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## Imagined Anatomy and Other Lessons from Learner Verification Interviews with Mexican Immigrant Women

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### Abstract

**Objective**—To identify clearer, learner-preferred, educational approaches for aspects of cervical cancer education found to be difficult to understand for low literacy, Mexican, immigrant women.

**Setting**—Kansas City, Kansas; Garden City, Kansas; San Antonio, Texas.

**Participants**—Forty-five Mexican immigrant women in the United States for five years or less, ninth grade education or less, and predominantly Spanish speaking.

**Methods**—Interviews were conducted to evaluate preference and best comprehension among options for specific cervical cancer educational elements, including reproductive system terminology, the purpose of Pap tests and meaning of results, Human Papilloma Virus, and illustrations of anatomy and PAP procedure.

**Results**—We identified terminology, translation, content, and illustrations preferred by participants and areas of inadequate existing knowledge needed for comprehension of concepts being taught. Analogies, illustrations, and introduction of medical terms in conjunction with equivalent common Spanish terms were effective ways of building bridges from existing knowledge to new knowledge. Participants desired detailed information and shared new information with others

**Conclusion**—We learned the importance of assessing patients' existing body knowledge. The detail desired by participants challenged common simplification approaches to teaching low literacy learners. Participant willingness to share information challenged ideas of cultural taboo. Results provide evidence for more effective delivery of women's health education and call for further research on best approaches to teaching low literacy learners.

### Keywords

cervical cancer; health literacy; learner verification and revision; women's health; immigrant health; Mexican culture

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Cervical cancer is a leading cause of cancer death among women in underdeveloped countries. In regions of Mexico and Central and South America, cervical cancer has been widespread and ranks higher than AIDS, childbirth conditions, tuberculosis, and stomach, lung, and breast cancers in disease burden and years of life lost (Hunter, 2002, 2005, 2006;

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International Agency for Research in Cancer [IARC], 2008; Parkin et al., 2008; Yang, Bray, Parkin, Sellors, & Zhang, 2004). Efforts to control cervical cancer in these regions have been largely unsuccessful, and health behaviors, perceptions and fears travel with immigrants to the United States. Between 1998 and 2003, cervical cancer incidence among Latina women in the United States was nearly 70% higher than that of non-Latina women, with Latinas twice as likely to die of the disease (American Cancer Society, 2011; Watson et al., 2008). Despite national efforts to provide screening to underserved women, this risk differential has not improved in a population that is increasing in size in the United States (Tangka et al., 2010).

With rising concern over health disparities, researchers have sought to identify factors related to low use of cervical cancer screening among Latina women. Abundant literature exists on behavioral, social, and cultural factors that influence low screening, high incidence, and mortality rates of cervical cancer in Latina populations (Borrayo, Thomas, & Lawsin, 2004; Carrasquillo & Patis, 2004; Chavez, McMullin, Shiraz, & Hubbell, 2001; Corbie-Smith, Flagg, Doyle, & O'Brien, 2002; Garbers & Chiasson, 2004; Lindau et al., 2002; Scarinci, Beech, Kovach, & Bailey, 2003). Among these factors, basic education and health literacy are critical elements to address in educational interventions. Low literacy influences health behavior, is linked to poor health status, and is a more accurate predictor of cervical cancer screening than ethnicity or education. Women with low functional health literacy in Spanish are 16.7 times less likely to have had a Pap test than those with adequate to marginal health literacy (Garbers & Chiasson, 2004; Lindau et al., 2002; Rudd, Kirsch, & Yamamoto, 2004).

Cervical cancer disparities have also prompted strategies to increase screening in this population. Patient/public education materials have been produced in Spanish and disseminated in hard copy and online by a variety of organizations and companies. In more comprehensive approaches, community based participatory educational programs have been developed involving lay community health advisors (CHAs) or promotoras de salud to deliver cancer prevention messages. Examples of these include Esperanza y Vida (Erwin et al., 2010), por la Vida Cuidanandome (Navarro, Rock, McNicholas, Senn, & Moreno, 2000), and outreach programs for Latino farm workers and rural women (Meade, Calvo, & Cuthbertson, 2003).

