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Asking Mom: Formative Research for an HPV Vaccine Campaign Targeting Mothers of Adolescent Girls

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*Vaccination against the types of human papillomavirus (HPV) that cause about 70% of cervical cancers is approved for use in girls and women between 9 and 26 years of age and recommended routinely in 11–12-year-old girls. This article reports on the systematic theory-based formative research conducted to develop HPV vaccine messages for a campaign targeting racially diverse mothers of nonvaccinated 11–12-year-old girls in rural Southeastern United States. A consortium of 13 county health departments concerned about high rates of cervical cancer in their region relative to state and national averages initiated the campaign. The research examined behavioral determinants for vaccination decisions as well as mothers' reactions to message frames and emotional appeals. On the basis of focus groups and intercept interviews (*n = *79), the authors demonstrated how preproduction message research and production message testing were used to develop messages that would motivate mothers of preteen girls. Core emotional truths that emerged were a mother's instinct*

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to protect her daughter from harm and to embrace aspirations for her daughter's future. Mothers also reacted more positively to text about preventing cervical cancer than about preventing HPV, a sexually transmitted disease. Mothers preferred message concepts with photos of minorities and Caucasian mothers and daughters.

Cervical cancer is preventable. In the United States, a quadrivalent vaccine against the two human papillomavirus (HPV) strains that cause about 70% of cervical cancers and the two strains that cause about 90% of genital warts was approved in 2006 for use in girls and women between the ages of 9 and 26 years and recommended for routine use in 11–12-year-old girls, ideally before any sexual activity (Centers for Disease Control and Prevention, 2007). As of 2009, 44.3% of 13–17-year-old girls had begun the three-dose HPV vaccination series, two thirds of whom completed the series (Centers for Disease Control and Prevention, 2010). A second bivalent vaccine against the HPV strains associated with cervical cancer was approved in 2009 (U.S. Food and Drug Administration, 2009).

Disparities in cervical cancer exist on the basis of race, socioeconomic status, and geographic region (Centers for Disease Control and Prevention, 2008). In 2009, an estimated 11,270 U.S. women were diagnosed with cervical cancer, and 4,070 died from the disease (American Cancer Society, 2009). Mortality and incidence rates are highest among women in the rural South, with mortality rates highest for African Americans and American Indians (Fazekas, Brewer, & Smith, 2008; National Cancer Institute, 2008; Yabroff et al., 2005). Thus, targeted health communication campaigns that promote the HPV vaccine have the potential to reduce racial and geographic risk disparities and lower incidence and mortality rates of cervical cancer by increasing vaccine uptake.

Parents, usually mothers, make the decision as to whether their minor daughter can be vaccinated (Fazekas et al., 2008; Leader, Weiner, Kelly, Hornik, & Cappella, 2009; Sperber, Brewer, & Smith, 2008; Wilson, Barakat, Vohra, Ritvo, & Boon, 2008). Studies have examined the knowledge, attitudes, and acceptance issues of mothers related to HPV vaccine (Brewer & Fazekas, 2007; Leader et al.), with few focused on rural populations (e.g., Sperber et al., 2008). However, even though one HPV vaccine has been licensed since 2006 and has experienced widespread media exposure through the manufacturer's direct-to-consumer marketing campaign and news stories (Kelly, Leader, Mittermaier, Hornik, & Cappella, 2009), little is known about mothers' reactions to messages designed to influence their decision to vaccinate their daughters. The manufacturer's advertisements consisted of awareness and empowerment appeals directed at relatively affluent (Rothman & Rothman, 2009) mothers and daughters (Herskovits, 2007).

This article reports on systematic theory-based formative research to develop HPV vaccine messages for a campaign targeting racially diverse mothers of nonvaccinated 11–12-year-old girls in rural Southeastern United States. A consortium of 13 county health departments concerned about high rates of cervical cancer in their region relative to state and national averages initiated the campaign (North Carolina Central Cancer Registry, 2009). We selected four of the counties for a pilot campaign on the basis of high cervical cancer rates (Foegeding & Dayton, 2008). Our research examined the behavioral determinants for vaccination decisions as well as mothers' reactions to message concepts and design features associated with the campaign.

Systematic Message Development and Design

A systematic theory-based approach to formative research helps ensure the development of effective messages that resonate with target audiences (e.g., Lindsey et al., 2009; Maddock, Silbanuz, & Reger-Nash, 2008; Noar, 2006). Systematic message development and design involves two stages of research: preproduction and production testing. Preproduction research examines the target audience's level of understanding about the desired health behavior, their attitudes, and beliefs about the behavior (Lindsey et al., 2009; Maddock et al., 2008), and the factors that motivate change (Noar). Production testing assesses the target audience's cognitive and affective reactions to specific message materials and their comprehension, attention, readability, relevance, and appeal (Brown, Lindenberger, & Bryant, 2008; Center for Substance Abuse Prevention, 1994; National Cancer Institute, Office of Cancer Communications, 2002).

