

# Promoting Pre-Conceptional Use of Folic Acid to Hispanic Women: A Social Marketing Approach

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**Objective:** To develop a culturally appropriate communication initiative in an effort to promote the use of pre-conceptional folic acid among Hispanic women of childbearing age. The materials were designed to communicate information about the risks of neural tube defects and the value of folic acid supplementation before conception. **Methods:** The initiative was developed using a social marketing approach. A series of focus groups were conducted with Hispanic women, particularly Mexican and Mexican-American women, to gain an understanding of their knowledge, attitudes, and behaviors regarding birth defects and folic acid. Additionally focus groups assessed women's preferences for existing folic acid education materials. Qualitative analysis of coded transcripts revealed key themes which were incorporated into a multi-media initiative. **Results:** Critical themes of the research highlighted the need to include the role of partners and a sense of family in the promotions aimed at these groups. Another key component was the need to dispel myths which act as barriers to pre-conceptional folic acid use. Other important elements included in the media products were the need for Spanish and English versions, an explanation of neural tube defects, and a reference to the cost of the supplements. **Conclusion:** The final products of the initiative included Spanish and English versions of a brochure, photo-novella, and radio public service announcement. Pre-testing results showed women understood the message, thought the message was for women like them, and expected to begin taking a folic acid supplement. Results of the overall evaluation of the initiative are on-going.

**KEY WORDS:** folic acid; social marketing; cultural sensitivity; focus groups; risk communication.

## INTRODUCTION

### Overview of Social Marketing

Social marketing is the application of traditional marketing principles towards the promotion

of health behavior change (1). It is based on the traditional marketing exchange theory which states that consumers will adopt behavior change when barriers are reduced and benefits highlighted, according to their specific needs (2). Audience segmentation, a key feature of social marketing, refers to "the process of dividing a population into distinct segments based on characteristics that influence their responsiveness to marketing intervention, such as the price they are willing to pay for a product or the spokesperson they would trust the most" (3). A focused example of the distinct approach of social marketing is shown in the conceptual framework by Rothschild (4), which contrasts social marketing with education efforts and law or policy change/development.

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Educational approaches facilitate people's ability to adopt behavioral change by creating awareness of the benefits of such change. Education is most effective when the benefits of change are high and attractive and the barriers or risks are low. Education also assumes the skills and knowledge needed for behavior change are readily available and simple (e.g. poison prevention). Laws and policy often use threat or punishment to achieve behavior change. Laws are the most effective approach when people will not receive an immediate benefit from the behavior change or will have to pay a high price (financial or emotional) for adopting the behavior change (e.g., driving under the influence of controlled substances). In contrast, social marketing manages behavior change by creating incentives or consequences that invite voluntary exchange.

Social marketers seek to identify barriers to behavior change and to highlight benefits that are relevant to the audience (e.g., some women breastfeed for the health benefits to the child, other women choose to breastfeed for the unique bond created between mother and child). Like education, marketing offers people a choice about behavior but unlike education, it assists in altering the environment to make the recommended behavior more advantageous by communicating the most favorable cost-benefit relation to the target audience (3, 4). For example, promoting the "peace of mind" offered by a mammogram for early detection as opposed to a promotion of the risk of breast cancer (5).

### Overview of Folic Acid Use in the United States

In 1992, the U.S. Public Health Service (USPHS) recommended that all women of childbearing age consume 400 micrograms of folic acid per day for the purpose of reducing the risk of having a pregnancy affected with spina bifida or other neural tube defect (NTD) (6). If a woman follows the guidelines for daily folic acid use, an estimated 50–70% of NTDs can be prevented (6). Yet, despite these recommendations and the mandatory fortification of grain products with folic acid in the United States (1998), approximately 3,000 pregnancies are still affected by NTDs each year in the United States (7, 8). The two most common NTDs are spina bifida and anencephaly (9). Anencephaly is the absence of major portions of the brain and the cranial vault and is not compatible with life (10). Spina bifida results from the failure of the neural tube to close in utero

(11). Both conditions occur early in a pregnancy, often before a woman knows she is pregnant (6).