Social support, through the use of helpers such as CHAs, has been shown to enhance screening behavior. Related to this, narrative (such as cancer survivors' stories) can be an effective technique for cancer control, in part for its ability to provide surrogate social connections (Kreuter et al., 2007). These programs have sought to address "macro" level cultural and social barriers to cancer prevention. What has been missing, however, is a close look at the *micro* units of the cervical cancer education: the words, phrases, and images translated into Spanish and verification from Latina learners that those words, phrases, and images are understood as intended.

Our study, designed to address this gap, was based on a preliminary study in which the primary author conducted in-depth interviews with 18 Mexican immigrant women in a Midwestern city (Mexicans represent the largest faction of Latino immigrants) to explore their knowledge of cervical cancer and prevention, to identify learning needs, and to compare learning needs with the content of patient education materials available in local clinics used by immigrant populations. Findings revealed discrepancies between learning needs and educational content related to wording (Spanish translations), readability level, structural format, and visual images, all which seemed likely to create learning barriers for Mexican immigrant women. In follow-up, a multisite learner verification study was conducted and is described here. Objectives included the following: to further explore the

learning impact of troublesome elements of cervical cancer education found in the prior study, to evaluate responses to various presentations of those elements, and to identify preferred and best understood options for cervical cancer educational in this population.

## Conceptual Framework

This research was grounded in constructivist epistemology (Guba & Lincoln, 1994) and specifically in constructivist learning theory. From the education field, constructivist learning theory draws on developmental theories of (Piaget, 1977) and (Kelly, 1991) and suggests that learners develop ways of understanding the world and making sense of new information by associating it with what they already know. What they already know has been constructed from life experiences and may differ from that taught in formal settings (Bulman, 2005). If new information cannot be assimilated into existing knowledge, the new information must be altered to fit, or the old way of thinking must be reconstructed to accommodate it (Lattuca, 2006; Ubbes, Black, & Ausherman, 1999). How new meanings are negotiated, therefore, is important in determining if the intended message in patient education matches the received message.

Constructivist learning theory is very applicable to immigrants facing new health care systems as it supports assessing learners from multiple perspectives, encourages sensitivity to learners' previous experience, acknowledges possible differences between learner and instructor goals and seeks to embed learning in social context (Ernest, 1995; Honebein, 1996; Hunter & Krantz, 2010; Jonassen, 1991). Although constructivism has been applied in health-related activities (Bellefeuille, 2006; Neimeyer, 2006; O'Callaghan & McDermott, 2004; Walter, 2006), this study fills a gap by applying constructivist learning theory to cancer prevention education. The interview questions and analysis of findings were guided by concepts from constructivist learning theory and learner verification and revision (Doak, Doak, & Root, 1996).

## Design

### Learner Verification Interviews

We used a form of learner verification interviews adapted from the process of learner verification and revision (LVR) described by Doak, Doak & Root (1996.). The goal of LVR is to achieve suitability of an educational message (literacy level, language, cultural appropriateness, and relevance) for a target audience. Mismatches between learner and instructor knowledge and goals, unsuitable design and content are often uncovered, allowing for revisions to be made to improve effectiveness (Doak, Doak, & Meade, 1996a; Flagg, 1990; Tessmer, 1993; Weston, LeMaistre, McAlpine, & Bordonaro, 1997). When compared to other qualitative methodologies, LVR interviews are similar to formal focused ethnographic interviews in that they are conducted face to face, allowing for simultaneous observation; can take place in a naturalistic settings; use pre-set questions, but are semi-structured in that questions can be added to obtain clarity for both investigator and participant, and seek to understand others' perspectives.

The process of LVR was popularized in the field of education in the 1970s (Baranski, 1976; Stolovitch, 1982) and was brought to the forefront of health care by Leonard and Cecilia Doak who encouraged its use in evaluation of health education materials for low literacy learners. This process is typically used to evaluate an entire educational message, such as a pamphlet or DVD. We adapted LVR interviews to focus on specific elements of cervical cancer education identified as potential barriers to learning. The elements evaluated in the interviews included the following: (a) terminology related to the female reproductive system, (b) the purpose of a Pap test, (c) the cause of cervical cancer, (d) the meaning of Pap

results, and (e) illustrations of anatomy and Pap procedure. For each element, options of wording, images, and/or approaches to teaching were evaluated for preference, comprehension and relevance to participants' existing knowledge.