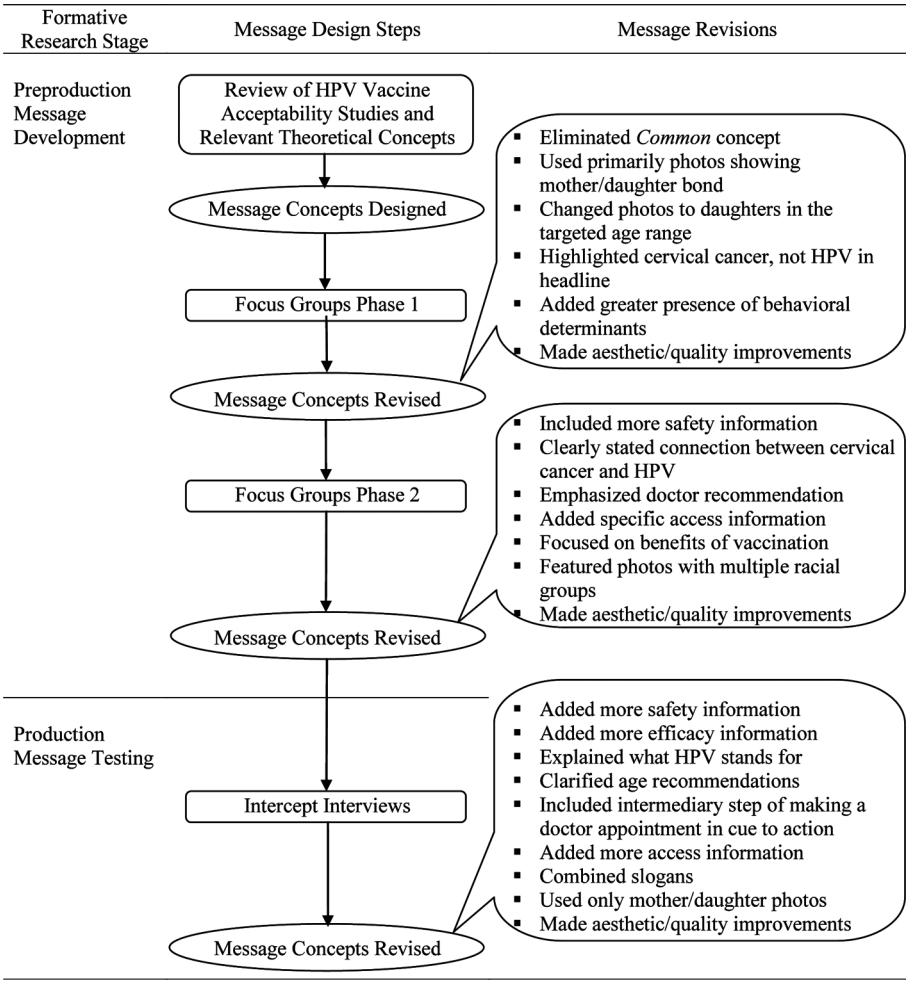

Figure 1. Formative research activities for message development.

Preproduction and production testing with mothers are important steps in developing messages for a campaign, given the relatively short time the HPV vaccine has been available, mothers' lack of understanding about HPV and the vaccine (Herzog, Huh, Downs, Smith, & Monk, 2008). Figure 1 shows our preproduction stage, which consisted of a literature review and two phases of focus groups. The production message testing included intercept interviews with the target audience.

Preproduction Message Development

Behavioral Theory-Informed Messages for HPV Vaccine Campaigns

Effective mass communication messages designed to affect behavior change typically are based in behavioral-change theories (Fishbein & Cappella, 2006; Noar, 2006; Slater, 2006) that describe the health decision-making process (Noar, Palmgreen, Chabot, Dobransky, & Zimmerman, 2009; Slater). The Health Belief Model (Rosenstock, 1974) guided campaign message development, and its constructs are important predictors of a person's decision to get vaccinated (Brewer & Fazekas, 2007; Hawe, McKenzie, & Scurry, 1998; Janz & Becker, 1984).