Federal efforts to increase women's folic acid intake have been coupled with various media campaigns aimed at increasing women's knowledge and use of this vitamin. For example, the March of Dimes (MOD) has used general marketing strategies to promote the use of folic acid in the prevention of NTDs for over ten years. Overall, their efforts have shown to be effective in increasing knowledge about folic acid among women of childbearing age, but less effective in achieving the goal of increasing folic acid consumption among them (12). Surveys conducted by the Gallup organization for the MOD in 2004 indicate among the general population of childbearing women in the United States, 77% were aware of folic acid, 24% knew that folic acid can prevent birth defects, and 12% knew that women should take folic acid before becoming pregnant, yet only 40% reported daily consumption of a vitamin containing folic acid (12). Whereas these rates show significant improvement compared to 1995 pre-campaign levels [52, 4, 2, and 28%, respectively] (12), they fall short of the Healthy People 2010 objective of having 80% of reproductive-age women consuming 400 micrograms of folic acid daily (13).

Though efforts to increase awareness and use of folic acid have shown progress, there still remains a need to focus on particular groups of women of childbearing age. For instance, telephone surveys conducted by the Centers for Disease Control and Prevention (CDC), in English and Spanish, still indicate disparities between Hispanic and non-Hispanic women (14). These surveys indicate that Hispanic women are less likely to have heard about folic acid, to know that folic acid can prevent birth defects, to take folic acid daily, and to take folic acid before pregnancy (14). Furthermore, Spanish speaking Hispanic women have lower levels of knowledge, more negative attitudes, and less healthy behaviors toward taking folic acid than English speaking Hispanic women (14). Such findings are significant because compared to non-Hispanic women, Hispanic women are 40–50% more likely to have a NTD affected pregnancy (9, 15, 16). Additionally, it is expected that by the year 2050, the Hispanic share of the United States' births will grow from the current 19% to 25% (13).

Surveys by the CDC also indicate that Hispanic women primarily learn about folic acid through radio and television followed by magazines and newspapers (14). The Hispanic Marketing Group, which

works to design and execute marketing programs targeting the Hispanic community, reports that Hispanics prefer advertising messages in Spanish and look for information in their own language (18). However, overcoming the challenges in marketing to the Hispanic community is not a simple task. To be successful in any marketing attempt aimed at Hispanic populations, marketers need to look beyond language preference and understand different consumer behaviors based on country of origin and the impact of acculturation and assimilation (19). For example, compared to European immigrants, Hispanics appear to have a slower adaptation process and are strongly influenced by their long-standing cultural beliefs, which ultimately affect the distinctive way Hispanics approach many things in life, including healthcare (20). Successfully reaching this target population requires an understanding of their cultural background. Health programs and targeted interventions that have focused on tailored messages and designs that incorporate cultural beliefs and their impact on decision making, have been more successful than those designed for general populations (21, 22).

Although understanding the cultural backgrounds of different Hispanic groups is not an easy task, it appears achievable, as evidenced in the successes of two marketing campaigns occurring in two different areas, the commercial and the health sectors. In 1999, the computer manufacturer, Gateway Inc., launched a successful marketing program aimed at Hispanics. Their success was attributed to the surveys and focus groups they conducted in Spanish and their marketing researchers' ability to go into Hispanic neighborhoods to observe consumers' habits firsthand (23). In the health sector, the CDC initiated a successful National Diabetes Education Campaign aimed at Hispanics/Latinos living in the United States. Key elements of this campaign's success included working with various Hispanic/Latino organizations in developing press kits that contained culturally appropriate television, radio, and print messages in Spanish and pre-testing developed messages with various members of the target population (24). The campaign successfully reached more than 5.5 million listeners, over 3.3 million viewers, and an estimated one million readers. As a result, the campaign was awarded the Health Improvement Institute's Award of Excellence for the first Spanish program of its type (24).

In 2001, the MOD began a national folic acid education campaign targeting Hispanic women. In-

corporating many of the same abovementioned marketing strategies, the campaign included radio, television, and written materials (25). The campaign was developed in collaboration with a Hispanic advertising and marketing agency. However, evaluation of this particular MOD campaign was insufficient and data did not focus on Hispanic women of childbearing age. Surveys conducted by the Gallup Organization for the March of Dimes also provide general information about women's knowledge, attitudes, and behaviors regarding folic acid intake, but again, none of these surveys addresses race and the impact race and ethnicity has on folic acid intake (12).

