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Original Investigation

## Developing Pictorial Cigarillo Warnings: Insights From Focus Groups

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### Abstract

**Introduction:** The Food and Drug Administration (FDA) selected six text-only warnings for cigarillos to be implemented on packaging and advertising. Pictorial warnings are more effective at discouraging cigarette use than text-only warnings, yet no research exists for cigarillos. We sought to understand what types of images might be most effectively paired with the cigarillo text warnings to inform broad principles for developing pictorial warnings, with a focus on young adults, who have the highest rate of cigarillo use.

**Methods:** We conducted five focus groups with a total of  $N = 30$  young adult cigarillo users and susceptible nonusers (53% female, 50% White, and 33% Black). Participants were shown four to eight unique images for each of the six text statements and were asked about visual–verbal congruency, emotional and cognitive reactions, and perceived effectiveness of each image. Sessions were recorded and transcribed; two investigators independently coded transcripts for emergent themes.

**Results:** Participants reported images that were graphic or “gross” would best grab attention and discourage use of cigarillos. Participants preferred images that were a direct illustration of the information in the warning text, rather than abstract images that required more cognitive effort to understand. Participants also highlighted that including people in the images, especially youth and young adults making eye contact, helped them relate to the warnings, garner their attention, and positively influence their reactions.

**Conclusions:** We identified several principles to inform the selection of images to pair with the FDA-required cigarillo text statements. These insights may also apply to pictorial warnings for other tobacco products.

**Implications:** This focus group study identified principles for selecting images to develop pictorial warnings for the six FDA text-only cigarillo warnings. We found that young adult cigarillo users and susceptible nonusers preferred images that were graphic and gross, believable, congruent to the warning text, and included people. Images that match young adults’ visual expectations of a disease and are emotion-provoking may be most effective in pictorial warnings and highlight challenges for developing pictorial warnings for health effects that do not have a visible health consequence.

## Introduction

Cigarillo use among young adults is a public health concern. In the United States, 72% of cigar users aged 18–29 report cigarillos as their typical cigar type,<sup>1</sup> and 39% of young adults have ever used cigarillos.<sup>2</sup> Cigarillo use is associated with other tobacco use and marijuana use,<sup>3,4</sup> and may encourage progression to cigarette smoking.<sup>5</sup> Vulnerable populations, including Black/African Americans also have higher prevalence of cigarillo use.<sup>2</sup> Cigarillo use leads to similar harms as cigarettes, including multiple cancers, heart disease, chronic obstructive pulmonary disease, and nicotine addiction,<sup>6–8</sup> yet misperceptions exist that cigarillos are less harmful than cigarettes.<sup>9</sup>

Cigarillo risk misperceptions may be related to their physical composition and patterns of use.<sup>10</sup> Many young adults erroneously believe them to be more natural and less dangerous than cigarettes, partly because they do not smoke frequently enough to cause health effects and can quit before becoming addicted.<sup>9,11</sup> However, many cigarillo smoke constituents exist at higher levels than in cigarette smoke, such as tobacco-specific nitrosamines and carbon monoxide.<sup>12,13</sup>

Cigarillo warnings, particularly pictorial warnings, could address these misperceptions and reduce cigarillo use. Warning labels are effective at reducing cigarette smoking by evoking negative emotion, reducing appeal, encouraging cessation, and preventing initiation.<sup>14–16</sup> Meta-analyses and randomized clinical trials have demonstrated cigarette pictorial warnings are more effective than text-only warnings at attracting attention and increasing knowledge, intentions to not start smoking, intentions to quit smoking, and negative smoking attitudes.<sup>14,15,17–19</sup> Furthermore, pictorial warnings impact behavior, including forgoing cigarettes and increasing quit attempts and calls to quitlines.<sup>14,18</sup> However, little research exists on the effectiveness of text or pictorial cigarillo warnings.<sup>19,20</sup>

