variability in risk factors and behaviors within Hispanic heritage subpopulations would also contribute to understanding the complex dynamic by which cultural factors modify and interact with biological and behavioral influences. Such approaches may generate grounded insights to inform research and guide the development of tailored, culturally competent prevention strategies and interventions [4].

**A Focus on Health Disparities** Attention to the health disparities that influence prevention practices and health outcomes is critically important in the context of skin cancer among Hispanics, who experience poorer disease outcomes than NHWs. *We therefore propose further investigation into the health and health care disparities that impact and determine skin cancer prevention practices and outcomes among Hispanics.*

Future research should examine physician awareness and recommendation for primary and secondary prevention in Hispanic patients and investigate the role of health care system factors that contribute to delayed diagnosis leading to advanced presentation of disease. In particular, research into the quality of and access and barriers to care, as well as the influence of socioeconomic and insurance status, may reveal some of the specific pathways leading to poorer outcomes in this population. Multidisciplinary research on the health care factors driving such disparities is required to promote enhanced opportunities for prevention and improve skin cancer outcomes for this at-risk population [109].

#### Compliance with Ethical Standards

**Conflict of Interest** The authors declare that they have no conflict of interest.

**Human and Animal Rights and Informed Consent** This article does not contain any studies with human or animal subjects performed by any of the authors.

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