As applied to HPV vaccine decisions, the Health Belief Model's constructs are as follows: (a) perceived threat (including perceived susceptibility to and severity of HPV infection and cervical cancer), (b) perceived benefits of the vaccine, (c) perceived barriers to getting the vaccine (psychological and practical), (d) self-efficacy beliefs about getting vaccinated, and (e) cues to action that encourage vaccination. Previous research has shown that mothers are more likely to accept HPV vaccination for their daughters when perceived susceptibility, severity, and benefits of vaccine effectiveness are increased, and perceived barriers are decreased (Fazekas et al., 2008; Herzog et al., 2008; Sperber et al., 2008; Zimet, Liddon, Rosenthal, Lazcano-Ponce, & Allen, 2006).

Message Framing and Emotion

Theories about behavioral determinants inform message content by allowing health communication practitioners to understand the attitudes and beliefs that are influential in the decision-making process. Other theories helped guide how message content should be presented. We used prospect theory to help frame the messages and adopted a technique commonly used in advertising, which is to create messages that are emotionally relevant to the target audience (O'Guinn, Allen, & Semenik, 2009).

Prospect theory suggests that decision making depends on whether the information is cast in a gain frame or a loss frame (Kahneman & Tversky, 1982; Schneider et al., 2001). Gain frames highlight the positive outcomes of behavioral compliance because the target will either gain a benefit or avoid a consequence by complying with the recommended health behavior. Loss frames portray the negative results of noncompliance by indicating the target will encounter consequences or lose benefits by not complying (Rothman, Bartels, Wlaschin, & Salovey, 2006). Gain-framed messages are generally more effective for promoting preventive health behaviors, such as vaccination (Rothman et al.); however, some studies showed little or no difference in the effectiveness of one framing strategy over another (O'Keefe & Jensen, 2007). Previous research on HPV vaccine acceptance suggested that mothers

would respond to messages about prevention of cervical cancer as opposed to a sexually transmitted infection (Leader et al., 2009). Therefore, we decided to use gain frames that highlighted the prevention of cervical cancer.

Emotional truths are insights or observations that resonate affectively with a target audience (Von Leyden, 2004) and influence decision-making (O'Guinn et al., 2009). Emotional truths within a message can increase attention and recall as well as influence attitude formation and change (Dillard & Nabi, 2006; Lang & Yegivan, 2008). Images and text that symbolize deeply personal shared experiences and understandings among target audiences convey emotional truths (Gobe, 2001). Examples of emotional truths relevant to our message development were the basic instinct mothers have to protect their children and mothers' desire for their children to be happy (Noriuchi, Kikuchi, & Senoo, 2008).

Preproduction Message Concepts

On the basis of the Health Belief Model, framing research that suggested focusing on the key benefit of vaccination (preventing cervical cancer), and emotional truths relevant to mothers, we developed three message concepts (*Hopes & Dreams, Protect*, and *Common*) to discuss with mothers in two phases of focus groups. Figure 2 shows concept executions and a summary of revisions stimulated by the research. All concepts targeted mothers of unvaccinated daughters to promote initiation of the series.

Hopes & Dreams

The slogan for this message concept was "You have hopes and dreams for your daughter, and they do not include cervical cancer." Three photos of a mother and her daughter embracing, one in the present and two representing future dreams of graduation and marriage reflected the emotional truth of mothers' aspirations for their daughters. Phase 1 included multiple cues to action, such as "Take Action NOW" and "Call 1-800-HPV-FREE." The gain frames positioned behavioral compliance as attainment of a happy future and avoiding the consequence of cervical cancer. After the first focus group's assessment, each of the Health Belief Model's constructs was reflected in the text, rather than the original emphasis on cues to action.

Protect

The slogan for this message concept was "Vaccinate today. Protect her tomorrow." and included two variations on mothers' desire to shield their daughters from harm. One execution presented an image of a young girl under an umbrella with the copy:

> We make sure our daughters have everything they need, no matter what the weather is like outside. But did you know you can do more to protect your daughter?... Find out how you can get your daughter vaccinated, and keep her safe.

The second execution with a similar headline showed a mother helping her daughter learn to ride a bicycle. Both executions emphasized the gain frame of avoiding the consequence of either cervical cancer or HPV in large print. After Phase 1 focus group feedback, only cervical cancer was in large print, and the photo was changed to a girl who looked closer to the target age for Phase 2. More access information to reduce barriers to vaccination also was included in revisions.

Figure 2. Sample executions of design concepts discussed in focus groups. Because of copyright restrictions, some photographs are not the images used during testing; however, they are similar in terms of style and model features. The empty spaces in Phase 1 concepts were placeholders for the key behavioral determinants that would be derived from mothers' feedback in Phase 1.