In 2016, the Food and Drug Administration (FDA) selected six text-only warnings to be placed on all cigarillo packaging and advertising that have yet to be implemented due to pending litigation (see Table 1).<sup>21</sup> In *Cigar Association of America et al. v. U.S. Food & Drug Administration et al.*,<sup>22</sup> the plaintiffs claimed the cigar warning requirements violated the First Amendment, stating that they were burdensome and did not support a legitimate government interest. The requirements were upheld by the court who said the mandated warning size allows sufficient space for packaging and advertising, and that tobacco health warnings supported a legitimate government interest to help consumers understand the risks of tobacco use. The warning requirements will not be enforced until 60 days after the final disposition of the plaintiffs' appeal. Although the text-only warnings are pending litigation, it is important to examine the

effectiveness of potential warning improvements to build an evidence base to support implementation.

Consumers process images quickly and instinctually.<sup>23</sup> Images provide consumers with visual evidence of an event or possibility of a harm that is more attention-grabbing and easily recalled than information conveyed in text.<sup>24</sup> Although research has demonstrated the superiority of pictorial over text-only cigarette warnings, there is little research on identifying images (ie, types of images or specific content) for pictorial warnings for products other than cigarettes.<sup>25</sup> Cigarette warnings studies have identified that message congruency between the image and text increased warning processing,<sup>26</sup> and that graphic depictions of diseased organs were more effective than symbolic images or images of human suffering.<sup>27–29</sup> However, little research has focused on the demographic characteristics of the people depicted in images.<sup>30,31</sup> Additionally, reviews of legal proceedings regarding pictorial warnings for cigarettes in the United States suggest images of actual health consequences of smoking are necessary to withstand legal challenges.<sup>32,33</sup> Additional research is needed to identify effective pictorial warnings for cigarillos. The purpose of this study was to provide qualitative data to inform the development of pictorial warnings for cigarillos. We conducted focus groups with young adults who had used or were susceptible to using cigarillos to gather in-depth information about specific images and features to develop guiding principles for developing effective pictorial cigarillo warnings.

## Methods

### Participants

Participants were recruited in Winston-Salem, North Carolina in May through September 2017. Advertisements were placed on Craigslist, at local colleges, health and medical centers, and recreation centers, and included a link for those interested to complete an eligibility screener. Eligibility requirements were aged 18–29 and an ever cigarillo user or a susceptible nonuser. Susceptible nonusers were those who had never used a cigarillo but were open to trying using a four-item susceptibility scale.<sup>34</sup> Eligible participants were invited to participate in a focus group.

### Procedures

Focus groups were designed following best practices for developing pictorial warnings.<sup>35</sup> Five focus groups were conducted, stratified by cigarillo user status ( $k = 3$  ever user groups,  $k = 2$  susceptible nonuser groups). Three team members facilitated focus groups: a moderator, comoderator, and note-taker. Written informed consent was obtained prior to the focus groups. At the beginning of the focus groups, the moderator provided an overview of tobacco warning labels, including pictorial warnings, and an overview of cigarillos to orient participants to the study. All focus groups were audio recorded and transcribed verbatim.

To guide discussion, participants were provided a booklet containing each of the six FDA cigarillo warnings; the warning order was randomized for each focus group. For each of the warnings, four to seven images were included for discussion (Supplementary Figure S1). Focus group discussion occurred with one text warning at a time, with all images discussed as they related to that warning before moving onto the next warning. At the end of the discussion, participants completed a questionnaire to collect demographic characteristics and tobacco product use. Each focus group discussion lasted approximately 90 minutes. Participants were provided a handout

**Table 1.** FDA-Required Cigarillo Text-Only Warnings

1	WARNING: Cigar smoking can cause cancers of the mouth and throat, even if you do not inhale.
2	WARNING: Cigar smoking can cause lung cancer and heart disease.
3	WARNING: Tobacco smoke increases the risk of lung cancer and heart disease, even in nonsmokers.
4	WARNING: Cigars are not a safe alternative to cigarettes.
5	WARNING: This product contains nicotine. Nicotine is an addictive chemical.
6	WARNING: Cigar use while pregnant can harm you and your baby.