## Setting

Research sites included San Antonio, Texas; Kansas City, Kansas and Garden City, Kansas. These sites were chosen as areas that represented different degrees of assimilation and acculturation among immigrant populations. The terms *assimilation* and *acculturation* are multi-factorial, dynamic paths including social, cultural, spatial, familial, educational, economic, language, and legal aspects (Allen & Turner, 1996; Durand, Massey, & Zenteno, 2001; Honig, 1998; Jasso, Massey, Rosenzweig, & Smith, 2005; Penaloza, 1994; Pulido, 2004; Smith, 2003).

San Antonio is 50 miles from the Mexican border, and approximately 60% of the population is of Latino descent; many live below poverty level and are monolingual Spanish speakers (MetroHealth, 2005). While San Antonio becomes a permanent home for some immigrants, it also acts as a receiving community for newcomers prior to dispersal to other locations. Kansas City, situated on the border of Kansas and Missouri, has a long history of immigration. Mexicans once herded cattle from Texas to Kansas City stock yards and then settled in the area. Of the total population, 6.9% of residents in 2000 were of Latino origin, with the majority of Mexican origin (diversitydata.org, 2012). Garden City, Kansas, has become diversified by the influx of immigrants coming to work in meat packing plants. The population at the time of the study was 43.3% Latino, compared with 7% for Kansas overall (United Methodist Mexican American Ministries [UMMAM], 2005). Many residents are new immigrants with limited English, low income, and low educational level.

## Participants

A purposive sample of Mexican immigrant women was recruited through a trusted community agency at each of the three sites. First generation immigrants were chosen, as they are more likely to have low levels of education and literacy, low income, low English proficiency, and more conflicting models of cultural knowledge about disease and prevention than later generations. Inclusion criteria included having been born in Mexico, having lived in the United States for five years or less, having completed nine grades or less of formal education, and speaking predominantly Spanish. Fifteen women were interviewed at each site for a total of 45 interviews. A sample size of 30 to 50 is recommended for in-depth interviews across various research strategies and in this case to obtain a level of confidence sufficient for materials that will have national distribution (Doak et al., 1996a; Morse, 1994). The size of the sample needs to be large enough to provide a sense of saturation yet small enough to obtain and manage depth of information. Each site recruited three age groups, providing a total of 15 women between the ages of 18 and 30, 15 between 31 and 50, and 15 older than 50. Permission to conduct this study was obtained from the University of Missouri-Kansas City Institutional Review Board.

## Procedures

**Preparation phase**—As a first step in developing the LVR interviews, educational elements were chosen for evaluation. An educational element is one aspect of the entire educational message. The evaluation of specific elements of an educational message represents the novel adaptation of LVR interviews in this study. The cervical cancer education message, which was earlier compiled from a variety of patient education materials, was deconstructed into elements and those that had been shown to be potentially troublesome for effective learning among the target population in a preliminary study (Hunter, 2005) were chosen for evaluation. For each element, element option sets were

developed. These included three to six alternative approaches for presenting the element, such as different wording or visual images. An order for evaluating the elements was determined and interview questions written for each element.

The development of interview questions was guided by five concepts drawn from constructivist learning theory and from the LVR process as described by Doak, Doak and Root (1996). These included (a) comprehension of the meaning of the element as intended; (b) connect-ability, the ability to assimilate the meaning of the element within existing knowledge; (c) bridge construction, ways of introducing new information that tie it meaningfully to existing knowledge, (d) persuasion, i.e., does improved comprehension motivate behavior (per report), and (e) re-teach-ability, i.e., if the participant is asked to share the educational element with a friend or family member, would the re-taught message match the intended message.

Element option sets and interview questions were developed in English then translated into Spanish through a three-step process. Initially, a trained medical interpreter/translator translated the materials from English to Spanish. A second trained interpreter/translator back-translated the Spanish version to English. Third, the two translators and the principal investigator (PI) discussed and reconciled differences in a process described as *centering* (Pasick et al., 1996) to obtain the best content equivalence across the two languages. The interview questions were pilot tested with 10 individuals in the Kansas City area who met the study criteria to evaluate the need for revisions to improve the validity of the process. The following questions were considered:

- Were the right questions being asked?
- Did translations elicit responses that answered intended questions?
- Were questions asked in the right order? Did early questions bias later questions?
- Were the educational elements and element option sets adequate? Were they understandable as intended? Were there too many, too few, or excessive redundancy?
- Were there points that seem to cause embarrassment or resistance?
- Did the participant become bored or impatient?