One important finding from the 2004 Gallup survey is that 89% of women age 18–45, who are not currently taking vitamins or supplements on a daily basis, report that they would likely take a daily multi-vitamin that contains folic acid if it was recommended by their doctor or health care provider (12). Furthermore, the Gallup survey results also suggest that physicians or other health care professionals along with print and broadcast media remain the leading source of information about folic acid among women who are aware of folic acid [29, 28, and 19% respectively] (12). Even though the Gallup Organization surveys are beneficial in our understanding of the effectiveness of folic acid education campaigns among all women of childbearing age, they, like others, fail to aid us in better understanding and serving Hispanic populations.

Increasing folic acid awareness, knowledge, and behavior remains a public health concern, particularly among Hispanic women of childbearing age. The literature illustrates that great strides have been made in educating women of childbearing age about the benefits of folic acid. Likewise, evaluations of folic acid campaigns, in general, have shown success in changing behavior. Yet, these successes have not been evaluated in specific populations of high-risk women, such as Hispanic women of childbearing age. These women have different biopsychosocial needs than their non-Hispanic counterparts, thus for messages and campaigns to be effective when working with the Hispanic community, cultural competency is not a choice, but a necessity.

This paper reports the early stages of a folic acid social marketing campaign undertaken to address issues surrounding daily folic acid intake among Hispanic women of childbearing age in central Florida. The goal of the campaign was to identify specific barriers and benefits as noted by the target audience and to develop an intervention that attended to the needs

and wants of the audience using a social marketing approach. The following sections provide details about the process and end products developed from the formative research.

## METHODS AND RESULTS

To better understand the behavioral determinants of daily folic acid use among Hispanic women in Florida, the University of South Florida Birth Defects Surveillance Program, in collaboration with the National Training Collaborative for Social Marketing at the University of South Florida began a new social marketing campaign in the fall of 2002. The unit of analysis, or target audience, for this study was Hispanic women of childbearing age, particularly women of Mexican origin living in the State of Florida. In keeping with the concept of social marketing, it was imperative that related messages aimed at promoting pre-conceptional use of folic acid consumption among Hispanic women contain culturally sensitive content regarding the importance of folic acid, but also be sensitive to the specific issues Hispanic women face. Marketing efforts also needed to be aware of and sensitive towards the subtle cultural differences that may exist across Hispanic subgroups (e.g. Mexican, Cuban, Puerto Rican, etc.). Although they share a common language, they differ in traditions and customs and thus require unique strategies tailored to different subgroup characteristics. The following sections describe the initial planning, formative research, strategy formation, product development, and program implementation phases of the folic acid social marketing campaign. Evaluation of the campaign is currently underway and will be reported separately. This study was approved by the University of South Florida's Institutional Review Board.

### Phase I: Initial Planning

Florida ranks fourth in the nation, behind California, Texas, and New York, in the annual number of overall births and in Hispanic births each year. Hispanic births accounted for 25.8% of the 212,243 births in 2003 (17). To determine the impact of NTDs in Florida, researchers reviewed data from the Florida Birth Defects Registry and the Florida Department of Health Bureau of Vital Statistics. Each year, approximately

100 babies are born in Florida with a NTD and between 1996 and 2002, 711 babies were born with a NTD. Researchers also investigated the occurrence of NTD births between 1996 and 1997 among Hispanic subpopulations (Mexican, Puerto Rican, Cuban, and other Hispanic) and maternal place of birth and found marked variability of NTD rates among subgroups, with the highest risk for mothers born outside the United States (26). In particular, among this group 80% of NTD live births were to foreign born mothers (women born outside the United States) and within the Hispanic subgroups, foreign born Mexican mothers had the highest relative risk (RR = 1.9).

### Phase II: Formative Research

#### Methods

Based on literature reviews showing that Mexican-American women were less likely than non-Hispanic white women to know about folic acid, to take it on a daily basis, or to believe that it has a link with birth defects (27), a preliminary logic model (Table I) was developed. The findings from the Initial Planning stage of the campaign guided the question to be answered in the formative research phase—What are the knowledge, attitudes and behaviors of Hispanic women regarding folic acid and how do they vary between those born in the United States and those who are foreign-born? Additional goals included understanding the specific barriers to folic acid education among this population in Florida with the identification of the target audience, the desired behavior, factors that influence the behavior, perceived benefits and barriers associated with the desired behavior, and price, product, placement, and promotion activities that are most likely to be successful within the target population—i.e., the traditional “4 P’s” of social marketing (3).