Common

The slogan for this message concept was "Cell phones, shopping and HPV are common among teenage girls . . . But HPV doesn't have to be." Two photos of teenage girls talking on a cell phone and shopping reflected mothers' perceptions of how their teenage daughters typically behave. The focus on how common sexually transmitted infections are among young women was based on the Health Belief Model construct of perceived threat, specifically increasing HPV susceptibility beliefs. The gain frame was the avoidance of HPV.

Focus Groups for Preproduction Message Development

Method

We conducted four focus groups in two phases. Participants in the first phase discussed the initial three message concepts (i.e., Hopes & Dreams, Protect, and Common). On the basis of feedback from the first two groups, we revised the design and text on two of the concepts (Hopes & Dreams and Protect) and eliminated the third design (Common). We conducted two additional focus groups with the revised materials. The university's institutional review board approved all phases of this study.

Participants

Focus group participants ($n = 40$) included 20 African American, 10 American Indian, 6 Caucasian, 2 Hispanic, and 2 mixed-race mothers. Consistent with our target audience, only female caregivers of daughters 11–12 years of age who had not received the HPV vaccine were included in the focus groups. County health department staff and community organizers recruited participants through flyers and word of mouth. Participants provided informed consent before the focus group discussions, and they received $35 each.

Procedure

Two experienced moderators who were members of the research team conducted the focus groups. Focus groups took place in community settings in two rural counties within the four pilot counties. The discussions lasted approximately 90 minutes and were audiotaped and transcribed for analysis. The four focus groups comprised 8, 12, 10, and 10 participants, respectively.

Discussion Guide

The discussion guide asked mothers about the following: (a) knowledge and attitudes about HPV, cervical cancer and the HPV vaccine, (b) decision making to vaccinate their daughter, (c) trusted sources of information, (d) preferred communication channels, (e) beliefs about access to the vaccine, and (f) response to message concepts. The guide also included questions that explored behavioral determinants identified in earlier studies and feelings about being a mother of a preteen daughter.

Analysis

Two researchers coded the transcripts and organized the themes according to the categories and subcategories of the discussion guide. Researchers compared themes

across the four focus groups using a constant comparison method (Lindlof & Taylor, 2002) and reached consensus agreement on the interpretation of responses.

Focus Group Insights

Key themes from mothers in the four focus groups informed message development and reflected the Health Belief Model constructs. Mothers also gave feedback on the message framing, emotional effect, and targeting of each concept. All direct quotes presented in the subsequent sections are from mothers in the focus groups.

Perceived Susceptibility and Severity
Most mothers said they had heard of HPV and the HPV vaccine, but many did not know of or understand the connection between HPV and cervical cancer. One mother shared, "Outside of HPV are there other ways that you can get cervical cancer? I'm not so concerned about cancer as I am with AIDS or her being sexually active."

Perceived Benefits
Mothers were unaware or nominally aware of vaccine benefits and wanted more detailed information on efficacy. One mother stated, "You see the girls on the commercials but they really don't go into a whole lot of depth about the pros and cons of getting the vaccine or not getting the vaccine...you want to make the right decision." Another asked, "You're saying it helps prevent it, is that 100% or is it just helps?"

Perceived Barriers
Mothers requested more information on what the vaccine cost, where to get it, and how safe it was. They said they would regret making a decision today that may have serious future side effects, such as infertility. They had reservations about vaccinating their daughters so young with a vaccine approved for widespread use for only 2 years:

> I wouldn't want to make a decision now for my daughter that's going to affect her in her adult life in a way where maybe she might not be able to have kids or it's going to cause her medical problems in the long run.

Self-Efficacy
Most mothers answered in the affirmative that they were confident they could get their daughters the vaccine if they made the decision to vaccinate.

Cues to Action
Some mothers were suspicious of drug company advertisements for the vaccine and wondered why there were suddenly so many ads. One mother shared:

> At least [with] the [Centers for Disease Control and Prevention] you know they've got some validity behind their name that gives some validity to the drug maker because most drug makers I think are just out there to make a buck.

Mothers wanted multiple sources of information about the vaccine to make a decision. One mother stated, "I would basically discuss it with the doctor and then if he don't tell me what I really want to know I go to the Internet and pull and then go back to him with my own information."

Gain Frame

In the first phase of focus groups, we learned that the mothers thought it was important to frame the benefit of the vaccine as protection against cervical cancer rather than HPV:

> If you see a flyer with a girl on it, you first think about your child, and then you see highlighted, or in big letters, cervical cancer, it's going to catch your eye and you're going want to find out information on it. But if it says HPV, a lot of people . . . wouldn't know.