In the Garden City and San Antonio sites, interpreters reviewed the English and Spanish versions of materials to check for needed changes based on regional variations in dialects.

**Interview phase**—The PI (first author) conducted all interviews with an interpreter fluent in Mexican-Spanish and English. Interviews were recorded for transcription (in Spanish and English) and lasted from one to two hours. The interview process remained flexible to answer participant questions about topics of discussion. When new information was presented, the investigator often used analogies to connect new information to existing knowledge. Three months post-interview, participants were called, asked to respond to several multiple choice questions to check retention, and asked if they had shared new information with others.

**Analysis**—Identification of more relevant presentation for each element was based on a complex content analysis which involved (a) consensus of the women interviewed, (b) contextualization of interview responses within the five guiding themes introduced in Phase I, (c) identification of differing consensus and/or contextual patterns based on site, age group, educational level, and other acculturation factors, and (d) responses to preliminary findings by focus groups organized at each research site. Participant responses were grouped

by elements for analysis, counts, and theme identification (Reissman, 2008). By simple count, the consensus of women's preferred options for presentation of each element were determined. A second step involved contextualization of interview responses within the guiding themes introduced in the Preparation Phase. Researchers used data displays to monitor for patterns and relationships among contextual factors within and between sites (Miles & Huberman, 1994).

Findings (see Table 1) were summarized and presented to a focus group at each research site, composed of the site coordinator, interested staff of the social organization where interviews had been held, a local health practitioner working with immigrant women, and members of the target population, some of whom had participated in the initial interviews. Notes were made regarding their responses and integrated into the final analysis.

## Results

### Element One: Terminology Related to the Female Reproductive System

To further explore women's knowledge of their bodies, we initially asked participants to point to where within an outline of the female body various organs or body parts were located. Participant recognition of different terms for the same organ was also explored. Close to 90% of women correctly located most terms, and cervix was the least known. However, 76%–84% correctly placed the cervix in the lower pelvic region when it was referred to by the names *cuello* (neck) or *entrada de la matriz* (entrance of the uterus); only 31% could define or locate the cervix when it was referred to by the term *cerviz*. These different terms for the cervix were not commonly recognized as equivalent. To teach these terms, a learning bridge was created by comparing the new concept to something familiar, a pear. Using an anatomical model, participants were shown how the uterus is shaped like a pear turned upside-down. The lower narrow part could be compared to the cervix, which forms a canal between the uterus and the vagina. The pear analogy was well retained and later shared with others by multiple participants.

Before the terms and relationship between the cervix and the uterus could be discussed, it was necessary to know what each woman called the uterus. They were asked, "What do you call the organ where babies are formed?" Of three options, *la matriz*, *el utero*, and *el vientre* plus an "other" (*otro*) option, only 11% of the women chose the term *el utero*, even though this was the term most commonly found in Spanish language educational materials. Women most commonly used the term *la matriz* (49%) and 38% used the term *vientre*. Many women stated that they had not known that *el utero* and *la matriz* were words for the same organ. *El vientre*, although often used, varied considerably in definition and envisioned location among our participants (as well as in dictionary definitions and regional dialectics).

When the variations in the use of the term *vientre* began to emerge in interviews, we pursued a more in-depth understanding of the meaning of this term for the women. By having some of the women draw pictures of the "female parts" inside their bodies, we were able to clarify if and how they differentiated between *el vientre* and *la matriz*. We discovered that many participants knew the words but did not fully understand the organization of their reproductive organs. Drawings revealed three main images. Some women considered both the terms *matriz* and *vientre* to be words for the uterus. Other women envisioned the *matriz* inside the *vientre*, which was perceived to be the abdominal space. Still others imagined the *matriz* to be more like the vagina, where sex took place, but they believed babies formed in an organ higher in the abdomen, the *vientre*. Understanding their existing knowledge through their drawings provided us with a starting point for education and discussion.