**Table I.** Preliminary Logic Model for Florida's Folic Acid Social Marketing Campaign

Target audience: Mexican, foreign born women of childbearing age living in Florida
Desired behavior: Increase folic acid use
Behavioral determinants to address:
Build knowledge
Improve access
Dispel myths about diet
Dispel myths about birth defects

To achieve the formative research goals, researchers conducted a series of interviews ( $n = 14$ ) and focus groups (6 focus groups totaling 44 participants) with both foreign-born and second-generation Mexican women. Given the large migrant farm worker population in Florida, the sampling plan was designed to specifically recruit women from the migrant farm worker populations, but also to provide a cross-sectional mix of Mexican-born women, Mexican-American women (they and/or their parents were born in the United States), teens, adults, and families with a history of NTD. The interviews and focus groups were conducted in Spanish or English, depending on the preference of the respondent. The instruments used in this project were transcreated; a process of translating English-language materials into Spanish and adapting them for specific Latino audiences in an effort to make them sound more natural (28, 29). The transcreation process was applied to all aspects of the project.

The women were recruited through flyers placed in community health centers, family planning and WIC clinics, and on-site education centers within the migrant camps and surrounding communities. The women were paid \$15 for participating in a focus group or interview. Women, who were recruited because of a family history of NTD or other birth defects, were interviewed individually with the idea that they may be less willing to share confidential health information in a group setting. Other women who wished to participate, but could not attend the scheduled focus groups, were also offered the opportunity to participate in an interview. Interviews and focus groups aimed to understand if there were any differences between foreign-born and second generation Mexican women regarding what they know about vitamins and folic acid, concepts of heredity and genetics, perceptions of risks related to birth defects, opinions about currently available folic acid education materials, and thoughts about appropriate spokespersons for folic acid materials. See Table II for a list of the core questions from the Moderator's guide used in the focus groups conducted in English.

To identify key themes and differences between foreign-born and second generation Mexican women, the data in this study, the verbatim texts of women's interview responses and focus group transcripts, were initially hand coded and later managed with The Ethnograph® computer software program version 5.07 (30). To help determine when saturation occurred, data were collected and analyzed concurrently. Content analysis, using a template anal-

**Table II.** Core Questions Used in Focus Groups Conducted for Florida's Folic Acid Social Marketing Campaign

1	Have you ever taken vitamins?
2	What is the purpose of vitamins?
3	How are they best taken – why?
4	Do women need vitamins if they eat the right foods?
5	Do you know what folic acid is – why is it important?
6	What might happen to women who don't take vitamins while they are pregnant?
7	Why do you think some babies are born with defects?
8	Do you know what spina bifida is, or neural tube defects? Have you or has anyone in your family ever had a child that was born with problems, neural tube defects (spina bifida or anencephaly)? Who?
9	What causes this? Can it be prevented?
10	What do you think of when you hear the word "hereditary"?
11	Examples of some things that are hereditary?
12	Can people change the outcomes of hereditary conditions?
13	What does the word genetics mean to you?

ysis plan, was performed to identify major themes and differences in participants' knowledge, attitude and behaviors regarding folic acid consumption (31). Three coders used an initial code list (developed before data analysis based on findings from the literature) and open coding throughout the analysis process. Each coder independently reviewed the data twice.

In the first coding pass, reviewers read the entire text of a transcript, applying the initial codes to the data, while also making notes on possible new codes. After each reviewer completed the first round of coding, they discussed their notes on probable new codes. After consensus was reached, a new codebook was created and coders once again independently reviewed the data and updated code categories from the first coding pass. After the second coding pass, the three reviewers met to discuss coding similarities and discrepancies. To check for coding validity and reliability, inter-rater reliability was established by counting the number of content areas to be coded, divided by the number of agreements (32). Three coding passes were attempted before reaching final consensus. Final data analysis was conducted with an inter-rater reliability rate of .90.

### Findings

Interview and focus group participants were of low socioeconomic status and ranged in age from

15 to 42. One focus group was conducted exclusively with women who had a child with a birth defect or a family history of birth defects, two focus groups were comprised solely of foreign-born Mexican women, and the other focus groups were heterogeneous in terms of 1st or 2nd generation women. None of the women who participated in the focus groups had even taken any type of oral vitamin, yet some 1st generation women used vitamin injections when they were in Mexico.

