



# Recall of indoor tanning salon warnings and safety guidelines among a national sample of tanners

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## Abstract

Indoor tanning (IT) is a known carcinogen, and regulation has increased across the USA. However, there is minimal point-of-sale regulation for adult users. The purpose of the present study is to explore whether IT users recall being provided with warnings or safety guidelines at tanning salons. A national sample of 273 young adult, female IT users (mean age = 22.26, SD = 2.38) was surveyed regarding the frequency that they recalled being provided with six different warnings and safety guidelines when at tanning salons. Between 65 and 90.1 % of participants reported recalling the various warnings and guidelines. Having very fair skin was reported by 16.8 % of participants, and these high-risk individuals were less likely to recall having read and signed a consent form than other IT users ( $p = .002$ ). The current level of regulation is insufficient to provide IT users with consistent warnings and safety guidelines at tanning salons.

## Keywords

Indoor tanning, Skin cancer, Tanning, Tanning industry, Policy

Skin cancer is the most commonly diagnosed cancer in the USA, and rates continue to increase [1, 2]. The financial cost of skin cancer treatment in the USA is currently estimated at \$8.1 billion annually [3]. Indoor tanning (IT) is implicated in approximately 400,000 cases of skin cancer diagnosed in the USA each year [4]. Having ever used IT increases the lifetime risk of melanoma by approximately 20 % [5, 6], and using IT before the age of 35 is associated with a 59 % increased risk compared to those who have never used IT [5]. Skin erythema (i.e., sunburn) is commonly reported following IT use [7] and represents additional harm to indoor tanners as an independent risk factor for skin cancer [8, 9]. In 2014, the US Surgeon General released a Call to Action that emphasized reducing IT as an important public health goal [10]. Despite these risks, approximately 30 % of US White women aged 18–25 years reported using IT within the past 12 months, and over half of these women reported using IT at least ten times in that period [11].

Laws in many US states require parental permission for minors to tan, and a growing number of states have

## Implications

**Practice:** Behavioral medicine providers need to address the importance of educating indoor tanning users with information about the risks of tanning, particularly among users with very fair skin.

**Policy:** Policy makers should be aware that warnings and safety messages at the point of sale in tanning salons may be inconsistent and that individuals with very fair skin continue to engage in indoor tanning.

**Research:** Future research should explore salon owners' knowledge of and/or affiliation with trade organizations and salon staff's training experiences with regard to Food and Drug Administration (FDA) and industry safety guidelines. Future research should determine optimum intervals for the frequency of these warnings or safety guidelines.

banned the use of IT among minors [12]. In 2014, the US Food and Drug Administration (FDA) enacted new safety regulations on the manufacturing of tanning beds and lamps and required that IT machines display a warning label affirming that devices should not be used by persons under 18 years, those with a personal or family history of skin cancer, and if skin lesions or open wounds are present and that people repeatedly exposed to UV radiation should be regularly evaluated for skin cancer [13]. The FDA also requires that sunlamp manufacturers include a recommended exposure schedule on their product label [14]. Thus, schedules are determined by manufacturers and vary based on the model of the tanning bed. However, the FDA states that the schedules "should provide for exposures of no more than three sessions in the first week" [14]. Beyond these requirements, there are no current regulations for adult IT users at the point of sale in IT tanning salons.

IT industry trade organizations in the USA, such as the American Suntanning Association (ASA) and the Smart Tan Association (STA), provide internal training guidelines for affiliated salons that are designed to

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teach salon staff to warn clients of the long-term risks of IT and to provide safety guidelines for avoiding skin erythema from tanning [15–17]. Of note, although avoiding skin erythema may reduce the total amount of skin damage during IT, the increased pigmentation associated with tanning is a sign of skin DNA damage and the cancer risk associated with IT exists independently from skin erythema [8, 9]. Internal trade guidelines also state that individuals with the fairest skin type (i.e., skin type I) should not be permitted to use IT [16, 17], because they are at increased risk of skin cancer [18]. In a committee hearing in Kansas to discuss a proposed bill to ban IT use by those under the age of 18, a spokesperson for the STA stated that additional regulation was unnecessary due in part to “aggressive self-regulation” by IT salons, which included using consent forms and exposure schedules as part of a “standard protocol . . . which are accepted nationwide” [15]. Similarly, the ASA highlights tanning salon efforts to “promote self-regulation” [19]. Prior research indicates a lack of regulatory compliance by IT salon staff. Researchers utilizing confederates posing as IT users via telephone survey found that IT salon staff provided inconsistent information about the potential risks of overexposure to UV light, allowable age for IT use, and recommendations on IT frequency [e.g., [20–23]]. Furthermore, researchers reported instances where misleading information was provided by IT salon staff, including denial of skin cancer risk for fair-skinned individuals with use IT and provision of unsolicited information about supposed benefits of IT [21, 22].