Emotional Truths

Mothers said the Hopes & Dreams and Protect concepts tapped into the protective love between a mother and daughter through the images of mothers and daughters together: "When I look at it, I see much love and then on the side it says, "and they don't include cervical cancer."

In addition, the Hopes & Dreams concept evoked mothers' aspirations for their daughters' future happiness. One mother stated, "It sort of grabs at you because you do hope that, you know, it's sort of a message about hopes and dreams . . . I think the family picture is reality."

Targeting

Mothers in the first two groups criticized the Common concept for appealing more to daughters than to mothers and the Protect concept for having daughters who looked too young. African American mothers liked the images of African Americans in the design: "I like this because it shows . . . an African American mother/daughter. Especially if you're going to send it to certain communities, people want to identify with the picture that they're with the picture that they're looking at."

At the same time, the mothers in this group asked whether only African Americans were at risk for cervical cancer because the materials had only African American faces. One stated, "Can I just ask a question . . . I mean I see that it's showing Black people. Are we among the highest to receive this cervical cancer?"

Preproduction Revisions on the Basis of Focus Group Feedback

From the focus groups, we learned that mothers needed more information about what HPV is and why their daughters should get the vaccine. Mothers preferred this information from a source other than from the pharmaceutical company. Dominant Health Belief Model constructs that emerged in the discussions were perceived benefits of vaccination and the perceived barriers of safety, effectiveness, and access to the vaccine. Mothers mentioned perceived susceptibility, although not as prominently as they mentioned benefits or barriers. Perceived severity and self-efficacy were not commented on often. Mothers reacted positively to the gain frames. The emotional truths seemed to tap into a mother's protective love for her daughter

and aspirations for her future. We also learned that message concepts with racially diverse photos of mothers and daughters together were strongly preferred.

On the basis of mothers' feedback, we made significant changes to the concepts before the production testing (see Figure 1). Focusing on cervical cancer and stating that cervical cancer is caused by HPV were designed to educate mothers about susceptibility while appealing to what they saw as the key benefit of the vaccine (preventing cervical cancer). We added more information on safety and access. A cue to action from a trusted source emphasized that doctors recommended the HPV vaccine. We eliminated the Common concept, seen to target daughters, and used more photos featuring multiple racial groups. The primary source of mothers' emotional reactions, photos of mothers and daughters, became focal points on most of the production messages.

Production Message Testing

Concepts Tested

In the next phase of message design, we tested the revised messages with mothers of young daughters. To ensure responses were not driven by a strong reaction to just one message element on a single poster (Brown et al., 2008), we produced three executions for each of the two creative concepts: Hopes & Dreams and Protect. We hired a professional marketing agency to develop six full-color 11 × 17-inch posters on the basis of our preproduction findings. Each poster had the same bulleted text, with varied and contrasting images. The production testing messages used the same emotional truths and gain frames as did the preproduction message concepts. We also incorporated more of the detailed behavioral determinants developed from the preproduction feedback (see Figure 3). For example, the perceived barrier of vaccine safety was addressed by stating, "It has been widely studied in thousands of girls and women in the U.S. and around the world."

Hopes & Dreams

The slogan for this concept was "Her hopes. Her dreams. Her future. Prevent cervical cancer. Get your daughter vaccinated today." A submessage on all three posters was a direct quote from one focus group mother, "You can't predict your daughter's future, but you can help it out a little bit." Similar to the preproduction concept, these posters emphasized a mother's protective love for her daughter and her aspirations for her daughter's future. The gain-framed message emphasized the benefit of having a good future.

Smiling Girl

This execution featured a large photo of an adolescent African American girl who was smiling and looking at the camera. We included the image as an alternative to photos with mothers and daughters.

Picture Blocks

Four racially diverse photos were on this execution (see Figure 4). Two photos were of a mother and daughter embracing, and the other two were of daughters smiling and looking at the camera. The layout was a simple box design.

