Methods | A cross-sectional study was performed using the 2013 National Health Interview Survey, a population-based survey representative of the US civilian population. Exempt approval was granted by the Emory University Institutional Review Board.

Sexual orientation was self-reported through previously described methods. We restricted analysis to adult respondents who identified with “gay” for male or “lesbian or gay” for female respondents, “bisexual,” or “straight, that is, not lesbian or gay.”

The survey asked about the frequency of indoor tanning device use within 12 months before the survey, including sunlamps, sun beds, or tanning booths but not spray-on tans. Frequent tanning was defined as 10 or more uses within the 12-month period. Prevalence estimates were weighed to account for the complex survey design to produce nationally representative estimates.

Prevalence of indoor tanning among gay or lesbian, bisexual, and straight individuals was compared, with stratification by age and sex, using the Rao-Scott χ² test and modeled using multivariate logistic regression (STATA software, version 12.1; StataCorp).

Two-sided tests with \( P < .05 \) were considered significant.

Results | Among 34,557 survey respondents, 571,233, and 32,546 individuals identified as gay or lesbian, bisexual, and straight, respectively. Compared with heterosexual counterparts, sexual minority men were younger and had higher educational levels; sexual minority women were younger and had different educational level patterns (Table 1). Bisexual women reported higher rates of low income (post hoc \( P = .002 \)) and no health insurance (post hoc \( P = .02 \)). No difference in geographic region or skin cancer history was noted.

Significant sexual orientation disparities in indoor tanning were noted among sexual minority men (Table 2). Compared with straight men, gay and bisexual men reported higher odds (with results reported as odds ratio [95% CI]) of any tanning (gay men: \( 3.1 \) [1.6-5.9]; bisexual men: \( 4.5 \) [1.7-12.0]) and frequent tanning (gay men: \( 4.8 \) [2.1-11.3]; bisexual men: \( 6.5 \) [2.0-21.4]) in crude analyses. Stratifying to men aged 18 to 34 years, younger gay and bisexual men also reported higher odds of any tanning (gay men: \( 3.0 \) [1.1-8.2]; bisexual men: \( 5.0 \) [1.4-17.8]) and frequent tanning (gay men: \( 5.8 \) [1.8-19.3]; bisexual men: \( 7.5 \) [1.7-33.6]).

Indoor tanning disparities among sexual minority men persisted after adjustment for covariates associated with indoor tanning, including younger age group, higher educational level, non-Hispanic white race, higher income, and Midwest location (Table 2). Younger bisexual women reported lower odds of any tanning (0.4 [0.2-0.8]), but the difference was not observed in multivariate modeling.

Discussion | Novel sexual orientation disparities in indoor tanning among gay and bisexual men, independent of sociodemographic differences, were identified as compared with straight men. These results are consistent with a study of 78 sexual minority and 1689 heterosexual young men aged 16 to 29 years, with sexual minority men reporting a 2.9-fold higher odds of indoor tanning. Larger future studies may increase prevalence estimate reliability among sexual minority populations. Concurrent health risk behaviors, intersectionality with socioeconomic disparities, health care access barriers, stigmatization and minority stress, and other sociocultural contexts should be explored as potential mediators. The roles of body image dissatisfaction and negative appearance evaluation
A large magnitude of disparities in the burden of indoor tanning have focused on high-risk groups, such as young women, the women. Although previous efforts at curbing indoor tanning behaviors should be analyzed because they may be more prevalent among sexual minority men and associated with skin cancer risk behaviors. Sexual orientation disparities in other skin cancer-related behavioral risk factors should be further examined.

Gay and bisexual men reported not only significantly more frequent tanning than straight men but also rates comparable to women. Although previous efforts at curbing indoor tanning have focused on high-risk groups, such as young women, the large magnitude of disparities in the burden of indoor tanning among gay and bisexual men warrants critically needed research and targeted clinical and public health interventions.

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Online Advertising for Cancer Prevention: Google Ads and Tanning Beds

Google receives more than 3.5 billion Internet searches daily, and the advertisements on their results pages may provide a unique opportunity to transmit targeted public health information to a large audience. Skin cancer is more common than all other cancers combined, and indoor tanning is a preventable risk factor that accounts for more than 450,000 new malignant neoplasms each year. Tanning bed use remains common, with 1 in 5 adolescents and more than half of college students exposed. Awareness of the dangers of tanning beds is one of the factors that can lead to behavior change. The goals of this study were to examine the volume of tanning bed-related searches on Google and pilot the use of Google’s advertising service for dissemination of skin cancer prevention messages to users entering searches related to tanning beds.

Methods | We used Google AdWords, a pay-per-click online advertising service that places 3-line, 105-character advertisements next to Google search results, to showcase skin cancer prevention advertisements. Google for Nonprofits provided free advertising. Google AdWords campaigns are organized by key words, which approximate the search terms that people type into Google. We developed a list of tanning bed–related key words and examined the search volume of these using Google AdWords Keyword Planner and Google Trends. Google Trends depicts relative search interest over time by normalizing Google search volume data by the total number of searches. Our campaign was restricted to North America and English-language searches. Clicking on the advertisement directed users to information from the Centers for Disease Control and Prevention’s The Burning Truth Campaign. The University of California at San Francisco Committee on Human Research deemed that this study posed minimal risk and was exempt from institutional review board approval.

From April 1, 2014, to March 31, 2015, key words and advertisement content were iteratively modified based on impressions (advertisement display frequency), clicks (user clicks on the advertisement), and click-through rates (ratio of clicks to impressions). We divided the pilot advertisements into 3 thematic groups: appearance, health, and education. The top performing advertisements in each group from the pilot period were selected to rotate evenly between April 2, and June 2, 2015. Although we were able to select key words and advertisements, Google’s internal algorithms determined how often each advertisement was shown: advertisements that match the content of the destination website or those that perform well initially are shown more often.

Results | Each month Google processes an average of more than 75,000 searches with search terms tanning, tanning bed, and tanning salon (Figure). Google searches for tanning bed–related key words are cyclical, with peaks observed in April and May of each year. Together, our selected advertisements were shown 235,913 times and clicked more than 2000 times (Table). A click-

![Figure. Trends in Google Search Terms Over Time](image-url)