Using a national sample of young adult women, the current study explored whether IT users recall being provided with warnings of long-term risks and safety guidelines to mitigate immediate negative consequences at tanning salons. It is important to understand whether IT users recall these messages in order to identify areas where additional IT policy may be beneficial as a skin cancer prevention and control strategy. As a secondary aim, we sought to determine whether individuals with the fairest skin type (i.e., “very fair” skin), a group at increased risk of skin cancer [18], reported IT use contrary to US Food and Drug Administration (FDA) recommendations and the IT industry’s stance that they should abstain from use [13, 17]. We explored whether the recollection of warnings and safety guidelines among individuals with the fairest skin type differed compared to individuals with darker skin types.

## METHOD

### Participants

Participants were 273 young women aged 18 to 25 years ( $M_{\text{age}}=22.26$ ,  $SD=2.38$ ) who reported having ever used a tanning bed or booth with tanning lamps at a tanning salon. Young adult females are the most common users of IT devices [24, 25]. Furthermore, melanoma is the most common cancer among young adult females in the USA [26].

### Procedure

A detailed description of the study procedures is available elsewhere [removed for blind review]. In brief, upon receiving institutional ethics approval, eligible individuals (young women aged 18 to 25 years) were invited to participate in a study about appearance-related perceptions and health-related behaviors including sun exposure and indoor artificial ultraviolet tanning. Participants were recruited from a nationally representative Internet-based survey panel administered by GfK Knowledge Networks [27]. GfK panel participants are randomly recruited to through address-based sampling (ABS). ABS utilizes addresses from the US Postal Service’s Delivery Sequence File to generate a probability-based sample frame that covers 97 % of US households. Randomly sampled addresses are recruited to join the GfK panel through a series of invitation mailings and phone calls. Those without access to the Internet were given a computer with Internet access in order to participate. A nationally representative sample was drawn from the GfK panel of all women aged 18 to 25 years for this study. In order to draw a nationally representative sample, a post-stratification weight that adjusted for demographic factors (e.g., age, race/ethnicity, education, census region, household income) was applied prior to study sample selection. The overall response rate from that larger sample was 37.5 % (data collection was suspended after the commissioned number of surveys was completed). The data reported in this paper represents a subset of the sample ( $N=823$ ). Data were collected in June (2014), the end of spring in the USA. Spring is generally considered the season with the most frequent IT use [28].

### Measures

**Demographic information**—Participants were asked to indicate their age, level of education, race/ethnicity, and family history of skin cancer. Skin type was assessed by asking participants the color of their non-sun-exposed skin (*very fair, fair, olive, light brown, medium brown, dark brown, or black*) [29]. This item was developed as part of a comprehensive, reliable, and frequently utilized skin cancer risk assessment measure [29–31].

**Warnings and safety guidelines**—Participants were asked the frequency with which they recalled being provided with six warnings and safety guidelines when at tanning salons (see Table 1 for list of items). All items were measured on a five-point Likert-type scale, anchored with “1” *never* and “5” *every time*. The six survey items were adapted from IT industry training materials designed to provide salon staff with the necessary information to communicate warnings of long-term risks of IT and safety guidelines to mitigate immediate negative consequences (i.e., skin erythema) to clients [e.g., [16, 17]]. For example, the ASA standard: “Sun Sensitivity. Clients are taught about photosensitizing medications, which can potentially make a person more susceptible to sunburn.” [16] formed the basis of the *warned about medication* survey item: “How

Table 1 | Recall of warnings and safety guidelines at tanning salons (unweighted  $n = 273$ )

Variable	Never (weighted %)	Rarely/occasionally (weighted %)	Often/every time (weighted %)
Read and signed a consent form with warnings about the potential risks of tanning before using a tanning bed	12.4	27.7	60.0
Been informed at the tanning salon about the potential risks of overexposure to UV light	16.9	40.8	42.3
A tanning salon worker talked to [participant] about how [their] skin type would react to the tanning bed	24.4	46.8	28.8
A tanning salon worker taught [participant] about how to avoid sunburn when tanning in the salon	31.4	45.4	23.2
A tanning salon worker helped [participant] to determine how long [they] should spend in the tanning bed during the tanning session	9.9	37.5	52.5
Been warned about medications that could put [the participant] at risk for sunburn while tanning	35.0	42.6	22.4

Due to rounding, not all figures sum to 100

often have you been warned about medications that could put you at risk for sunburn while tanning.” To preserve adequate cell sizes for comparisons, response options *rarely* and *occasionally* were collapsed, as were *often* and *every time*.

