Indoor Tanning Attitudes and Practices of US Dermatologists Compared With Other Medical Specialists

Kathryn R. Johnson, MD; Lauren F. Heilig, BA; Eric J. Hester, MD; Shayla O. Francis, MD; Sara Jane Deakyne, BS; Robert P. Dellavalle, MD, PhD, MSPH

Objective: To compare the indoor tanning attitudes and practices of dermatologists with physicians in other medical specialties (internal medicine, pediatrics, and family medicine) commonly providing sun safety counseling to patients.

Design: Cross-sectional study.

Setting: Questionnaire mailed to randomly selected US dermatologists, internists, family practitioners, and pediatricians.

Results: The overall response rate was 38% (364/949): 71% indicated that patients had asked their opinions about indoor UV tanning, 80% believed that UV tanning was unsafe, and 90% agreed they would counsel patients against nonmedical indoor UV tanning. Many supported increased UV tanning legislation, including minimum age restrictions (91%) and parental consent requirements (90%). Dermatologists were significantly more likely than other physicians to respond to the survey (52% vs 31%, \( P < 0.001 \)), speak with patients about indoor UV tanning (odds ratio [OR], 26.5; 95% confidence interval [CI], 9.5-74.1), believe that indoor UV tanning is unsafe (OR, 14.0; 95% CI, 5.0-39.4), and support increased regulation (OR, 11.7; 95% CI, 1.5-88.5). Women discouraged indoor UV tanning more than men (OR, 5.2; 95% CI, 1.8-15.2). Physicians who had used indoor UV tanning (19%) more often agreed that non-UV tanning lotion (OR, 2.0; 95% CI, 1.1-3.8) and airbrush tanning (OR, 1.9; 95% CI, 1.1-3.4) were safe but did not differ in attitudes regarding UV tanning safety. Physicians practicing in the Northeast and Midwest were more likely to support UV tanning to improve mood (OR, 2.0; 95% CI, 1.1-3.5) and more commonly believed that UV tanning could help treat depression (OR, 2.6; 95% CI, 1.5-4.6) or prevent vitamin D deficiency (OR, 1.7; 95% CI, 1.0-2.8).

Conclusions: Physicians, especially dermatologists, are frequently asked about and generally discourage indoor UV tanning. Dermatologists regard indoor UV tanning more negatively compared with other physicians. Physician sex and geographic location were associated with specific indoor UV tanning attitudes.

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Indoor tanning has grown over the past several decades into a more than $5 billion-per-year industry, with traditional UV tanning being the most popular service offered by tanning salons.1 UV tanning bed use has been associated with adverse health consequences including cutaneous and ocular burns; altered immune responses; polymorphous light eruptions; drug- and cosmetic-induced photosensitivity;2,3 DNA mutation in human skin;4,5 and increased risk of squamous cell, basal cell, and melanoma skin cancers.6-8 Non-UV tanning booths that apply dihydroxyacetone containing mist are increasingly available.9 Non-UV tanning booths that apply dihydroxyacetone containing mist are increasingly available.9 Non-UV tanning booths that apply dihydroxyacetone containing mist are increasingly available.9 Non-UV tanning booths that apply dihydroxyacetone containing mist are increasingly available.9 Non-UV tanning booths that apply dihydroxyacetone containing mist are increasingly available.9 The Food and Drug Administration has approved dihydroxyacetone as safe for external use for cosmetic tanning purposes, with the caveat that the effects of eye, lip, mucous membrane, and internal exposure are untested.10

The attitudes and personal practices of physicians correlate with their sun protection recommendations: physicians who view skin cancer prevention as important and who use sun protection themselves are more likely to recommend sun protection to patients.11 Better understanding of physician beliefs and behaviors regarding UV exposure may identify opportunities to improve patient counseling regarding indoor tanning.