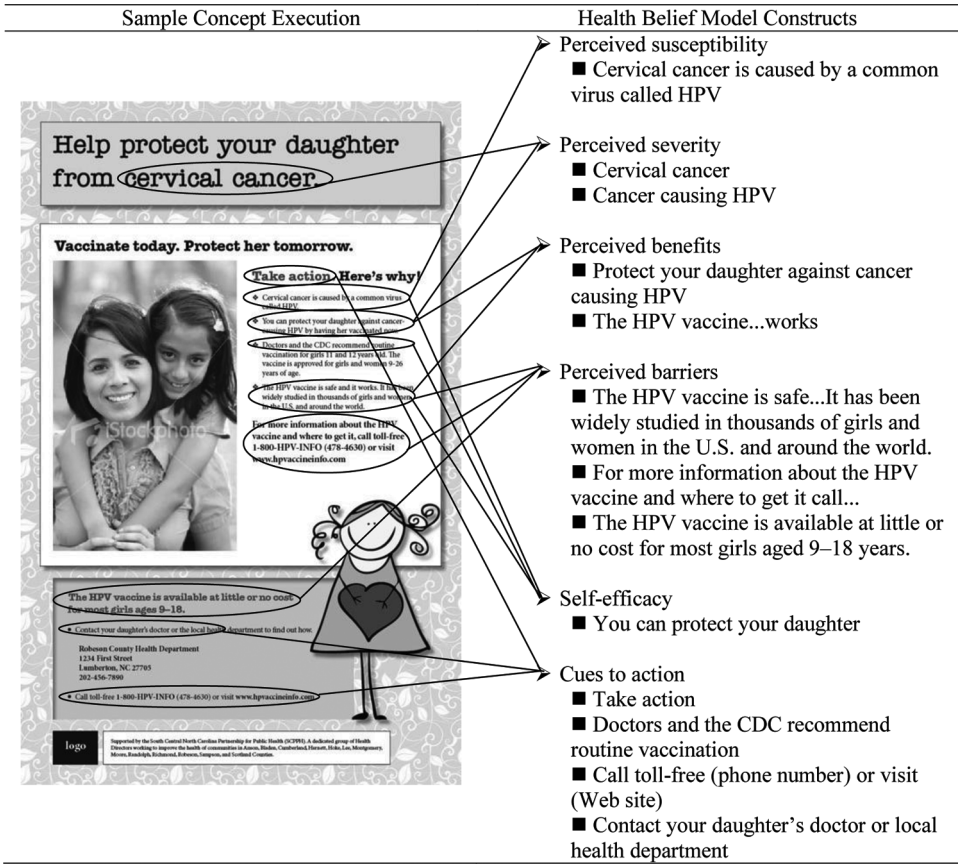

Figure 3. Message copy based on Health Belief Model constructs.

Sunset

This execution featured three girls holding hands and looking at each other. Faces were not visible because the photo is backlit. In both concepts, this execution offered a distinct contrast with the designs with more vivid images.

Protect

The slogan for this concept read, "Protect your Daughter from Cervical Cancer. Vaccinate today. Protect her tomorrow." As in the preproduction concepts, we designed these versions to portray mother's protective love for her daughter and desire to keep her safe from harm. The gain-framed poster emphasized the benefit of avoiding cervical cancer.

Mother/Daughter

The layout on this execution (see Figure 3) featured a boxed headline at the top with a single large photo of an Asian Indian mother and daughter embracing.

Butterfly

This execution (see Figure 4) had a centered tree graphic with small photos of racially diverse mothers and daughters and daughters alone.

