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Increased interest in sunless tanning versus tanning beds in the United States: A Google Trends analysis



To the Editor: Tanning became fashionable in 1920s, when Coco Chanel had a suntan after returning from vacation, and it still remains popular. Despite strong evidence for its association with skin cancer and aging, altering the perception of tanning and its dangers has been difficult so far. Therefore, the American Academy of Dermatology has suggested the use of artificial self-tanning products containing dihydroxyacetone for individuals who want to achieve a bronze look.¹ We aimed to evaluate how this suggestion and the warnings about the dangers of UV tanning have changed the interest in 2 tanning methods and sunscreen use by using Google Trends (Google, Mountainview, CA). Google Trends has been used for describing interest in search terms.^{2,3} We extracted and quantified searches for *tanning bed*, *spray tan*, and *sunscreen* to indicate popular trends. Queries from the United States for years 2004 through 2019 were included in the analysis. Data presented as search volume index, ranging from 0 (for no searches) to 100 (for the peak of the most populous search). Every year, interest in sunscreen peaked in June. Interest in sunscreen increased during the period studied (β coefficient, 0.05; 95% confidence interval [CI], 0.00-0.10; $P = .057$). As in prior literature, the 2 tanning-related searches peaked in spring, suggesting a greater interest in the prospect of summer.³ This seasonal trend was also noted in southern US states with continuous sunlight. The search volume index was higher for *tanning bed* than for *spray tan* in 2004 (Fig 1). Regression analysis showed a significant increase over time for the term *spray tan* ($\beta = 0.11$; 95% CI, 0.09-0.13; $P = .001$) but no change for *tanning bed* ($\beta = 0.01$; 95% CI,

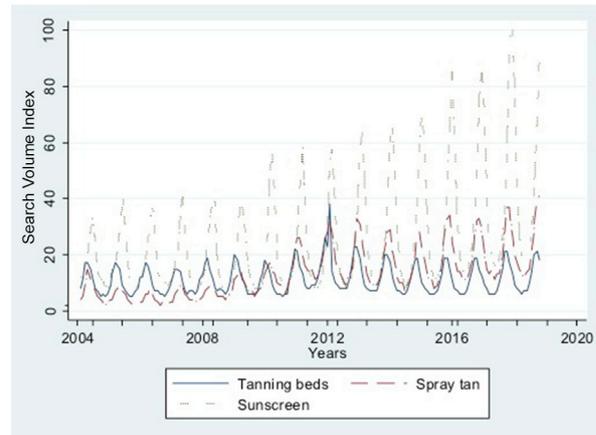


Fig 1. Google Trends for *tanning beds*, *spray tan*, and *sunscreen*, 2004 through 2019 in the United States. Data are presented as search volume index, ranging from 0 (for no searches) to 100 (for the peak of the most populous search).

0.00-0.03; $P = .108$). This resulted in a greater mean number of searches for *spray tan* after 2011. Being tan is often misunderstood as being less sun-sensitive, even when the tan is due to the application of dihydroxyacetone (which provides a sun protection factor of 3 on the day of application).^{1,4} Emphasis should be given to the fact that a spray tan does not prevent sun damage and sunburns. Regular consultations about photoprotection, including sunscreen use, staying in shade, and wearing sun-protective clothing all year long, are necessary to achieve compliance with dermatology recommendations.

Based on these metrics, the popularity of looking tan has not decreased. This is reasonable because beauty standards are affected by the media, which still promotes a bronzed appearance.⁵ Considering how the tanning trend began, the media might be a way for people to start loving their natural skin color. However, given the fact that light-skinned people are still pursuing a tan appearance, the greater interest in alternatives that do not involve ultraviolet radiation could be a positive step.