Methods

A 29-question survey (available in an online eBox [http://www.archdermatol.com]) was developed that assessed (1) indoor UV tanning

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Table 1. Respondent Characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Dermatologists</th>
<th>Nondermatologists</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, y</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;30</td>
<td>4/136 (3)</td>
<td>19/226 (8)</td>
<td></td>
</tr>
<tr>
<td>30-39</td>
<td>29/136 (21)</td>
<td>70/226 (31)</td>
<td></td>
</tr>
<tr>
<td>40-49</td>
<td>39/136 (29)</td>
<td>55/226 (24)</td>
<td>.006</td>
</tr>
<tr>
<td>50-59</td>
<td>37/136 (27)</td>
<td>56/226 (25)</td>
<td></td>
</tr>
<tr>
<td>60-69</td>
<td>24/136 (18)</td>
<td>17/226 (8)</td>
<td></td>
</tr>
<tr>
<td>≥70</td>
<td>3/136 (2)</td>
<td>9/226 (4)</td>
<td></td>
</tr>
<tr>
<td>Sex, F/total M + F</td>
<td>85/136 (63)</td>
<td>139/226 (62)</td>
<td>.85</td>
</tr>
<tr>
<td>Region of practice</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Midwest</td>
<td>28/134 (21)</td>
<td>55/221 (25)</td>
<td></td>
</tr>
<tr>
<td>Northeast</td>
<td>25/134 (19)</td>
<td>33/221 (15)</td>
<td></td>
</tr>
<tr>
<td>South</td>
<td>49/134 (37)</td>
<td>79/221 (36)</td>
<td>.81</td>
</tr>
<tr>
<td>West</td>
<td>31/134 (23)</td>
<td>51/221 (23)</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>1/134 (1)</td>
<td>3/221 (1)</td>
<td></td>
</tr>
<tr>
<td>Type of practice</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Private practice</td>
<td>110/133 (83)</td>
<td>111/216 (51)</td>
<td></td>
</tr>
<tr>
<td>Academic practice</td>
<td>13/133 (10)</td>
<td>22/216 (10)</td>
<td></td>
</tr>
<tr>
<td>Residency/fellowship</td>
<td>5/133 (4)</td>
<td>24/216 (11)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>HMO</td>
<td>3/133 (2)</td>
<td>12/216 (6)</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>2/133 (2)</td>
<td>47/216 (22)</td>
<td></td>
</tr>
<tr>
<td>Personal history of:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Melanoma</td>
<td>3/136 (2)</td>
<td>3/228 (1)</td>
<td>.68</td>
</tr>
<tr>
<td>Nonmelanoma</td>
<td>12/136 (9)</td>
<td>14/228 (6)</td>
<td>.34</td>
</tr>
<tr>
<td>skin cancer</td>
<td>24/136 (18)</td>
<td>26/228 (11)</td>
<td>.09</td>
</tr>
<tr>
<td>Actinic keratoses</td>
<td>13/136 (10)</td>
<td>18/228 (8)</td>
<td>.58</td>
</tr>
<tr>
<td>Family history of:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Melanoma</td>
<td>13/136 (10)</td>
<td>18/228 (8)</td>
<td>.58</td>
</tr>
<tr>
<td>Nonmelanoma</td>
<td>53/134 (40)</td>
<td>55/228 (24)</td>
<td>.002</td>
</tr>
<tr>
<td>skin cancer</td>
<td>45/136 (33)</td>
<td>55/228 (24)</td>
<td></td>
</tr>
<tr>
<td>Actinic keratoses</td>
<td>45/136 (33)</td>
<td>55/228 (24)</td>
<td>.06</td>
</tr>
<tr>
<td>Fair or medium skin</td>
<td>108/135 (80)</td>
<td>144/227 (63)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>white skin</td>
<td>21/133 (16)</td>
<td>46/224 (21)</td>
<td>.27</td>
</tr>
</tbody>
</table>

Abbreviation: HMO, health maintenance organization.
*Data are given as number/number of respondents (percentage).

RESULTS

Fifty-one surveys were undeliverable owing to incorrect mailing addresses, 364 physicians returned completed surveys, and 40 respondents or their representatives returned blank surveys and/or notes describing the reason for declining to answer the survey (addressee deceased [n=3], no longer in practice [n=5], retired [n=9], out of the country [n=1], not an AMA member [n=3], had no opinion on the matter [n=1], survey topic not a patient concern [eg, neonatal intensive care pediatrician] [n=3], and blank survey returned without explanation [n=15]), giving an overall response rate of 38% (364/949). Response rate for each question ranged from 98% to 100% for dermatologists and 95% to 100% for other physician responders.

Women respondents tended to be younger than men (P<.001); sex of respondents showed no statistical differences across the surveyed specialties. Eighteen respondents (<5%) reported not regularly seeing patients in a clinical setting during the past year. Dermatologists responded to the questionnaire more frequently than other physicians (52% dermatologists vs 31% other physicians; P<.001). Blank surveys or letters otherwise declining to answer were returned by 2% of dermatologists and 5% of nondermatologists (P=.06). Dermatologists were older (P=.004) and more frequently reported light or medium white skin color (P<.001) and family history of nonmelanoma skin cancer (P=.002) (Table 1).