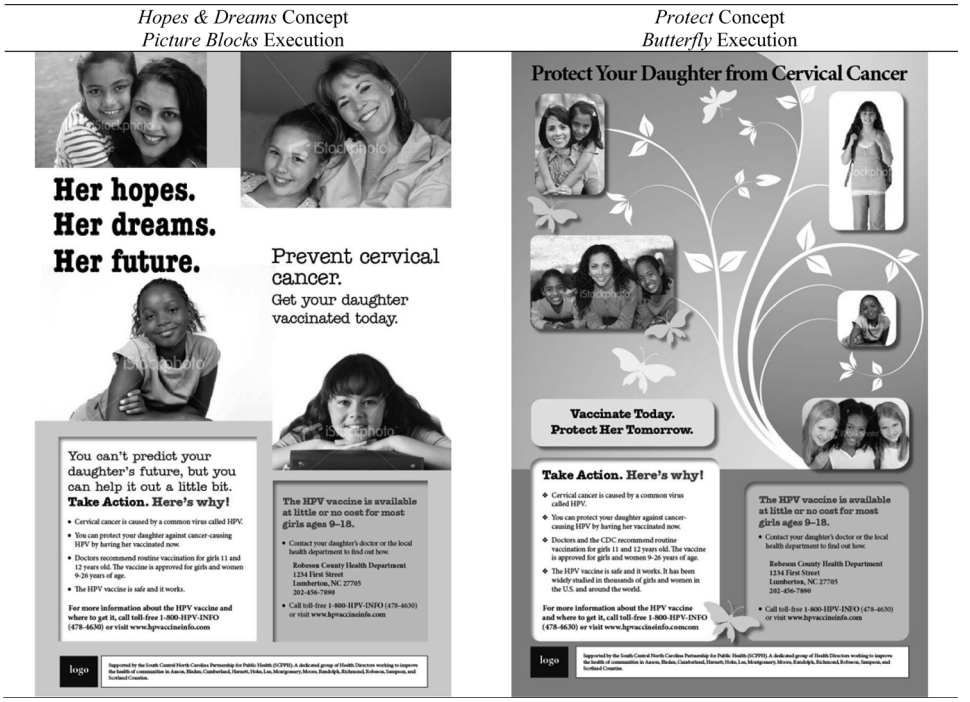

Figure 4. Production testing campaign posters.

Sunset
This poster was identical to the Hopes & Dreams—Sunset poster, only the slogans differed.

Production Testing with Intercept Interviews

Methods

Participants
Mothers ($n = 39$) of 9–13-year-old daughters who had not received the HPV vaccine were the target group for the production testing intercept interviews (see Table 1). Two mothers indicated during the interviews that they were unsure about their

Table 1. Production intercept interviews: Mothers' ethnicity and daughters' age

			Daughters' age (years)				
Mothers' ethnicity	*n*	%	9	10	11	12	13
African American	22	58	—	7	6	2	8
American Indian	9	23	1	3	2	4	1
Caucasian	7	18	2	1	2	—	2
Latino	1	3	—	—	—	—	1

Note. Three mothers had two daughters between 9 and 13 years of age.

daughter's vaccination status; however, they were retained in the study. All participants signed an informed consent and received $20.

Procedure

Locations for the intercept interviews were determined on the basis of recommendations from focus group participants (e.g., libraries, grocery stores, pharmacies, shopping centers). Trained interviewers recruited participants by asking women whether they would like to volunteer and by posting signs about the study. Interviews were audiotaped and completed in approximately 20 minutes.

Interview Guide

We alternated concept sets for the mothers to view. The mothers answered a set of open-ended questions about comprehension and meaning, attention-getting, attractiveness, relevance, believability, acceptability, persuasiveness, overall themes, and comparison of messages, as recommended by the National Cancer Institute's guide for message testing (National Cancer Institute, 2008). We also collected basic demographic information.

Analysis

Two of the authors created a coding protocol on the basis of interview notes and audio recordings. Following the guidelines established in Hruschka et al. (2004) for reliably analyzing open-ended interviews, the two coders compared interpretations and resolved discrepancies. Codes included what participants thought were the main messages, their opinions on effective and ineffective elements, lingering concerns about the HPV vaccine and design preferences. Emotional reactions were coded using words and themes identified in other studies of emotional appeals (e.g., Dillard, Shen, & Vail, 2007; Shaver, Schwartz, Kirson, & O'Connor, 1987).

Three rounds of coding small samples were conducted to establish consistency among the coders, with each coder coding all 39 interviews in the final round. Strong reliability between the two coders was achieved (agreement ranged from 90% to 100% and Cohen's kappa of more than .75 was reached for 80% of the units). After coding was completed, the coders resolved each difference and reached consensus on all of the codes. The frequencies presented in the analysis are from the consensus codes.

Production Testing Feedback

Message Concept Preferences

Mothers' preferences were split evenly between the two message concepts. Most mothers who preferred Protect stated it was more direct and action orientated than was the Hopes & Dreams concept. For example, one mother said the Protect slogan would motivate her to vaccinate her daughter: "[The slogan] goes directly to what you are trying to get across, help protect your daughter from cervical cancer."

Mothers who preferred the Hopes & Dreams concept responded to its portrayal of motherly love and joy. One mother stated that she liked Hopes & Dreams better: "I like that it does sort of tug at your heartstrings a little bit, talking about a child's future."

Execution Preferences

Most mothers preferred Butterfly ($n = 15$) and Picture Blocks ($n = 14$), which featured multiple photos of racially diverse mothers and daughters together. The two least preferred posters featured a sunset photo, which mothers thought was generic and too dark. Poster preferences did not differ by either mother's or daughter's age. African Americans had a slight preference for the Hopes & Dreams concept and Picture Blocks execution. American Indians showed a clear preference for the Protect concept and the Butterfly execution. Caucasians split evenly on concept and execution preferences between Butterfly and Picture Blocks.