FDA = Food and Drug Administration.

from the Campaign for Tobacco Free Kids about the cigarillo use harms. The study received approval from the Wake Forest School of Medicine Institutional Review Board.

### Image Selection

Images were selected after the study team curated a library of existing warning images used in other countries from the WHO FCTC Health Warnings Database, Campaign for Tobacco Free Kids, and the Tobacco Labelling Toolkit.<sup>36,37</sup> An expert panel independently reviewed the library and selected their choice of five images that best illustrated each of the six text warnings. Then, as a group, each image selected by each panel member was discussed until reaching majority consensus on which few images would be best to further examine in the focus groups. The team also discussed any potential challenges with images, such as legal challenges. The expert panel included a tobacco regulation attorney with legal expertise in pictorial tobacco warnings, and visual and health communication experts. Medical experts reviewed images to ensure accuracy of the diseases and organs represented.

### Qualitative Measures

A semi-structured moderator's guide was developed to organize the discussion. The guide was based on the Message Impact Framework, which is used to understand how tobacco warnings have impact, from attracting attention, to eliciting emotional and cognitive reactions, to motivating behavior.<sup>17</sup> Open-ended questions assessed the constructs of: visual-verbal congruency of the images to the text statement (eg, which images best communicate what's in the text in an understandable way?); believability of the images (eg, are these warnings believable?); cognitive reactions (eg, what image made you most think about the harms of cigarillo smoking?); emotional reactions (eg, tell me how this image makes you feel?); and perceived effectiveness of the images (eg, which of these do you think would be the most effective at discouraging cigarillo use?). We also asked participants to provide feedback on improvements to the images or suggestions for alternative images not shown.

### Quantitative Measures and Rankings

Before focus groups began, we asked participants to go through each warning set and select the image that they thought (1) best showed the health risk stated in the text; (2) would most discourage them from cigarillo smoking; and (3) best grabbed attention. These questions were included in the booklets to help stimulate discussion. At the end of the focus group discussions, we asked participants to return to their booklets to individually rank order the images for each warning text to indicate their preferred image. These rankings are provided in [Supplementary Figure S1](#). The concentration of our findings is primarily on the qualitative results throughout.

### Codebook Development and Data Analysis

A codebook was developed deductively using the moderator's guide, with codes for each construct described above (eg, believability). For example, we coded responses based on discussion of believability or visual-verbal congruency of an image. Codes were also developed inductively from reading the transcripts to identify common themes that were not already included in the moderator's guide (eg, presence of people in warnings). Two trained qualitative researchers and the first author tested the initial codebook using one randomly selected transcript. To test the draft codebook, the three researchers each coded the

transcript independently, then convened to discuss their application and understanding of the codes. The codebook was revised during the discussion, as is consistent with an interpretive approach to thematic analysis (eg, clarifications on how to code, definitions for different codes, or removal of existing codes).<sup>38</sup> Adjustments were made to create the final codebook based on this testing. The final codebook was used by the two qualitative researchers who each coded the five transcripts in Atlas.ti 7.0. After coding one transcript, they met and discussed discrepancies to ensure consistent application of codes. After coding was completed, the content of each code was extracted into individual files. One team member read through each file (which included all codes) to identify emergent and recurrent themes (thematic analysis),<sup>38</sup> and two additional team members reviewed selected files for consensus. The first author reviewed the themes to synthesize across warnings and cigarillo user status.

### Results

**Table 2** reports characteristics of the focus group participants ( $N = 30$ ). Participants were 53.3% female, 50% White, and 33.3% Black. The mean age was 25.03 (SD = 1.97, range: 22–29). Twenty participants had ever smoked cigarillos (66.7%) and 10 were susceptible nonusers (33.3%). Most had used other tobacco products, including cigarettes (65.5%), large cigars (60%), e-cigarettes (44.3%), and waterpipe tobacco (86.7%). Discussion across the five focus groups was generally consistent; where differences emerged, they are reported below.