## Element Two: The Purpose of the Pap

All of the women had heard of a Pap test and most had learned about the test through contact with the healthcare system; only 8 of 57 listed information sources as family members. Women's preferences among five explanatory options about Pap tests (see Table 2) varied, but 98% preferred descriptions that involved the concept of prevention and finding early changes such as *precancerous lesions* or *abnormal cells, before you know they are there*, instead of a description that stated that the Pap was a test for cervical cancer.

When participants were asked what a cell (*celula*) was, most could not define it, and many thought that it was something abnormal that invades the body. Cells were explained by the researcher as units that normally make up the entire body. One cell in the body was compared to something familiar: one bean in a pot of beans or one granule of corn in a tortilla. Women contributed other analogies: one grain of sugar in a bowl or a kernel on an ear of corn.

## Element Three: HPV as Causal Factor

Few women knew that a virus was linked to cervical cancer, and many were unclear what a virus was. Some had heard about a vaccine for Papilloma virus for young girls but did not connect it with cervical cancer prevention. The element option list provided three different descriptions of HPV and its causative role in cervical cancer. Each of the three descriptions of HPV had a different degree of detail. Of the three options, 71% of women preferred the most detailed and complex description including sexual transmission of HPV.

## Element Four: Meaning of the Pap Results

Women reviewed three options providing different aspects of Pap results. One option discussed the difference between positive and negative test results and explained that abnormal findings could include inflammation, dysplasia, infections, or more serious signs of cancer. A second option added what next steps might be recommended and emphasized timely follow-up. A third option presented all of the above and details about cytological classification terminology and degrees of dysplasia accompanied by images of cell changes. When asked which of the three provided the information they most wanted to know about, women consistently chose the third option. They indicated that they wanted to know all the information from these differing examples and that they wanted detailed information, including what cells looked like, how dysplasia could worsen into cancer, technical terms for the various levels of dysplasia, and what happened next if they had abnormal results. All wanted pictures accompanying the words. In these discussions, the terms *positive* and *negative* results often confused women. They understood *negative* as something bad instead of no abnormal findings.

## Element Five: Illustrations of Anatomy & Pap Exam

We anticipated that many of the anatomical pictures within pamphlets would be difficult for women with lower levels of education to understand, especially cross-sections of the body and magnifications of parts of larger illustrations. Findings showed, however, that participants were able to understand both frontal views and side cross-sectional illustrations of reproductive anatomy fairly well. The most confusing illustrations for the women were those with sections (such as the cervix) that were circled and then enlarged in another area of the illustration (where cervical cells or dysplasia could be shown, for instance).

Participants expressed preferences among the options based on color, clarity, comfort, and realism. Among the frontal views of female reproductive anatomy, 37.5% preferred those in which reproductive organs were shown in a realistic looking torso/pelvis, and 43% preferred

those which showed the organs alone, with the uterus illustrated as a whole solid organ versus a cross sectioned view and without surrounding body parts.

Among the cross-sectional side views, 20% preferred illustrations in which more information was included, such as the preparation of the sample on the slide. Most women preferred color to black and white but preferred that the color be used discriminatively to clearly denote the uterus from other organs. They also preferred images in which the speculum appeared smaller, which was less threatening to the women. The illustrations involving magnified views of specific sections were confusing for the women and required explanation. No preferences were elicited.

Two pictures were shown of a woman in position for a pelvic exam. One was in color and showed a woman on an exam table with her knees up but not obviously apart. She was completely covered. The second was in black and white, and the woman's feet were in stirrups, her legs separated, and lower legs uncovered. More women (58%) preferred the latter picture, even though it was in black and white, because "this is how it really is." Less than 43% preferred the colored picture of the more covered woman in the first picture. Very few were offended by pelvic exam illustrations, though some thought that older women might be. Of the women older than age 50, 67% preferred the black and white illustration, and 31% preferred more modest illustration. This suggests that cultural taboos against looking at or talking of sexual or private parts should not be assumed to be universal among older Mexican women. Several women did note, however, that although they were comfortable viewing such images in private or with their health care providers, they were embarrassed to pick up pamphlets of a personal nature from a rack in a waiting room, for instance, when other people were present.