Statistical analysis

IBM SPSS Statistics 21.0 *Complex Samples* was used for the analyses. As 16.8 % of the sample reported having very fair skin, chi-square analyses were also conducted to compare the tanning salon experiences of those with very fair skin compared to all other participants. Analyses were weighted to adjust for numerous factors. On the overall survey panel, a base weight adjusted for sources of deviation from an equal probability sampling strategy, and a panel demographic post-stratification weight adjusted for non-response and non-coverage bias. Additionally, once the study-specific data were collected and finalized, post-stratification weights adjusted for the study’s sample design and non-response (factors were as follows: age, race/ethnicity, education, census region, household income, and metropolitan area).

RESULTS

The mean number of lifetime IT sessions reported by participants was 54.94,  $SD = 115.53$ , and 50.2 % of the sample reported prior 12-month use of IT. First-degree familial history of skin cancer was reported by 20.3 % of participants. Level of education among the sample was as follows: less than high school, 12.8 %; high school, 20.7 %; some college, 47.8 %; and bachelor’s degree or higher, 18.7 %. Participants reported their race/ethnicity as follows: non-Hispanic White, 82.8 %; non-Hispanic Black/African American, 2.9 %; non-Hispanic other, 3.5 %; and Hispanic, 10.8 %. Region of US residence was as follows: northeast, 15.0 %; mid-west, 35.1 %; south, 36.9 %; and west, 13.0 %. Reported skin type among the sample was as follows: very fair, 16.8 %, fair, 49.7 %, olive, 24.8 %, light brown, 6.2 %, and medium brown, 2.5 %.

Frequencies of recalling warnings and safety guidelines at tanning salons among the entire sample are reported in Table 1. Reading and signing a consent form about the potential risks of tanning were the most frequently reported warning; 60 % of the sample reported that they recalled this occurring often or every time that they tanned at a salon. The most infrequently reported experiences involved being taught how to avoid sunburn (i.e., skin erythema) while using IT and being warned about medications that may increase risk of sunburn while using IT; over 31 % of the sample reported never recalling being provided with these messages at a tanning salon.

### Differences in experiences according to skin type

Of the entire sample, 16.8 % (weighted) used IT despite having very fair non-exposed skin. As shown in Table 2, recalling having read and signed a consent form was the only warning or safety guideline that differed significantly according to participants' reported skin type. A higher proportion of participants with very fair skin (27.6 %) reported never signing a consent form compared to those with other skin types (9.5 %). All other warnings and safety guideline experiences did not differ significantly by skin type.

### DISCUSSION

The present study explored whether IT users recall being provided with warnings of long-term risks and safety guidelines at tanning salons. Participants did not consistently recall receiving warnings and safety guidelines, and 9.9 to 35 % of the sample reported that they were never provided with these guidelines. Individuals with the fairest skin type continue to engage in IT, despite IT industry guidelines and FDA recommendations [13, 17]. Moreover, a greater proportion of very fair-skinned participants reported never recalling having read and signed a consent form compared to those with darker natural skin tones. While the differences are not statistically significant, it is notable that a higher proportion of very fair IT users also reported never

receiving the other six warnings and safety guidelines compared to users with darker skin tones. Because individuals with very fair skin are at increased risk of skin cancer [18], it is particularly important that they are informed of the risks of IT. Of concern, 35 % of the sample reported never being warned about photosensitizing medications (i.e., medications that increase risk of sunburn). Photosensitizing medications include—but are not limited to—commonly prescribed antibiotics, non-steroidal anti-inflammatories including naproxen and ibuprofen (common to treat pain, swelling, menstrual cramps, and inflammation), and some acne medications [32, 33]. Thus, it is important that this risk information is communicated to IT users.