#### Image Preferences

**Warning 1: Cigar smoking can cause cancers of the mouth and throat, even if you do not inhale.** Participants selected two images as their preferred images: one with diseased gums (Image 1-6) and one with a stoma with stitches (Image 1-4). Participants liked that they were graphic and gross and stated that they were believable and realistic. One user said, "I would probably drop a cigarillo if it had [diseased gums image] on it." A nonuser preferred an image of a stoma with stitches because it looked more serious than other images with stomas, saying, "There's a couple of different ones here where they have holes in their neck, but this one looked the gnarliest."

**Warning 2: Cigar smoking can cause lung cancer and heart disease.** Participants consistently selected two images: an image with two lungs (one healthy, one diseased; Image 2-3) and an image of two hearts (one healthy, one diseased; Image 2-2). Participants said these two images were the most discouraging, would most grab their attention, and best depicted the warning text. One user said, "The contrast between a healthy and lung cancer lungs are very stark."

**Warning 3: Tobacco smoke increases the risk of lung cancer and heart disease, even in nonsmokers.** Participants selected the same two images for this warning as they did for warning 2. However, based on feedback from our first four focus groups, almost no participants found the images to be a good fit for the text statements. Thus, we sought out two additional images based on their feedback. These two additional image options were presented at the last focus group, and those images were preferred: one of an adolescent girl in a hospital receiving breathing treatment (Image 3a), and one of two older women with one smoking and the other with oxygen tubes (Image 3b). Participants said these images demonstrated the effects of smoking on nonsmokers/bystanders. One user said that these two new images were "much more appropriate. Finally including someone who you don't presume is a smoker."

**Table 2.** Participant Demographic Characteristics and Tobacco Use Behaviors

	Cigarillo ever users ( <i>n</i> = 20)	Cigarillo susceptible nonusers ( <i>n</i> = 10)	Total ( <i>N</i> = 30)
	Mean (SD) or <i>N</i> (%)	Mean (SD) or <i>N</i> (%)	Mean (SD) or <i>N</i> (%)
Age	24.9 (1.89)	23.0 (2.21)	25.03 (1.97)
Sex			
Female	10 (50%)	6 (60%)	16 (53.3%)
Male	10 (50%)	4 (40%)	14 (46.7%)
Ethnicity <sup>a</sup>			
Non-Hispanic	18 (90%)	10 (100%)	28 (96.6%)
Hispanic	1 (5%)	0 (0%)	1 (3.4%)
Race <sup>b</sup>			
White	11 (55%)	4 (40%)	15 (50%)
Black	9 (45%)	1 (10%)	10 (33.3%)
Other <sup>d</sup>	2 (10%)	5 (50%)	7 (23.3%)
Mother's education <sup>c,a</sup>			
College degree or greater	16 (80%)	7 (70%)	23 (76.7%)
Less than a college degree	3 (15%)	3 (30%)	6 (20%)
Lifetime use of tobacco products			
Cigarettes <sup>a</sup>	15 (75%)	4 (40%)	19 (65.5%)
E-cigarettes	11 (55%)	2 (20%)	13 (43.3%)
Waterpipe tobacco	20 (100%)	6 (60%)	26 (86.7%)
Cigarillos	20 (100%)	0 (0%)	20 (66.7%)
Little cigars	6 (30%)	0 (0%)	6 (20%)
Large cigars	14 (70%)	4 (40%)	18 (60%)
Smokeless tobacco	5 (25%)	0 (0%)	5 (16.7%)

<sup>a</sup>Missing data of *n* = 1 among cigarillo users for ethnicity, mother's education, and cigarette use.

<sup>b</sup>Participants could select more than one race.

<sup>c</sup>Mother's education was used as a proxy for socioeconomic status.

<sup>d</sup>Other responses selected by participants included Asian and Other.