### **Added Findings from Follow-Up Phone Calls and Focus Groups**

Another key finding of the study was the willingness of the women to share information with others once they understood it, which challenged our assumption of cultural taboo against talking about intimate matters. In telephone follow-ups, 87% of participants reported sharing information they learned with friends and family. Focus group participants shared the opinion that many women did not talk with their daughters about women's health issues, not just because of taboo, but because they were never taught and did not know what to teach their children. As one participant shared, "Women don't want to be embarrassed in front of their kids."

## **Discussion**

The cervical cancer educational message is comprised of a variety of elements and is found in many formats: printed materials, audiovisuals, television advertisements, one on one teaching interactions in clinical settings, and within larger scale educational programs. While larger scale community educational programs have focused on breaking down macro level social and cultural barriers to health education, this research has focused on the micro level aspects of barriers to learning created by misunderstood words or pictures.

In this article, we summarize findings of learner verification interviews with 45 first generation Mexican immigrant women with 9<sup>th</sup> grade or lower educational levels. Findings provide evidence to guide recommendations for educational materials production and community and clinical patient educational practice. They also provide insight into the usefulness of LVR and constructivist learning theory in health promotion practice.

The LVR method was an effective approach to use in exploring the impact of elements of cervical cancer education found to be potential learning barriers in a preliminary study.



Exploration of how the women comprehended the content of various educational explanations helped identify areas within the message where confusion or inaccurate conclusions could be drawn. Within these discussions, we learned what women knew, what information they lacked, and what prevented them from effectively building on existing knowledge. The women taught us about their preferences of words and pictures, their eagerness to learn extensive and detailed information, and their willingness to share information when they understand it.

Our adaptation of LVR demonstrated that the process can be usefully applied to specific elements of an educational message as well as to educational products as a whole. Though our success in using LVR, this process has been shared by other researchers (Doak, Doak, & Meade, 1996b; Quinn et al., 2006; Vadaparampil & Pal, 2010), but it has not been used extensively in the United States. It has been used in Canada, where recent applications for gaming and simulation illustrate the potential for newer learning approaches (Kaufman & Sauve, 2010).

Constructivist learning theory, which stresses that learners build new knowledge based on existing knowledge, proved to be a meaningful framework by which to interpret our findings. Interviews revealed that the most essential missing piece of existing knowledge was that of basic body structure and function. This lack of this knowledge more than the other issues created an inadequate cornerstone upon which to build new health knowledge. When women encountered new information that did not logically build on existing knowledge, they were forced to fill in the gaps with their imaginations based on life experiences. This was exemplified by the three models of envisioned female reproductive organs described by participants.

Inadequate knowledge and understanding of anatomy, particularly as related to Pap tests, was also observed by Erwin et al. (2010) among Mexican and other recent Latino immigrants. The same knowledge gap has been noted in a variety of populations with little formal education (Alvarez, 1996; Boonmongkon, Pylypa, & Nichter, 1999; Gregg, 2000; Hubbell, Chavez, Mishra, & Valdez, 1996; Wood, Jewkes, & Abrahams, 1997). Based on this evidence, it is clear that this type of information gap is not limited to Mexican immigrant women or to cervical cancer education content but likely involves many individuals who have had little opportunity for education and applies to all health education.

Our findings are congruent with the tenets of constructivist learning theory, however, this theory has not been among those frameworks previously applied to research and interventions aimed at overcoming barriers to cervical cancer screening among Latinas. Theories that have been used include the health belief model, theory of transcultural care and universality, social support theory, social learning theory, diffusion of innovations theory, and the PEN-3 model, which has guided some of the community programs (Airhihenbuwa, 1992; Allison, Duran, & Pena-Purcell, 2005; Erwin et al., 2010; Scarinci et al., 2003). Our findings further confirm the appropriate place for a constructivist paradigm in health promotion education as promoted by others over the last two decades (Labonte & Robertson, 1996; Lattuca, 2006; Lewis, 2006; Lincoln, 1998; Ubbes, 1997; Ubbes, et al., 1999). Constructivist learning theory seems particularly applicable to examining the micro aspects of health promotion messages.