There were few, if any differences in women's responses between those who participated in an interview vs. focus group or foreign vs. U.S. born women. The only areas in which we found significant differences among the groups were between teens (aged 15–19) and young adults (aged 20–35). The teens preferred to conduct interviews in English and wanted the focus of the campaign to be a family planning issue, whereas the young adults preferred to be interviewed in Spanish and wanted the campaign to focus on babies. Findings regarding Mexican-American women's knowledge about vitamins showed that whether foreign or U.S. born, most perceived that vitamins were important only during pregnancy and that any type of vitamin that might be taken as an oral supplement would most likely happen after a woman determined she was pregnant. Most of the women reported not taking any type of vitamins on a regular basis. Reasons for not regularly taking vitamins included not having the time or money to purchase them, belief that vitamins made them nauseous, and because the doctor did not recommend it to them.

Folic acid was also misperceived and misunderstood across both samples of Mexican women. For example, the use of the term "acid" led many women to believe it was an illegal substance similar to LSD. To address this issue, we retested a concept from a previous campaign and substituted "B vitamin" for folic acid and found that although folic acid did have a negative connotation, "B vitamin" was not distinguishable from other vitamins and that it was best to use the term folic acid and explain what it is. Many women felt that if folic acid was so important their health professionals would talk to them about it on a regular basis, but that it would also be available in injectable form at the pharmacy. Participants volunteered that in Mexico people often receive vitamin injections from the pharmacist for fatigue or other ailments. The majority of women also did not believe that there is a link between folic acid and birth defects.

These women did not recognize or understand the terms "heredity" or "genetics." When explained, the closest terminology they used was "running in the blood." Most of the women believed that cancer and diabetes are hereditary, and they also thought that other aspects of health and behavior, including personality and susceptibility to AIDS "ran in the blood." There was also a strong belief that birth defects were an act of God and had no biological origins. Even though many of the women, both teens and adults, could list several types of birth defects, they believed that as long as they complied with their cultural and social norms (e.g. following the rules of God, only having sex with and living with the man they were married to, and not speaking ill of other people) their risk of having a baby with a birth defect was low. Across populations, birth defects were also associated with myths, such as sleeping with the moon shining in the window, lunar and solar eclipses, and "weak uteruses." They associated pesticides with "weak uteruses" and birth defects among women living in migrant farm camps.

In addition to investigating the knowledge, attitudes, and behaviors regarding folic acid use, we sampled women's perceptions and thoughts on current folic acid media and credible spokespersons for the intervention. This phase of the research yielded highly useful information regarding the vehicles for delivering health messages about folic acid. For example, women's top preference for receiving health information was in the form of a photo-novella (combination of pictures and text), followed by radio and television. Teens wanted messages to have less emphasis on the baby and both teens and adults found folic acid education materials that portrayed "sexy Latinas" offensive. Also, both foreign and U.S. born women felt strongly that the spokesperson for issues surrounding folic acid should be a female health care professional. They also felt strongly that celebrities and religious leaders should not be spokespeople for health related information. The most successful existing educational material presented to focus group participants was a novella, with line drawings and not actual pictures, entitled *How Lucky I Am to Know about Folic Acid* (33).

### Phase III: Strategy Development

The formative research phase generated rich data about this group of Mexican women's knowledge, attitudes, and behaviors regarding folic acid.

**Table III.** Working Logic Model for Florida's Folic Acid Social Marketing Campaign

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Target audience: Migrant first and second generation Mexican women of childbearing age, primarily teens, living in Florida
Desired behavior: Talk to a health care professional about the use of pre-conceptional folic acid to prevent birth defects
Behavioral determinants to address:
Perceptions of risk
Attitudes toward vitamins
Misconceptions about vitamins
Culturally appropriate spokesperson
Role of the partner
Spokesperson: Female healthcare professional

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Many of the perceptions about the cause of birth defects or the manner in which vitamins are typically administered in their native Mexican environment were in stark contrast to traditional U.S. medical culture. It seemed futile and disrespectful to attempt to intervene at these points. It was also clear that most women were familiar with the use of vitamins in relation to pregnancy. However, two prevailing concepts from the formative research data were instrumental in refining the preliminary logic model into the working logic model shown in Table III. First, teens were anxious to acculturate into U.S. customs and traditions, yet they still valued their culture and traditions regarding the importance of having a family and that family and being part of a family come first in life. Thus, in an effort to respect their two desires and avoid implying having a baby outside of wedlock, researchers decided that the behavioral focus of the campaign should be having teens talk to healthcare professionals about the use of pre-conceptional folic acid. Second, given the findings from the formative research, it seemed unrealistic to simply talk about increasing folic acid use when most women mentioned experiencing problems accessing folic acid and not having the money to purchase it. Therefore, another focus of the campaign needed to center on sources of folic acid and ways to obtain free or low cost vitamins.