INDOOR UV TANNING

Indoor UV tanning had been used by 16% of dermatologists vs 21% of other physicians (OR, 0.7 [95% CI, 0.4-1.3]), with 6% overall indicating use for treatment of a medical condition. Reasons for indoor UV tanning included improving appearance (57%), preventing sunburn by developing a base tan (43%), and improving mood (10%). Fewer than 15% of those reporting tanning bed...
Table 2. Indoor Tanning Attitudes and Practices of Dermatologists Compared With Other Medical Specialists*

<table>
<thead>
<tr>
<th>Response</th>
<th>Dermatologists</th>
<th>Nondermatologists</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ever asked by a patient about indoor UV tanning</td>
<td>132/136 (97)†</td>
<td>126/227 (56)†</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>With how many patients have discussed indoor UV tanning in past 12 mo?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>4/136 (3)†</td>
<td>111/227 (49)†</td>
<td></td>
</tr>
<tr>
<td>1-10</td>
<td>38/136 (28)†</td>
<td>92/227 (41)†</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>11-50</td>
<td>39/136 (29)†</td>
<td>10/227 (6)†</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>&gt;50</td>
<td>55/136 (40)†</td>
<td>6/227 (3)†</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Important to discuss risk with patients who regularly use indoor UV tanning</td>
<td>1.3 (1.2-1.4)</td>
<td>1.8 (1.7-1.9)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Would discourage indoor UV tanning</td>
<td>1.1 (1.0-1.2)</td>
<td>1.8 (1.7-1.9)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Believe indoor UV tanning is safe</td>
<td>4.5 (4.4-4.6)</td>
<td>3.8 (3.6-3.9)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Believe outdoor UV tanning is safe</td>
<td>4.4 (4.3-4.5)</td>
<td>4.1 (4.0-4.2)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Likely to tan in next 12 mo</td>
<td>4.9 (4.8-5.0)</td>
<td>4.7 (4.6-4.8)</td>
<td>.001</td>
</tr>
<tr>
<td>Indoor UV tanning increases risk of:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Melanoma</td>
<td>1.5 (1.3-1.6)</td>
<td>1.8 (1.7-1.9)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Nonmelanoma skin cancer</td>
<td>1.2 (1.1-1.3)</td>
<td>1.5 (1.5-1.7)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Premature aging</td>
<td>1.1 (1.0-1.2)</td>
<td>1.5 (1.4-1.5)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Sunburn</td>
<td>2.2 (2.0-2.4)</td>
<td>2.0 (1.8-2.1)</td>
<td>.09</td>
</tr>
<tr>
<td>Benefit provided by indoor UV tanning:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prevent vitamin D deficiency</td>
<td>3.6 (3.4-3.8)</td>
<td>3.0 (2.9-3.2)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Treat depression</td>
<td>3.6 (3.4-3.8)</td>
<td>3.3 (3.1-3.4)</td>
<td>.02</td>
</tr>
<tr>
<td>Lower blood pressure</td>
<td>4.4 (4.2-4.5)</td>
<td>4.0 (3.9-4.2)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Decrease risk of nonskin cancers (eg, prostate, breast, or colon)</td>
<td>4.4 (4.3-4.6)</td>
<td>4.1 (4.0-4.2)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Acceptable to tan in order to:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Improve mood</td>
<td>4.1 (3.9-4.2)</td>
<td>3.5 (3.3-3.6)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Improve appearance</td>
<td>4.5 (4.4-4.7)</td>
<td>3.9 (3.7-4.0)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Prevent sunburn by developing base tan</td>
<td>4.4 (4.2-4.5)</td>
<td>3.7 (3.6-3.9)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Treat psoriasis</td>
<td>2.6 (2.4-2.8)</td>
<td>2.5 (2.5-2.8)</td>
<td>.75</td>
</tr>
<tr>
<td>Treat eczema</td>
<td>3.0 (2.8-3.2)</td>
<td>3.4 (3.2-3.5)</td>
<td>.001</td>
</tr>
<tr>
<td>Support minimum age limit</td>
<td>1.3 (1.1-1.4)</td>
<td>1.7 (1.6-1.8)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Support parental consent requirements</td>
<td>1.3 (1.2-1.5)</td>
<td>1.7 (1.6-1.9)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Support excise tax on tanning services</td>
<td>2.1 (1.9-2.3)</td>
<td>3.0 (2.8-3.2)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Asked by patients about non-UV tanning</td>
<td>124/136 (91)†</td>
<td>33/226 (15)†</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Non-UV tanning lotion is safe</td>
<td>1.5 (1.4-1.6)</td>
<td>2.4 (2.3-2.5)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Non-UV airbrush tanning in safe</td>
<td>1.7 (1.6-1.9)</td>
<td>2.6 (2.5-2.7)</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>