Findings related to participants' preferred wording, illustrations, and degree of detail can guide the development of cervical cancer educational content in any media format. Common sources of printed and online Spanish language materials include National Institutes of Health, National Cancer Society, American College of Obstetrics and Gynecology, American Academy of Family Physicians, Cancer Research Foundation of America, Krames

and The Stay Well Company, and American Reproductive Health Professionals. Despite the seemingly high quality of some of these materials, all that we have examined include one or more areas, such as those identified in this study, that have potential to block learning for low literacy, primarily Spanish speaking populations. All can be improved with minor changes in word choice, translation, illustrations and explanations as indicated in these findings. Examples of issues leading to insufficient comprehension that could be easily improved in educational products were translation of materials using Spanish terms that were not commonly used by these women (uterus vs. *matriz*), lack of inclusion and comparison of various terms the women might encounter that have equivalent meanings (cervix and *cuello de la matriz*), lack of thorough explanation of medical and anatomical terms (cell and virus), and words without accompanying illustrations.

## Conclusions and Implications

The findings of this study were not intended to inform a single intervention but to have cross-cutting application for materials production, practice, policy and research. Our participants' desire for detailed versus simplified information has significant implications for production of materials intended to be sensitive to the needs of low literacy learners (Centers for Disease Control and Prevention [CDC], 2010; Doak et al., 1996a; National Cancer Institute [NCI], 2010). The typical approach is to simplify the information, use small words, focus on need-to-know versus want-to-know information, and to emphasize recommended behavior versus greater knowledge and understanding. Most of the women in this study, however, wanted detailed information accompanied by pictures and explanations using both familiar Spanish words and the English/Spanish medical words that they would hear and see in clinical settings.

A major implication for clinical practice is the importance of assessing patients' commonly used vocabulary and existing body knowledge related to the topic of health education in order to identify an appropriate starting point for health teaching. Another important finding for practitioners is the women's desire to know. We consistently observed participants' willingness to engage and participate in long interviews and noted that many seemed to hunger for information. Similar observations, even echoing the term *hunger*, were reported by Meade, Calvo, and Cuthbertson (2002). The women's demonstrated desire to know and willingness to share new knowledge challenged assumptions of cultural taboo against speaking of private matters such as body parts or procedures such as Pap tests. The following are tips for clinical settings based on our findings:

- Read the patient education materials in your facility and examine Spanish translations for trouble spots as identified in this article (do this with a medical interpreter as needed).
- When using medical interpreters, instruct them to interpret meaningfully to the patient versus literally, to ask patients about and to use words that are most familiar to her, and to explain other terms or ones that the provider is using that are similar or equal to the familiar terms used in initial interpretation.
- Helpful ways to find an appropriate starting point for health education include asking the patient to point to where, in a body outline, an organ is located or having her draw a picture of how she imagines that an organ or system is situated in the body.
- Provide a basic explanation of related body structure and function with pictures or models, and use analogies such as the uterus looks like a pear turned upside down to help bridge new information to existing knowledge.

- Women may be excited to have new knowledge. Affirm with them that their new knowledge is something of value that they can share with others.

Our findings also have implications for community and public health educational programs. The importance of an initial assessment of body knowledge of individuals who have entered training to be lay community health advisors is one implication for community education programs using CHAs. This assessment would be important to ensure that trainees obtain the basic building blocks on which to accurately build new information with which to teach others. The modeling of this type of assessment could then be utilized by the CHAs in community. CHAs could also be taught to use analogies as bridge-builders between existing knowledge and new information. Teaching narratives (Kreuter et al., 2007) can incorporate common misinterpretations, or instances of imagined anatomy to which other learners could relate meaningfully.

In addition to implications for practice discussed above, findings speak to several priority recommendations for cancer research, health professional education and cross-cultural communication outlined in the agenda of *Redes en Accion*, a major national cancer and prevention control network among the National Cancer Institute's Special Populations Networks (Ramirez et al., 2005). Findings stimulate a need for new research on educational interventions informed by these findings; comparisons of Mexican women's preferences with other subpopulations of Latinos; new approaches to teaching low literacy learners; and the impact of education on changing cultural norms.

A potential limitation of the study was the degree of flexibility allowed in the interview and the addition of new questions over the course of the study (such as the questions about *vientre* vs. *matriz* and the request for participants to draw pictures). These strategies, however, are congruent with the nature of iterative interviewing, which is appropriate in qualitative methods. This means that the process of repeated interviews aims at a desired goal (understanding) wherein each repetition of the interview process builds on the results of those prior. In analysis, where the responses to interview questions were counted, however, this degree of difference between interviews resulted in smaller Ns for some questions.