#### Phase IV: Program Development

Based on the findings from the formative research, researchers decided to create three different media products in English and Spanish—a photo-novella using actual photographs, a brochure to keep

in health clinic waiting rooms, and a radio public service announcement (PSA), aimed at the teen population. Specifically, the photo-novella, which shows a woman and her male partner planning a pregnancy and asking the doctor questions together, addresses the teens' preference for seeing family planning messages, whereas the brochures, which show a young adult face on one side and an infant on the other, address the adults' desire for the campaign to focus on babies. The photo-novella also addresses the importance and sense of family through the portrayal of sisters planning a wedding together as well as discussing health issues as a family and sharing information. The radio PSA focused on presenting "the facts" as teens expressed a desire for the message to be told "straight up" without promoting motherhood. As with the interview and focus group guides, the media products were transcreated. Each of the media products were created with target audience's place of origin in mind and were pre-tested with members of the target audience. For example, in creating the photo-novella, researchers looked extensively for models that represented Mexican origin, but who would also appeal to other Hispanic women. Both the photo-novella and brochure were well received by members of the target audience. Interestingly, whereas teens originally indicated that they did not want to see messages with "cute babies" in them, during the pre-testing, teens liked the babies and explained that the babies brought them back to the message that ultimately doing all of this is to prepare for a baby someday.

Developing and pre-testing the radio PSA was more challenging than the photo-novella and brochure. The original radio PSA entitled "The Facts" was a MTV style, quick pace, fast talking, just-give-out the facts type ad that tested very well with the target population, but not with the project's partners and other health care professionals. They felt the line that said "now that you know all the facts, you would be crazy not to take folic acid" was inappropriate because "loco," the Spanish word for crazy, carries a negative connotation. To address their concerns, a second, more "timid" radio PSA, titled "Shopping," was developed and the original sentence was changed to "now that you know all the facts, it wouldn't make sense not to take folic acid." However, the second version of the PSA did not test well with the teens; they thought it was boring and that the tone and manner of speech sounded staged and artificial and not representative of how teens really talk to one another. After the second

PSA tested poorly, the original PSA was revisited and modified to say “for your own health, or if you are even thinking about having a baby some day, you would be crazy not to take a multi-vitamin with folic acid.” Also, the original opening line of “Listen up Mexicanas” was changed to “Listen up Latinas.” This latter change was made because during pre-testing, many non-Hispanic healthcare providers said the PSA made it seem like folic acid use and birth defects were only a problem among Mexican women and that other Hispanic and non-Hispanic women did not have to worry and were not at risk. Although the revised PSA may still not appeal to non-Hispanic and African American women, it was designed to help broaden the potential receptive population by referring to all Hispanic women, not just Mexican women. It is important to note that although the new opening sentence was intended to be inclusive of all Hispanic women, the language used in the PSA represented specific Mexican dialect.

#### **Phase V: Program Implementation**

The goal of the project thus far has been to distribute these materials to health professionals who work most closely with the target audience. This implementation phase is currently in progress and to date, the folic acid education materials for Hispanics have been distributed to health professionals through a variety of outlets including the March of Dimes Florida Chapter, the Florida Department of Health, Local County Health departments and the University of South Florida. A flash version of the photo-novella is on the March of Dimes Spanish language website—[www.nacersano.com](http://www.nacersano.com) and the materials are also being used as part of the Florida VitaGrant project, a three-year, statewide, vitamin distribution project that aims to “provide folic acid and pre/interconceptional health education to underserved women of childbearing age through provision of free multivitamin/multimineral supplements, folic acid awareness materials and pre/interconceptional health materials” (34). In addition, the materials are available to both individuals and health professionals from the Florida Folic Acid Coalition. A project to assess the materials with other Hispanic ethnicities (Cuban and Puerto Rican women) is also underway. Lastly, the evaluation phases of the campaign are currently underway and will be reported on at a later date.