Angelica Misitzis, MD,^{a,b} and Martin A. Weinstock, MD, PhD^{a,b}

From the Department of Dermatology, Alpert Medical School of Brown University^a and Center for Dermatoepidemiology, Veterans Affairs Medical Center, Providence, Rhode Island.^b

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Correspondence to: Angelica Misitzis, MD, Center for Dermatoepidemiology, Providence VA Medical Center, 830 Chalkstone Ave, Providence, RI 02908-4799

E-mail: angelicamisitzi@gmail.com

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Validation of the electronic Psoriasis Area and Severity Index application: Establishing measurement equivalence



To the Editor: Despite its many shortcomings, the Psoriasis Area and Severity Index (PASI) remains the standard method worldwide for psoriasis assessment.¹ Several studies have implemented electronic versions without evidence of formal validation, raising the possibility of lack of equivalence with the paper counterpart.² This study compared the conventional paper-based and a novel electronic application version of the PASI (Fig 1). International Society for Pharmacoeconomics and Outcomes Research (ISPOR) guidelines³ were followed to assess rater preference and consistency of scores.

The study used a randomized cross-over design using a within-subjects comparison of the 2 formats of the PASI. The study was conducted at the dermatology outpatient department, University Hospital of Wales, Cardiff, United Kingdom.

Inclusion criteria were patients aged 18 years or older with a clinical diagnosis of chronic plaque psoriasis from a dermatologist and the ability to read and understand English. Raters ranged from medical students to senior trainees and received standardized clinical training for the PASI assessment to ensure uniformity of rating. The study power was 80%, with an expected intraclass correlation coefficient (ICC) of 0.9 ($\alpha = 0.05$), resulting in a target sample size of 44 patients.

All 3 raters showed high correlation in test scores (Pearson correlation, 0.949; $P < .05$; $n = 5$) demonstrating standardization of the assessment criteria. Forty-four patients (59.1% male) were recruited, with a mean \pm standard deviation (SD) age of 45 ± 16 years. The mean duration of chronic plaque psoriasis diagnosis was 19.2 ± 14.8 years (interquartile range, 8-30 years), with PASI severity ranging from 0.7 to 28.5. The ICC showed high concordance between the total PASI scores from paper and the iPad (Apple Inc, Cupertino, CA) format (ICC, 0.993; 95% confidence interval, 0.988-0.996; Table 1). The median difference in PASI scores was also within the hypothesized difference of $CC = 0.993$ ($P = .72$). The lower and higher limits of agreement were -1.4 and 1.4 , respectively.

The PASI iPad version demonstrated reduced interrater variability compared with the paper version (Pearson correlation, 0.982 vs 0.949; 5 patients assessed). There was no carryover effect demonstrated with scores ($P = .82$) or time to completion ($P = .16$) regardless of which format of the PASI was used first.

The raters, using a stopwatch, took a median of 147 seconds (iPad) vs 152 seconds (paper), not including calculation time ($P = .81$). Raters reported that the iPad version was easier to use compared with the paper version due to the visual nature of the application allowing accurate assessment and calculation of severity scores, although suggestions were made to improve the user interface.

The future of medical practice is intricately anchored within the evolution of digital technology. There is high correlation, and thus equivalence, between the PASI iPad and paper versions. The raters preferred the iPad version due to the visual nature of the scoring process and the reduced likelihood of calculation errors. The higher interrater reliability and the inherent advantages of electronic tools⁴ further reinforces the superiority of the digital format. The validated Psoriasis 360 (Janssen EMEA, Beerse Belgium) application, together with the previously validated Dermatology Life Quality Index⁵ component, has the potential to be of considerable value to clinicians, researchers, and patients.

Faraz Mahmood Ali, MBChB, MRCP,^a Sam Salek, PhD, RPh,^{b,c} Andrew Y. Finlay, MBBS, FRCP,^a and Vincent Piguat, MD, PhD, FRCP^{a,d}

From the Division of Infection and Immunity, Department of Dermatology and Academic Wound Healing, School of Medicine, Cardiff University,^a the School of Life and Medical Sciences, University of Hertfordshire, Hatfield,^b