*Unless otherwise indicated data are given as mean (95% confidence interval) based on 5-point Likert scale (1 = strongly agree, strongly encourage, or very safe; 5 = strongly disagree, strongly discourage, or very unsafe) unless otherwise specified.
†Fraction of respondents (percentage).

Table 3. Survey Responses According to Respondent Sex, Personal History of Actinic Keratoses (AK) or Skin Cancer, and Personal Tanning History*

<table>
<thead>
<tr>
<th>Response</th>
<th>Men</th>
<th>Women</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Would discourage indoor UV tanning</td>
<td>1.6 (1.5-1.8)</td>
<td>1.4 (1.3-1.5)</td>
<td>.001</td>
</tr>
<tr>
<td>Believe indoor UV tanning is safe</td>
<td>4.0 (3.8-4.1)</td>
<td>4.2 (4.0-4.3)</td>
<td>.02</td>
</tr>
<tr>
<td>Believe outdoor UV tanning is safe</td>
<td>4.1 (4.0-4.2)</td>
<td>4.4 (4.2-4.5)</td>
<td>.003</td>
</tr>
<tr>
<td>Support minimum age limit</td>
<td>1.6 (1.5-1.8)</td>
<td>1.4 (1.3-1.5)</td>
<td>.02</td>
</tr>
<tr>
<td>Support parental consent requirements</td>
<td>1.7 (1.5-1.8)</td>
<td>1.5 (1.3-1.6)</td>
<td>.08</td>
</tr>
<tr>
<td>Support excise tax on tanning services</td>
<td>2.8 (2.6-3.0)</td>
<td>2.4 (2.2-2.6)</td>
<td>.01</td>
</tr>
<tr>
<td>Have used indoor UV tanning in last 12 mo</td>
<td>32/222 (14)†</td>
<td>35/134 (26)†</td>
<td>.006</td>
</tr>
<tr>
<td>Positive History (AK or Skin Cancer)</td>
<td></td>
<td></td>
<td>.74</td>
</tr>
<tr>
<td>Would discourage indoor UV tanning</td>
<td>1.5 (1.2-1.7)</td>
<td>1.6 (1.5-1.7)</td>
<td>.30</td>
</tr>
<tr>
<td>Support minimum age limit</td>
<td>1.5 (1.2-1.7)</td>
<td>1.5 (1.4-1.7)</td>
<td>.49</td>
</tr>
<tr>
<td>Support parental consent requirements</td>
<td>1.5 (1.3-1.8)</td>
<td>1.6 (1.5-1.7)</td>
<td>.63</td>
</tr>
<tr>
<td>Support excise tax on tanning services</td>
<td>2.2 (1.9-2.6)</td>
<td>2.8 (2.6-2.9)</td>
<td>.007</td>
</tr>
<tr>
<td>Negative History (AK or Skin Cancer)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Would discourage indoor UV tanning</td>
<td>1.6 (1.4-1.8)</td>
<td>1.5 (1.4-1.6)</td>
<td>.26</td>
</tr>
<tr>
<td>Non-UV tanning lotion is safe</td>
<td>1.9 (1.7-2.0)</td>
<td>2.2 (2.1-2.3)</td>
<td>.006</td>
</tr>
<tr>
<td>Non-UV airbrush tanning in safe</td>
<td>2.1 (1.9-2.3)</td>
<td>2.3 (2.2-2.4)</td>
<td>.02</td>
</tr>
</tbody>
</table>

*Unless otherwise indicated data are given as mean (95% confidence interval) based on 5-point Likert scale (1 = strongly agree, strongly encourage, or very safe; 5 = strongly disagree, strongly discourage, or very unsafe) unless otherwise specified.
†Fraction of respondents (percentage).

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use had done so in the previous 12 months, and 73% had first used indoor UV tanning prior to age 30 years. Dermatologists less commonly planned to use indoor UV tanning in the next 12 months (1% vs 6%; OR, 0.1 [95% CI, 0.02-0.91]). Indoor UV tanning sessions were obtained from multiple sources including tanning salons (82%), health clubs or gyms (22%), physicians’ offices (6%), or home tanning beds (6%).