#### **DISCUSSION**

Despite the strong evidence that daily consumption of 400 micrograms of folic acid can prevent NTDs (7, 8), most women of childbearing age do not consume the recommended dose of folic acid and NTDs remain a serious public health problem. To address the issue, Healthy People 2010 includes an objective that focuses on increasing the number of women consuming 400 micrograms of folic acid daily to 80% (13). In order to reach the Healthy People 2010 objective, public health and other healthcare professionals need to develop and implement evidenced-based programs targeting women who are the least likely to currently take folic acid on a daily basis—non-white, young, and less educated women. The present project represents a culturally sensitive, systematic, evidence-based approach of increasing folic acid awareness and knowledge among both foreign and U.S. born Mexican women of childbearing age. Although previous folic acid campaigns have focused on increasing folic acid awareness, knowledge, and behavior among high-risk Hispanic women, none have specifically targeted the Mexican subpopulation of Hispanic women of childbearing age.

However, it is important to acknowledge the limitations of the study. First, women who were concerned about their immigration status were reluctant to participate and this may have impacted the sample in terms of representativeness within this sub population. Second, whereas the target audience is the Hispanic woman, the need to respond to secondary audiences such as health care professionals and the sponsor played a role in the ultimate product. For example, word use and speech code was carefully attended to while collecting data with these women, however when some health care professionals reviewed the materials, they insisted on “improving the grammar and sentence structure” within the Spanish language versions. These changes may have affected the literacy level and readability for some women. Third, it is not yet known if the materials appear so specific to Mexican women that women of other Hispanic groups do not attend to the message. Additional research is underway to test the perceptions of Cuban and Puerto Rican women. Fourth, male partners of women in the focus groups and interviews were concerned that folic acid was somehow connected to family planning. The migrant camps where some of the research was conducted had recently been inundated with health educators who had



come to talk about pregnancy spacing. This may have affected women's responsiveness to participate as well as their impression of the materials. Yet, despite these limitations, the present campaign represents a well researched and designed social marketing project whose results will be instrumental in advancing health professionals' knowledge and understanding of Mexican women's experiences with pre-conceptional folic acid.