There are a number of factors to consider with regard to tanning salon point-of-sale regulation. Beyond the 2014 FDA requirement for health warning labels on tanning products and manufacturer-generated exposure schedules [13, 14], there are currently no point-of-sale federal regulations for adult IT users in the USA. Thus, the provision of warnings and safety guidelines rests at the individual tanning salon level. Despite IT industry trade organizations stating that IT salon self-regulation is adequate [15], these organizations are not governing bodies, and unaffiliated tanning salons are not obliged to be members or to train their staff in accordance with the trade organization guidelines. In this national sample, IT users' recollection of point-of-sale warnings and safety

**Table 2** | Bivariate analyses of the recall of warnings and safety guidelines

Variable	Very fair skin (unweighted $n = 47$ ) weighted %	Fair or darker skin (unweighted $n = 225$ ) weighted %	$p$ value
Read and signed consent form			.002
Never	27.6	9.5	
Rarely/occasionally	6.9	31.0	
Often/every time	65.5	59.5	
Informed about potential risks of overexposure to UV light			.244
Never	26.5	14.9	
Rarely/occasionally	38.2	41.1	
Often/every time	35.3	44.0	
Skin type reaction			.092
Never	38.2	22.0	
Rarely/occasionally	32.4	49.4	
Often/every time	29.4	28.6	
How to avoid sunburn while indoor tanning			.449
Never	38.2	30.1	
Rarely/occasionally	35.3	47.0	
Often/every time	26.5	22.9	
Determine exposure schedule			.611
Never	14.7	9.1	
Rarely/occasionally	35.3	38.2	
Often/every time	50.0	52.7	
Warned about medications			.221
Never	41.2	33.9	
Rarely/occasionally	29.4	45.2	
Often/every time	29.4	20.8	

guidelines was inconsistent with IT industry salon training guidelines. Thus, self-imposed industry regulations do not appear to be sufficient for consistent provision of warnings and safety guidelines by US tanning salon staff. Additional regulation is needed at the point of sale to ensure that IT users are consistently receiving accurate and comprehensive information about the risks of IT.

Study results should be interpreted in light of the following considerations. Publically available STA and ATA trade industry materials were utilized to develop survey items [16, 17]. It is not known whether the salons used by participants were affiliated with any trade organization or whether salon staff received formal training with these guidelines. Potential inaccuracy in participants' recall of receiving warnings and safety messages may have influenced the present results. In particular, frequency of IT use may have influenced recall of warnings delivered at the salon. The survey items were worded in such a way that suggested oral communication of information from IT salon staff. It is possible that the present work underestimated the prevalence of non-verbal communication of warnings and safety guidelines, for example, via pamphlets or in-salon posters. Additionally, the efficacy of these warnings and safety guidelines in reducing the health risks from IT is unclear. Aside from FDA regulations enacted in 2014 requiring warning labels to be displayed on IT devices at all times [13], there are currently no established recommendations regarding the frequency with which warnings and safety guidelines should be communicated to adult IT users. Certain warnings may be important to communicate to an IT user each time that they visit a salon (e.g., warning of the potential risks of overexposure to UV light, warning about medications that could put the participant at risk for erythema while tanning). However, other warnings and guidelines may be more suitable for first-time IT users and then repeated at regular intervals (e.g., discussing IT users' skin type and reaction, how to avoid erythema, exposure scheduling). In acknowledgement of this complexity, we focused on IT user reports of never recalling warnings or safety guidelines. Of note, in the time since this study was conducted, the FDA has proposed a rule that adult IT users be required to sign a "risk acknowledgement certification that states that they have been informed of the risks to health that may result from the use of sunlamp products ... before their first tanning session and every six months thereafter" [34].

This work informs the need to conduct future research on the enforcement of regulatory guidelines. Future research should explore salon owners' knowledge of and/or affiliation with trade organizations and salon staff's training experiences with regard to FDA and industry safety guidelines. Future research should determine optimum intervals for the frequency of these warnings or safety guidelines.

In conclusion, results of this study indicate that additional regulation is needed regarding the point-of-sale information that adult IT users receive. Adult IT

users in the US do not consistently recall being provided with warnings and safety guidelines at tanning salons, suggesting that the current level of regulation is insufficient. Of additional concern, high-risk individuals with very fair skin continue to report engaging in IT and may be less likely to read and sign a consent form than those with darker natural skin.

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#### Compliance with ethical standards

**Conflict of interest:** None of the authors has any conflicts of interest to declare.

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