More dermatologists had discussed indoor UV tanning for nonmedical purposes with a patient in the preceding 12 months than other physicians (97% vs 51%; OR, 31.5 [95% CI, 11.3-88.5]), and the number of patients with whom they had spoken about indoor UV tanning was significantly greater (P < .001) (Table 2). More than 90% of all physicians agreed that it is important to discuss potential risks with patients who indoor UV tan frequently (at least once monthly) for nonmedical purposes, although dermatologists believed significantly more strongly that this was important (Table 2). At least 4 of 5 physicians believed that both indoor and outdoor UV tanning was unsafe, and only 20% agreed that indoor UV tanning devices emit less dangerous forms of UV radiation compared with outdoor sunlight. Dermatologists had more negative opinions about the safety of both indoor and outdoor UV tanning compared with nondermatologist physicians (Table 2). Differences between dermatologists and nondermatologists regarding the perceived safety of indoor UV tanning (OR, 0.06 [95% CI, 0.01-0.5]) and number of patients counseled regarding indoor tanning (OR, 30.0 [95% CI 10.7-84.5]) remained significant after controlling for age, sex, and skin tone.

When discussing the use of indoor UV tanning for nonmedical purposes with a healthy patient, 100% of dermatologists and 84% of nondermatologists would discourage UV tanning. Most respondents did not believe that a desire to improve one’s mood (61%) or appearance (77%) or to prevent sunburn by developing a base tan (72%) provided adequate justification for UV tanning use. Dermatologists were more likely to believe that regular indoor UV tanning increased an individual’s risk for melanoma and premature aging but were less likely to believe that indoor tanning increased risk of sunburn and less likely to believe that indoor UV tanning could benefit users by preventing vitamin D deficiency or treating depression (Table 2). Very few respondents agreed with statements that indoor UV tanning lowered blood pressure or prevented nonskin cancers (5 and 2 respondents, respectively).

Most respondents favored legislation regulating indoor UV tanning, especially minimum age limits (91%) or a regulation requiring parental consent for minors (90%). Forty-four percent supported an excise tax on tanning services to decrease demand. Dermatologists more strongly supported such legislative measures (Table 2). Other regulations recommended by responding physicians included more strict inspection and regulation of tanning bed equipment, limits on UV dose exposure, required education on the potential risks prior to use, prohibition of marketing aimed at youth, and outright bans on tanning bed use.

Male and female physicians counseled similar numbers of patients about indoor UV tanning in the past year, and both were frequently asked by patients for opinions on UV tanning. Logistic regression analysis controlling for specialty, age, and skin tone revealed that women were more likely to discourage patients from tanning compared with men (97% vs 85%; OR, 6.5 [95% CI, 2.1-19.6]). Women were also more likely than men to have used indoor UV tanning at any time in the past, but they were not more likely to have tanned in the last 12 months (Table 3). Men who had used indoor UV tanning tended to have first tanned at a later age compared with women (P = .004) and were less likely to have tanned at a tanning salon (72% vs 91%; OR, 0.2 [95% CI, 0.06-1.0]).

Women more commonly support tanning legislation (Table 3), and this difference remained significant (OR, 3.9 [95% CI, 1.1-13.9]) after controlling for specialty, age, and skin tone.

Logistic regression analysis controlling for age, sex, specialty, and skin tone revealed that respondents with a personal history of skin cancer (melanoma or nonmelanoma) (9%) or actinic keratoses (14%) were less likely than those without to agree that indoor UV tanning increased risk for melanoma (OR, 0.3 [95% CI, 0.1-0.7]). However, they did not differ otherwise in attitudes toward the safety, risks, and potential benefits of indoor UV tanning or personal history of tanning bed use (Table 3). History of indoor UV tanning bed use did not significantly predict perceptions of the safety of indoor UV tanning (OR, 1.0 [95% CI, 0.4-2.8]) or likelihood to discourage indoor tanning or support tanning legislation (Table 3).