One could question whether the more desired outcome of cervical cancer health education is new and accurate knowledge or behavior change leading to increased cervical cancer screening and early diagnosis. We would argue that the greatest achievement is knowledge. With knowledge, women can make their own health care choices rather than simply adhering to what providers choose for them. More importantly, knowledge allows the social reproduction of health (Janzen, 2002). That is, when women and men know what to teach their children about their bodies and about health, knowledge will be passed on, and behaviors are much more likely to shift when based on knowledge than on silent obedience.

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**Callouts**

1. We sought to identify more relevant options for the elements of cervical cancer education that blocked learning for low literacy Mexican immigrant women.
2. Many participants knew terms but not the organization of their “female parts.” Having participants draw pictures illustrated three different models of imagined anatomy.
3. Participants’ consistent desire for detailed, extensive rather than simplified information has significant implications for teaching low literacy learners.

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**Table 1**

## Summary of Key Findings for Each Educational Element

EDUCATIONAL ELEMENT	KEY FINDINGS
Element 1: Terminology related to the female reproductive system	<p>The word <i>cervix</i>  Only 31% could define or locate the cervix when referred to in Spanish as <i>el cerviz</i>.  Equivalence was not commonly recognized between the terms <i>cerviz</i>, <i>cuello</i> (neck) and <i>entrada</i> (entrance) of the uterus.</p> <p>Common names for the uterus  49% preferred the term <i>la matriz</i>.  <i>El vientre</i> was used by 38%.  <i>El utero</i> was used by 11%.</p> <p>Overall reproductive system  Many women knew the words but not the organization of their female parts.</p>
Element 2: The Purpose of the PAP	<p>98% of women preferred descriptions of the PAP test that involved the concept of prevention and finding early pre-cancerous changes rather than a description that stated that the PAP was a test for cervical cancer.</p> <p>The word <i>cell</i> was often unfamiliar.</p>
Element 3: HPV as Causal Factor	<p>Few women knew of a viral link to cervical cancer and many did not know what a virus was.</p> <p>Some had heard about a vaccine for Papilloma virus.</p> <p>71% preferred the most complex description of HPV, including its sexual transmission.</p>
Element 4: Meaning of the PAP Results	<p>The terms <i>positive</i> and <i>negative</i> describing results often confused women.</p> <p>Women wanted detailed information about cellular changes and about next steps if they had abnormal results.</p> <p>All women wanted pictures with the words.</p>
Element 5: Illustrations of Anatomy & PAP Exam	<p>Women, even with low educational levels, were able to understand front and side view illustrations of reproductive anatomy with little help.</p> <p>Very few were offended by pelvic exam illustrations and most preferred a picture that was less modest in design, because "this is how it really is."</p> <p>Magnified views of specific sections of an illustration were the most confusing for the women, requiring explanation.</p>

Table 2

## Element Option Set for Element 2: Purpose of the Pap

The Pap test is a test for cervical cancer. <i>El examen de Papanicolaou es un examen para cáncer cervical</i>	1%
The Pap is a <i>screening</i> test. That means that it can detect problems before you know that the problems are there. <i>El examen de Papanicolaou es un examen de "prevención." Eso significa que le puede detectar problemas, antes que usted sepa que los problemas están allí.</i>	31%
The Pap test can find infection or changes in the cervix that might lead to cancer. <i>El examen del Papanicolaou puede identificar infección o cambios en la cerviz que podrían conducir a cáncer.</i>	14%
The Pap is a test that is used to look for infections or abnormal cells that are <i>pre-cancerous</i> , that is, they might lead to cancer in the cervix later. <i>El Papanicolaou es un examen que se utiliza para identificar infecciones o células anormales que son "pre-cancerosas, es decir, que ellas podrían conducir más enseguida a cáncer en la cerviz.</i>	16%
The Pap can identify infections or early changes in your cervix (before you even know that they are there) that can be treated so that they won't become cancer. <i>El Papanicolaou puede identificar infecciones o cambios previos a cáncer en su cerviz (aún antes que usted sepa que ellos están allí) que pueden tratarse para que no se conviertan en cáncer.</i>	38%