Warning 4: *Cigars are not a safe alternative to cigarettes.* There was little consensus for an appropriate image for this warning. Participants stated that an image of a woman in a hospital bed hooked up to tubes was most discouraging and would grab attention (Image 4-5), but did not directly reflect the warning text. Participants also preferred a before/after image of a smoker as effective at grabbing attention and making them think about the effects of using cigarillos (Image 4-2).

Warning 5: *This product contains nicotine. Nicotine is an addictive chemical.* Participants selected an image of a man with smoke coming out of his throat stoma (Image 5-2). They said that it effectively depicted the severity of addiction. The second image selected by participants was of a man smoking in a wheelchair who was hooked up to an IV bag (Image 5-3). This one was discussed as making participants think about the risks of cigarillo smoking, and as a good representation of the warning text.

Warning 6: *Cigar use while pregnant can harm you and your baby.* Participants preferred a side-by-side image of a woman smoking with a premature newborn baby (Image 6-5), and a close-up image of a baby with a nose cannula (Image 6-4). These images were described as attention-grabbing, discouraging, and a good pairing with the warning text. One user said about the pregnant woman/baby image, "this image is the only one that could stand alone without the words to make you understand what that picture is about."

## Principles for Developing Pictorial Warnings

### 1. Importance of image believability

Image believability was a prevalent theme, and participants questioned the believability of some images. Participants felt many of

the diseases or conditions depicted could have been caused by something other than tobacco. One nonuser said "They look like a trauma patient...which I don't see cigarettes and cigars causing you to get into a car accident or anything" referencing an image of a person in a hospital bed hooked up to machines. Participants suggested including the product within the image or selecting health conditions commonly associated with smoking to make it clear the disease was actually caused by cigarillo smoking—"I went with the lung, 'cause I guess that's just the most relevant when you think about smoking." Similarly, some did not think some of the images were realistic because they would never let their health condition get that severe. One cigarillo user said about an image of a man being zipped into a body bag, "Too extreme...I woulda [sic] went to the hospital a long time ago. When it gets that bad, I mean that's just a lot. A dead body."

Participants commented that several images appeared fake or unrealistic. One user said, "looks like it's just a stock photo in a photo album or something...it looks like a movie poster. It doesn't really look like real life to me." For some images, participants struggled to identify what was depicted or what the image was supposed to communicate. Sometimes this was related to image style; one user said, "Maybe if the [image] was in color, then I would have clearly seen that she has a nasal cannula." In other instances, the image did not communicate a clear message, with a user stating, "I don't know what I'm necessarily looking at. I don't know what that scar is" in reference to an image of a man with a postsurgery scar on his back. Overall, young adults preferred images that were realistic because they enhanced their believability.

### 2. Balancing level of graphicness

Participants commented extensively on the graphicness of warning images. Several mentioned that graphic images (those showing

diseased body parts) were more likely to grab their attention and influence behavior. One nonuser said, “For whatever text...put the most gross image on there.” Participants also preferred graphic images because the graphicness emphasized the seriousness of the health conditions. One user said, “I think to me the more graphic the more it gets across that it will cause this type of cancer. Cancer’s a gross and graphic thing.” However, some participants cautioned against using images that were extreme or too graphic. Cigarillo users felt images that were too graphic were less likely to be effective or relevant to them: “[the image] is just too extreme...I’m like come on, I’m not gonna die... It’s just very, very extreme.”

### 3. Images should be congruent to the text warning

Participants, particularly users, preferred images that were a direct representation of the text warning; a more direct connection between the image and the text (high visual-verbal congruency) was easier to understand and process. One nonuser said “...it pushes me away if I have to look too hard... I don’t wanna think when I see a picture.” Understanding was increased when images portrayed a specific health outcome that was the direct result of smoking. One user said “If I read that text and see that picture I could automatically reason that it was the lungs or heart. With the [image of a scar after surgery], looking at it after the fact you see the scar, but you just gotta do a lot of reasoning like, ‘Okay that’s because this, he had surgery,’ and then by that point I don’t care anymore.” Another user added “Instead of [image of a scar after surgery]...Show why or what was wrong that caused that surgery I think would be more effective than the scar from the aftermath of it.”