Older physicians tended to agree more often that UV tanning was unsafe (OR, 1.3 [95% CI, 0.7-2.2]) and that it was important to discuss the risks with patients who tanned (OR, 1.5 [95% CI, 0.6-3.5]) and to discourage patients from tanning (OR, 1.8 [95% CI, 0.8-4.0]). No trend with age was seen in relation to tanning legislation. Physicians in the Northeast and Midwest more strongly supported indoor UV tanning for improving mood (23% vs 13%; OR, 2.0 [95% CI, 1.1-3.5]), treating depression (33% vs 16%; OR, 2.6 [95% CI, 1.5-4.6]), and preventing vitamin D deficiency (35% vs 24%; OR, 1.7 [95% CI, 1.0-2.8]) compared with physicians in the South and West. Those practicing in states with indoor UV tanning youth access restrictions13 showed no significantly different indoor UV tanning attitudes compared with those in states without such laws.

NON-UV TANNING

Of the dermatologists, 91% had been asked by patients about non-UV tanning, such as tanning lotions or airbrush tanning, compared with 24% of the family practitioners, 13% of internists, and 4% of pediatricians. Respondents generally considered non-UV tanning safe, with dermatologists considering self-applied tanning lotions (94% vs 52%; OR, 14.5 [95% CI, 6.8-31.1]) and airbrush tanning (86% vs 41%; OR, 8.9 [95% CI, 5.1-15.5]) safe much more often compared with other physicians (Table 2). Those with a history of indoor UV tanning were significantly more likely to agree that tanning lotions (79% vs 65%; OR, 2.0 [95% CI, 1.1-3.8]) and airbrush tanning (70% vs 54%; OR, 1.9 [95% CI, 1.1-3.4]) were safe compared with those with no such history (Table 3).
Most physicians agreed that indoor UV tanning was unsafe (80%) and that patients should be discouraged from indoor UV tanning (90%); however, the opinions of dermatologists toward indoor UV tanning were significantly more negative than those of other physicians. Conversely, dermatologists had more favorable opinions of non-UV tanning compared with other physicians. Women more commonly discouraged indoor UV tanning compared with men, but other factors examined were not predictive of most responses.

This study has strengths and limitations. Use of a random sample from the AMA database containing all practicing physicians in the United States and its territories helped to ensure a representative sample that increases the generalizability of results, and the 38% overall response rate is similar to the response rates of other published postal surveys of physicians, a demographic group that generally responds at a rate approximately 10% lower than that of other populations.15 Nondermatologist respondents at a lower rate (31% vs 52% of dermatologists), allowing for the possibility of a response bias. Nondermatologist respondents are more likely to be concerned about the risks of indoor UV tanning compared with non-respondents, favoring an overestimation of the frequency of patient interactions regarding tanning and a more negative attitude toward indoor tanning than may exist across the sample. In addition, this survey did not assess distribution of printed materials on indoor tanning or counseling offered by other office staff members. A social acceptability bias may be seen with studies regarding controversial issues such as tanning, which might lead to overestimation of the frequency of patient counseling regarding tanning. This survey was made anonymous to minimize this effect.

Few previous studies have examined the attitudes and practices of physicians regarding indoor tanning. A survey study of 1616 members of the American Academy of Pediatrics regarding sun protection found that pediatricians believed sun protection should be discussed with patients (93%) and that most had recently counseled patients regarding sun protection (88%).15 Attitudes toward sun protection counseling and skin cancer risk did not vary with practice characteristics or personal or family history of skin cancer; however, women and physicians practicing in the Northeast or Midwest were more likely to frequently counsel patients on sun protection. Another study of pediatricians found that personal sun protection practices were predictive of professional practices regarding sun protection counseling.11 These studies did not address indoor tanning. A pilot study of employees of a health care system in the United Kingdom (UK) examined the association of specific attitudes and demographic characteristics with the likelihood to use a UV tanning bed.16 Of the respondents, 18% believed that tanning bed use was safer than tanning outdoors, similar to results of the present study. However, results of the UK study varied from the present study in that those who reported tanning bed use differed significantly in their perceptions of the safety of indoor tanning and association with skin cancer. Because our study was limited to physicians, our study population may have been more uniformly informed about skin cancer risk factors. Another UK study of 56 health care professionals including 28 junior physicians found that 14% of physicians reported tanning bed use.17 This small study did not appear to be anonymous, allowing for the possibility of social desirability bias, which may underestimate the frequency of tanning in this population. Neither of these studies addressed physician interactions with patients regarding indoor tanning.