Main Message and Targeting

When asked what each concept's main and secondary messages were, the majority of mothers thought that Hopes & Dreams was about encouraging them to protect their daughter from cervical cancer and about keeping their daughter healthy for the future. Most mothers thought the main message for Protect was about protecting their daughters from cervical cancer. When mothers reacted to the simple Picture Blocks layout, they noticed the written messages more. With Butterfly, they focused on the graphics, photos, colors, and, last, the messages. Mothers thought the Butterfly poster graphic targeted children more than any of the other posters did.

Emotional Reactions

Each concept evoked specific emotions from mothers. When asked how the posters made them feel, mothers most often said "love" ($n = 22$) and "joy" ($n = 19$). The Hopes & Dreams concept was more likely to evoke a feeling of love than was the Protect content. Smiling Girl was most associated with joy. Picture Block*s* was evenly associated with love and joy. Mothers reacted positively to images that seemed to reflect their own emotional experiences: "I like seeing moms and daughters cause it reminds me of my baby and I, and I love my pudd'n."

Motivational Effectiveness

About one third of mothers said the Protect concepts would motivate them to vaccinate their daughters, and about one third said they would talk to their doctor about it. For Hopes & Dreams, more than half indicated they would vaccinate their daughter but fewer than one fifth said they would talk to their doctor about the HPV vaccine. More than half of the mothers indicated they were not aware the vaccine was intended for their daughters; they thought the vaccine was for older girls because of the drug company's commercials featured older teens. Many of the mothers said they needed more information about safety, side effects, and vaccine efficacy before they could make the decision to get the vaccine for their daughters.

Revisions After Production Message Testing

The intercept interviews indicated that mothers liked aspects of both concept slogans. Thus, the final messages included both slogans. Final campaign messages used a layout similar to the simple Picture Blocks poster and incorporated a subdued version of the Butterfly poster graphics because the simpler format helped mothers notice the information and the butterflies attracted attention. More information about safety and efficacy was included in the final campaign messages and all materials included photos of mothers and daughters together from a variety of racial

backgrounds. We included a more direct cue to action, "schedule an appointment," to motivate action from more mothers. Before final production, we solicited feedback on the final two designs using an informal electronic survey of health department staff in the four counties and project researchers not directly involved in the message-testing phase. We made minor wording changes to standardize language across message platforms (e.g., posters, brochure, Web site) and changed one photo on the basis of staff feedback.

Lessons Learned

The value of conducting both preproduction research and production message testing lay in what we were able to glean with each phase. Preproduction research using focus groups allowed us to make connections between theory and message design by providing a more in-depth understanding of the underpinnings of mothers' behavioral determinants, such as trustworthy sources to deliver cues to action. Production message testing through intercept interviews was an efficient way to find out whether mothers interpreted the designed messages as intended (e.g., what first drew their attention, design preferences, or motivational effectiveness).

Similarities in mothers' feedback in preproduction and production stages existed; however, each stage also produced unique findings. For example, mothers in both the focus group settings and the one-on-one intercept interviews reacted positively to gain frames about preventing cervical cancer. Images and text about protection of and aspiration for their daughters resonated with mothers in both stages. In addition, both stages informed us about how important vaccine safety was to the mothers. The evidence that campaign messages were effective in persuading mothers to vaccinate their daughters will ultimately be determined by an evaluation of the campaign. However, we expect that our systematic theory-based formative research will increase the probability of campaign success.

Strengths and Limitations

This research provides insights from rural and racially diverse mothers, populations most likely to experience disparities in cervical cancer rates. The inclusion of African American and American Indian mothers from rural counties ensured that those populations most affected by cervical cancer have a voice in designing campaign messages. Another strength of this study is its target audience of mothers with younger daughters, especially because many of these mothers incorrectly assumed the vaccine was for older girls. An important finding at the preproduction and production testing stages was a clear preference by mothers across all racial groups to have photos of multiple racial groups: "Any mother with a daughter between [the age ranges], no matter the race, or nothing, as long as you got a daughter, it's speaking to you."

The main limitation of this study is that results may not be generalizable to all populations of concern. Mothers who agreed to participate may have been those who were more willing to discuss and accept the vaccine. The decision to elicit focus group feedback on predeveloped message concepts rather than elicit core values and emotional truths to then inform the development of concepts may be a limitation and a strength. The strength of this decision is that developed messages were grounded in constructs shown to contribute to health decision making. The

limitation is that we may have missed an opportunity to discover new ground by allowing mothers to freely direct message design. Last, the campaign focused on increasing vaccine initiation and future research may be needed to address series completion.

The research presented here is from a health communication campaign implemented during the summer of 2009. This study can serve not only as a tool for theory-based message design and testing for HPV vaccines, but also as an example of systematic formative research to develop effective campaign messages for other health topics.

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