Many participants indicated that understanding was decreased when images portrayed the warnings in a symbolic way. Describing an image of a person behind bars meant to capture nicotine addiction, one nonuser said “...at first glance, you have to think more about it... At first glance, you’re like ‘It’s behind bars, what does that have to do with cigarettes?’”

Participants also indicated that congruency is not necessarily related to the warning being discouraging. One user said “[image of woman in hospital hooked up to machines] was the one that grabbed my attention the most... but I don’t think that it’s a good association between the [warning] and the picture.” Another user said “I’d say it’d discourage me more, but I just don’t feel like it portrays addiction very well.”

### 4. Inclusion of people

Participants consistently discussed the impact of the presence of people in images. Images with people made the warnings more relatable, grabbed attention, and evoked emotions. Many participants talked about having different representations of people in images to enhance relatability. Some participants suggested including races that are more diverse because “you look at it and you can’t relate to the image ‘cause you’re not the same color. You’re like, ‘This doesn’t happen to me.’” Some participants suggested including people who were similar in age to increase relatability. One nonuser said about an image displaying the same younger woman as healthy compared with herself with cancer, “I feel like portraying the girl as a young totally healthy person actually makes it more relatable.”

Images with people also seemed to resonate, evoking strong emotional reactions. One nonuser said, “you have someone—you can relate more to that than just organs,” comparing an image of a person to images depicting body parts. Related, close-up images of faces or images with people making eye contact with the camera seemed to

resonate more. One nonuser said, “I think it just has to be being up close to the face...something about seeing that baby’s face. It’s like you can just tell he is sick and just by looking in the eyes will get you.” One user said an image of a person hooked up to machines in a hospital bed looking at the camera evoked emotions, “[image] did for me... but just gazing at the viewer is the part that I got.”

Other participants noticed the emotions portrayed by people in the images. One user said, “I feel like if you can see anguish on their faces, it definitely would be more impactful as well.” One user said about the image of a woman receiving chemotherapy, “They look like they’ve been deceived. Just that facial expression.”

Some participants suggested showing a young person in a more natural setting (eg, going to work) while carrying the oxygen tank as showing “the juxtaposition between somebody who has to take this oxygen tank with them in an everyday life setting would hit home more for us.” A user said, “I just know how cumbersome it is to have to walk around with an oxygen tank. I would never wanna be that person. Because everywhere you go, a restaurant, you always have to have that thing with you. Walking up the stairs, you can’t even make it up the stairs because you can’t breathe.”

## Discussion

The goals of this study were to understand the types of images that are most effective for cigarillo warnings and identify broad principles for developing effective pictorial warnings. Our results suggest the following principles: (1) choose images that depict health harms clearly caused by the product; (2) use graphic images when possible, as long as they are realistic (eg, not extreme or unusual scenarios); (3) have images that are congruent to the warning text; and (4) include people that represent users/target audience with faces that display emotion.

These findings extend previous pictorial warnings research, which found graphic images (those of diseased body parts) were preferable over other image types.<sup>27-29,31</sup> Although graphic images may not be appropriate for all text statements, some certainly warrant consideration (eg, warnings about a visible health consequence, like mouth cancer). Similarly, images that were more congruent with the warning text were more attention-getting and discouraging. Conversely, symbolic images, which were not directly congruent with the warning text, were not well received in the focus groups, consistent with prior research. However, it poses challenges about how to depict smoking consequences that are not easily represented in an image, such as addiction. In our study, participants preferred the image of someone smoking a cigarette with cigarette smoke coming out of his throat stoma; they stated this clearly depicted addiction. They were less enthusiastic about symbolic representations, such as a person locked in a jail cell where the bars were made of cigarettes (Image 5-4). Additional work is needed in how to effectively and accurately portray addiction in messages, such as through illustrations or icons.<sup>39</sup>