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## REFERENCES

- Andreasen AR. *Marketing Social Change: Changing Behavior to Promote Health, Social Development, and the Environment*. San Francisco: Jossey-Bass, 1989.
- Kotler P, Armstrong G. *Principles of marketing*, 6th edn. Englewood Cliffs, NJ: Prentice Hall, 1994.
- Coreil J, Bryant C, Henderson J, Forthofer M, Quinn G. *Social and Behavioral Foundations of Public Health*. Thousand Oak, CA: Sage, 2001:219.
- Rothschild M. Carrots, sticks and promises: A conceptual framework for the management of public health and social issues behaviours. *J Mark* 1999;63(4):24-37.
- Bryant CA, Forthofer MS, McCormack Brown KR, Alfonso ML, Quinn GP. A social marketing approach to increasing breast cancer screening. *J Health Educ* 2000;31(6):320-8.
- Centers for Disease Control. Recommendations for the use of folic acid to reduce the number of cases of spina bifida and other neural tube defects. *MMWR* [serial online]. 1992;41(RR-14):001. Available at <http://www.cdc.gov/mmwr/preview/mmwrhtml/00019479.htm>.
- Institute of Medicine. *Report of the Institute of Medicine Food and Nutrition Board, Standing Committee on the Scientific Evaluation of Dietary Reference Intakes*. Washington, DC: National Academy Press, 1998.
- Centers for Disease Control and Prevention. Spina bifida and anencephaly before and after folic acid mandate—United States, 1995-1996 and 1999-2000. *MMWR* [serial online]. 2004;53(17):362-5. Available at <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5317a3.htm>.
- Williams LJ, Rasmussen SA, Flores A, Kirby RS, Edmonds LD. Decline in the prevalence of spina bifida and anencephaly by race/ethnicity: 1995-2002. *Pediatrics* 2005;116(3):580-6.
- Anencephaly Support and Information website. Available at <http://anencephaly.net>. Accessed September 10, 2005.
- March of Dimes website. Available at [http://www.marchofdimes.com/pnhec/4439\\_1224.asp](http://www.marchofdimes.com/pnhec/4439_1224.asp). Accessed September 10, 2005.
- The Gallup Organization. *Folic acid and the prevention of birth defects: A national survey of pre-pregnancy awareness and behavior among women of childbearing age, 1995-2004*. Princeton, NJ, 2004; Publication no. 31-1897-04.
- U.S. Department of Health and Human Services. *Healthy people 2010: Understanding and improving health*, 2nd edn. Washington, DC: U.S. Government Printing Office, 2000.
- Centers for Disease Prevention and Control. Folic acid awareness, knowledge, and behavior change in 2000: How are we doing? [Campaign Update 2003]. Available at: <http://www.cdc.gov/doc.do/id/0900f3ec8000e5f1>. Accessed January 6, 2005.
- Ahluwalia IB, Daniel KL. Are women with recent live births aware of the benefits of folic acid? *MMWR* 2001;50(RR-6):3-14.
- Feuchtbaum LB, Currier RJ, Riggle S, Roberson M, Lorey FW, Cunningham GC. Neural tube defect prevalence in California (1990-1994): Eliciting patterns by type of defect and maternal race/ethnicity. *Genet Test* 1999;3(3):265-72.
- Population Projections Program, Population Division, U.S. Census Bureau. *Projections of the resident population by age, sex, race, and Hispanic origin: 1999-2100*. Washington, DC: US Census Bureau (NP-D1-A) 2000.
- Hispanic Marketing and Advertising Group website. Available at <http://www.hispomag.com/market.html>. Accessed January 8, 2005.
- Xpress Press. International marketing executive launches Lopez-Martin & Associates [News Bulletin 2002]. Available at <http://www.minorityprofessionalnetwork.com/edited/News/Lopez-Martin.htm>. Accessed January 8, 2005.
- Fisher CB, Hoagwood K, Boyce C, et al. Research ethics for mental health science involving ethnic minority children and youth. *Am Psychol* 2002;57(12):1024-40.
- Gonzalez Castro F, Garfinkle J. Critical issues in the development of culturally relevant substance abuse treatments for specific minority groups. *Alcohol Clin Exp Res* 2003;27(8):1381-8.
- Kagawa-Singer M, Kassim-Lakha S. A strategy to reduce cross-cultural miscommunication and increase the likelihood of improving health outcomes. *Acad Med* 2003;78(6):577-87.
- American Marketing Association. Marketing news: Lingua franca. January 3, 2000. Available at <http://www.hispanic-research.com/home/MNLinguaFranca.pdf>. Accessed January 8, 2005.
- Social Marketing Institute. Centers for Disease Control and Prevention: National diabetes education program Hispanic/Latino campaign. Available at <http://www.social-marketing.org/success/cs-ndephispanic.html>. Accessed February 3, 2005.
- March of Dimes Birth Defects Foundation. March of Dimes launches national folic acid education campaign targeted to Hispanic women. Available at: <http://www.marchofdimes.com/aboutus/791-1801.asp>. Accessed February 3, 2005.
- Frias JL, Hauser KW, Johnson DR, Mardon RE. Neural tube defects in infants of Hispanic origin: Florida 1996-1997. *Florida Health Care J* 2001;2(2):2-7.
- Werler MM, Shapiro S, Mitchell AA. Periconceptional folic acid exposure and risk of occurrent neural tube defects. *JAMA* 1993;269(10):1257-61.
- Bravo M, Canino GJ, Rubio-Stipec M, Woodbury-Farina M. A cross-cultural adaptation of a psychiatric epidemiologic instrument: The diagnostic interview schedule's adaptation in Puerto Rico. *Cult Med Psychiatry* 1991;15(1):1-18.

29. Collins MM, O'Leary MP, Calhoun EA, Pontari MA, Adler A, Eremenco S, Chang CH, Odom L, Litwin MS. Chronic Prostatitis Collaborative Research Network. The Spanish National Institutes of Health-Chronic Prostatitis Symptom Index: Translation and linguistic validation.
30. Qualis Research Associates. The ethnograph for windows. [Computer software]. Denver, CO, 1998.
31. Miller WL, Crabtree BF. Clinical research. In: Denzin NK, Lincoln YS, editors, *Strategies of Qualitative Research*, 2nd edn. Thousand Oaks, CA: Sage, 2003:397–434.
32. Borg WR, Gall MD. *Educational research: An introduction*, 5th edn. White Plains, NY: Longman, 1989.
33. Auger S, Colindres M. *How Lucky I Am to Know About Folic Acid*. Aprendo Press, 2000.
34. March of Dimes website. Available at [http://www.marchofdimes.com/files/PR\\_Jensen.ppt](http://www.marchofdimes.com/files/PR_Jensen.ppt). Accessed September 15, 2005.