The high frequency with which physicians are asked by patients about indoor tanning highlights the importance of all physicians being well informed about the risks and potential benefits. Although nearly all physicians in our study would discourage indoor UV tanning when speaking with patients, a major question remains: to what degree can physician recommendations regarding tanning affect actual patient behavior? Physician opinion regarding the safety of non-UV tanning were generally positive, especially among dermatologists and physicians who had previously used a tanning bed and may support promotion of non-UV tanning in favor of UV tanning as a safer alternative for those seeking a tan. Further studies are needed to determine how physicians promoting non-UV tanning affects UV tanning practices.15

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Additional Resources: The online-only eBox is available at http://www.archdermatol.com.

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REFERENCES

Please mark a single answer, unless otherwise instructed, by filling in the mark next to the desired response.

1. Has a patient ever asked your opinion regarding indoor UV tanning?
   - ☐ Yes
   - ☐ No

2. In the past 12 months, with approximately how many patients have you discussed the use of indoor UV tanning for nonmedical purposes?
   - ☐ None
   - ☐ 1-3
   - ☐ 4-10
   - ☐ 11-25
   - ☐ 26-50
   - ☐ >50

Questions 3-5: Please indicate your level of agreement with each of the following statements by circling the one best answer.

3. Regular indoor UV tanning (averaging once monthly or more often) increases a person’s risk for each of the following:
   - A. Nonmelanoma skin cancer (eg, basal cell, or squamous cell) [Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree, Not Sure/Don’t Know]
   - B. Melanoma skin cancer [Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree, Not Sure/Don’t Know]
   - C. Premature aging of skin [Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree, Not Sure/Don’t Know]
   - D. Sunburn [Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree, Not Sure/Don’t Know]

4. If asked by a patient whether you would support their decision to use indoor UV tanning for each of the following reasons, you would be likely to support your patient in their decision for each of the following potential indications:
   - A. Improve mood [Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree, Not Sure/Don’t Know]
   - B. Improve appearance [Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree, Not Sure/Don’t Know]
   - C. Prevent sunburn by developing base tan [Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree, Not Sure/Don’t Know]
   - D. Treating psoriasis [Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree, Not Sure/Don’t Know]
   - E. Treating eczema [Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree, Not Sure/Don’t Know]
   - F. Other (please specify): [Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree, Not Sure/Don’t Know]

5. Indoor UV tanning can provide each of the following benefits to its users:
   - A. Prevent vitamin D deficiency [Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree, Not Sure/Don’t Know]
   - B. Decrease risk of nonskin cancers (eg, prostate, breast, or colon) [Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree, Not Sure/Don’t Know]
   - C. Lower blood pressure [Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree, Not Sure/Don’t Know]
   - D. Treat depression [Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree, Not Sure/Don’t Know]
   - E. Other (please specify): [Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree, Not Sure/Don’t Know]

6. When discussing the use of indoor UV tanning for nonmedical purposes with a healthy patient who expresses interest in tanning, you would:
   - ☐ Strongly encourage tanning
   - ☐ Somewhat encourage tanning
   - ☐ Neither encourage nor discourage tanning
   - ☐ Somewhat discourage tanning
   - ☐ Strongly discourage tanning

7. Think about all members of your family, as well as friends and acquaintances. Approximately how many of these individuals use indoor UV tanning?
   - ☐ None
   - ☐ 1%-5%
   - ☐ 6%-10%
   - ☐ 10%-20%
   - ☐ >20%
8. Have you personally ever used indoor UV tanning, for medical or nonmedical purposes?
   □ Yes (go to questions in the box below.)
   □ No (skip to question 9.)
   A. How many times have you used indoor UV tanning in the last 12 months?
      □ 0 times
      □ 1-5 times
      □ 6-12 times
      □ 13-24 times
      □ 25-52 times
      □ >52 times
   B. For what reasons have you used indoor UV tanning in the last 12 months? (Select ALL that apply.)
      □ No tanning in last 12 months
      □ Improve mood
      □ Improve appearance
      □ Prevent sunburn by developing base tan
      □ Treat medical condition (please specify):
      □ Other:
   C. For what reasons have you used indoor UV tanning in the past, prior to the last 12 months? (Select ALL that apply.)
      □ No tanning in the past prior to 12 months ago
      □ Improve mood
      □ Improve appearance
      □ Prevent sunburn by developing base tan
      □ Treat medical condition (please specify):
      □ Other:
   D. How old were you when you first used indoor UV tanning?
      □ <15 years old
      □ 15-19 years old
      □ 20-29 years old
      □ 30-39 years old
      □ 40-59 years old
      □ >59 years old
   E. Where have you obtained indoor UV tanning at any time in the past? (Check ALL that apply.)
      □ Tanning salon
      □ Doctor's office
      □ Health club or gym
      □ Other (Please specify):

9. How safe do you believe indoor UV tanning to be?
   □ Very safe
   □ Fairly safe
   □ Neutral
   □ Fairly unsafe
   □ Very unsafe

10. How safe do you believe outdoor UV tanning to be?
    □ Very safe
    □ Fairly safe
    □ Neutral
    □ Fairly unsafe
    □ Very unsafe

Questions 11-15: Please indicate your level of agreement with each of the following statements by circling the one best answer.