Including images that represent the target audience poses challenges. Our focus groups were exclusively young adults who felt the older people were not representative; messages are most likely to resonate with audiences when they can “see” themselves or identify with the person shown.<sup>24,40,41</sup> Cigarillos are commonly used among young adults—often Black/African Americans whereas large traditional cigars are commonly used among older adults—often White men with higher incomes.<sup>2,42</sup> The FDA requires the same warnings for all cigars, despite distinctly different user groups and use patterns across the cigar subtypes. One action that could be considered when

implementing pictorial warnings is to have different images on the different subtypes that are targeted to those most likely to use the product; images could vary according to product subtype based on nationally representative data that inform regulators as to who tends to use the particular cigar product subtype. Another option would be having rotating images with pictures of differently aged people for a single text warning, thereby showing a range of different kinds of people for each text statement. Warnings and imagery that resonate with young adults may be necessary to ensure this vulnerable population identifies with and understands the potential risk of product use for them.

Images that portrayed people displaying emotions and images that evoked reactions were perceived as most effective, consistent with prior research. This included graphic images of diseased body parts or disfigurement and images of people. Close-up images of people displaying emotion or making eye contact can evoke similar emotions and engage viewers.<sup>23,24</sup> When viewing an image, the audience becomes the other half of a social interaction (eg, who the image subject is looking at). The distances between the consumer and the person in the warning represent an implied social distance, ranging from intimate to public.<sup>43</sup> Close-ups (images showing the face or face with upper body) simulate social distances naturally used with someone familiar and likable.<sup>23</sup> In imagery, how a person is portrayed, including gaze direction, increases attention and engagement among viewers. This helps explain why images of real people are effective in pictorial warnings.<sup>30</sup>

Warnings evoking emotions have been a controversial topic in the US courts. The courts struck down one set of pictorial warnings for cigarettes when subjected to a higher level of legal scrutiny because, in the court's view, some of the images were not "factual and uncontroversial." However, subsequent research has shown that emotion-evoking images can also be informative and factual.<sup>44</sup> Pictorial warnings work in part by eliciting emotional risk appraisals,<sup>45-47</sup> and from this perspective, negative emotions are a natural and productive response to pictorial warnings that contextualizes risk information and aids in constructive decision-making.<sup>48</sup>

Findings from this study address a comment raised during the cigarette pictorial warning court proceedings. One complaint against the FDA's proposed pictorial cigarette warnings was the images included actors, not real depictions of disease.<sup>32,49</sup> This was a common theme among focus group participants in the present study. While we were not able to determine whether the people in the photos were actors, we reviewed all images with medical professionals to ensure they were medically valid. Warning images should depict disease in ways that appear realistic.

This study is not without limitations. Our convenience sample of young adults may not be representative of all young adult populations. Although our sample was racially diverse, reflecting cigarillo users in the population, the majority of participants had mothers with at least a college education (proxy for socioeconomic status [SES]). According to the health knowledge gap hypothesis, high SES individuals obtain health information more effectively than low SES individuals.<sup>50</sup> Thus, it is possible that those from lower SES may have reacted differently to images. However, previous studies have shown graphic warnings images are effective across SES groups.<sup>51,52</sup> Additionally, participants were exposed to a limited number of images. Our expert panel may have missed some effective image types during the selection process. For example, we included two additional image variations for the final focus group based on earlier focus group feedback. Future research might continue to explore different image variations. However, findings from our study generally support previous research on optimizing imagery in tobacco warnings.

This study provides greater understanding and guidance for developing effective pictorial warnings. Overall, participants prefer images that are graphic, accurately depict the consequences of cigarillo smoking, and include people, particularly those that are similar to the viewer and display emotions. Integrating such images into FDA's text warnings has potential to enhance the effectiveness of cigarillo warnings, in turn reducing cigarillo use and the morbidity and mortality caused by cigar smoking.

## Supplementary Material

A Contributorship Form detailing each author's specific involvement with this content, as well as any supplementary data, are available online at <https://academic.oup.com/ntr>.

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## Declaration of Interests

None declared.

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