11. It is important to discuss potential risks of indoor UV tanning with patients who regularly use indoor UV tanning (at least once monthly on average) for nonmedical purposes.

12. In general, indoor UV tanning devices emit less dangerous forms of UV radiation than outdoor sunlight.
13. In general, users of indoor UV tanning are less likely to acquire sunburn while tanning than those who sunbathe in the outdoors.

Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree | Not Sure/Don't Know
1 | 2 | 3 | 4 | 5 | 0

14. I am likely to seek indoor UV tanning in the next 12 months.

Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree | Not Sure/Don't Know
1 | 2 | 3 | 4 | 5 | 0

15. Each of the following types of legislation regarding indoor UV tanning is warranted:

A. A minimum age requirement
B. A regulation requiring parental consent for minors
C. An excise tax on tanning services to decrease demand
D. Other (please specify):

Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree | Not Sure/Don't Know
1 | 2 | 3 | 4 | 5 | 0

Questions 16-18: Non-UV tanning

Tanning lotions containing dihydroxyacetone have been available for years over the counter and simulate the appearance of a tan. Recently, non-UV indoor tanning booths, commonly known as Mystic Tan, Magic Tan, or airbrush tanning, have been developed to allow for even, all-over application of such dihydroxyacetone-containing tanning solutions. Patrons are enclosed in a stand-up booth, where the tanning solution is sprayed or misted onto the skin. The following 3 questions refer to these forms of non-UV tanning.

16. Have any patients asked for your opinion regarding the use of non-UV tanning such as lotions or airbrush tanning?
   - Yes
   - No

17. How safe do you believe use of self-applied tanning lotions to be?
   - Very safe
   - Fairly safe
   - Neutral
   - Fairly unsafe
   - Very unsafe

18. How safe do you believe use of airbrush tanning to be?
   - Very safe
   - Fairly safe
   - Neutral
   - Fairly unsafe
   - Very unsafe

19. What is your age?
   - <30 years
   - 30-39 years
   - 40-49 years
   - 50-59 years
   - 60-69 years
   - ≥70 years

20. What is your sex?
   - Female
   - Male

21. During the past year, have you regularly seen patients in a clinical setting?
   - Yes
   - No

22. In what state do you primarily practice?

23. What is your primary medical specialty?
   - Family medicine
   - Internal medicine
   - Pediatrics
   - Dermatology
   - Other (please specify):

24. Which of the following best describes your practice environment? (Select ALL that apply.)
   - Private practice
   - Public health clinic
   - Hospital/inpatient
☐ Academic practice
☐ Health maintenance organization
☐ Urgent care clinic
☐ Emergency department
☐ Residency/fellowship
☐ Retired
☐ Other (please specify):

25. Please indicate if you have a personal history of any of the following (select ALL that apply):
   ☐ Melanoma
   ☐ Skin cancer other than melanoma
   ☐ Actinic/solar keratoses
   ☐ None of these
   ☐ Not sure/don’t know

26. Please indicate if you have a family history (including parents, siblings, and children) of any of the following (select ALL that apply):
   ☐ Melanoma
   ☐ Skin cancer other than melanoma
   ☐ Actinic/solar keratoses
   ☐ None of these
   ☐ Not sure/don’t know

27. If you were outside in strong sunshine at the beginning of summer for 1 hour with no protection at all, which of these statements best describes what you think would happen to your skin?
   ☐ A painful burn the next day and no tan 1 week later
   ☐ A painful burn the next day and a light tan 1 week later
   ☐ A slight burn the next day and a little tan 1 week later
   ☐ No burn the next day and a good tan 1 week later

28. Which of the following best describes the color of your skin?
   ☐ Fair white
   ☐ Medium white
   ☐ Dark white or olive
   ☐ Light brown
   ☐ Medium brown
   ☐ Dark brown
   ☐ Black

29. Any additional comments about indoor tanning: