Project Summary

Cervical cancer continues to be the second most common cancer among women worldwide. In Peru, rough estimates place screening coverage between 7-43% of the eligible population. Effective community-based interventions are needed to address screening coverage in the Andean region of Peru, but the development of such interventions are limited by gaps in our understanding of: (1) cultural beliefs toward cervical cancer and HPV; and (2) effective intervention programs targeting specific priority populations, such as indigenous Quechua women. This project is significant because it will positively impact gynecological health among Quechua women through the implementation of a well-executed, participatory, implementation evaluation and social marketing intervention pilot study to maximize screening opportunities. The overall goal of this application is to conduct Rapid Assessment, Response, and Evaluation (RARE) - a rapid ethnographic assessment approach - to evaluate a large cervical cancer screening initiative and use the formative findings to design and pilot a brief social marketing intervention. The social marketing intervention will be aimed to increase screening uptake during the third year of the 3-year screening initiative. The rationale that underlies the proposed research is that interventions using a social marketing strategy will be effective for increasing cervical cancer screening in Quechua populations when such screening opportunities are both convenient and low cost. The two specific aims are to: (1) evaluate the social, behavioral and cultural factors that impact cervical cancer screening uptake among Quechua women from the Cusco, Peru region using RARE; and (2) develop and pilot a social marketing intervention to increase cervical cancer screening uptake and appropriate follow-up care targeted to Quechua women in the Cusco, Peru region. The proposed project is innovative because it will use RARE to conduct an implementation evaluation of the screening initiative and inform the design and piloting of a brief social marketing intervention. The contribution of the proposed research is expected to be the development of a promotional strategy which will consist of photonovella booklets and radio advertisements, and be supplemented by ‘word of mouth’ communications using social network analysis.

A. SPECIFIC AIMS

Despite advances in the prevention of cervical cancer with the introduction of the human papillomavirus (HPV) vaccine and attempts to deliver comprehensive cervical cancer screening programs, women from developing countries in Latin America continue to experience higher rates for cervical cancer morbidity and mortality than women in developed countries. Current estimates for Peru indicate that cervical cancer is the most commonly diagnosed cancer among women with an incidence rate of 34.5 per 100,000; moreover, screening coverage is low, with only 31% of urban women aged 18-29 ever screened – and rough estimates are even much lower among rural women (HPV Information Centre 2010; Paz Soldan, et al. 2008). Similar to other countries in Latin America with high rates of cervical cancer incidence and mortality, in Peru, limited organized screening programs, poor service delivery, and lack of quality control for screening decrease the effectiveness of prevention efforts (Agurto, et al. 2004; Robles, et al. 2009). To respond to these gaps in screening coverage, in February 2011, the National Cancer Coalition and Becton, Dickinson and Company (BD) partnered with CerviCusco to implement the BD Surepath™ liquid-based Pap test by awarding a $1 million grant to provide free screening to approximately 75,000 women over three years in the Cusco, Peru region. CerviCusco is a Peruvian nonprofit organization focused on cervical cancer screening and prevention in Cusco, and the surrounding regions (Ferris, et al. 2006). The complex nature of this unprecedented screening initiative will require marketing of the screening exam, coordination of screening events, routine quality controls of the screening procedures, appropriate follow-up of women with abnormal results, and evaluation of outcomes (Munoz, et al. 2008). The overall goal of this application is to conduct Rapid Assessment, Response, and Evaluation (RARE) – a rapid ethnographic assessment approach - to evaluate the cervical cancer screening program and use the formative findings to design and pilot a brief social marketing intervention (Trotter and Needle 1999). The social marketing intervention will be focused on increasing screening among Quechua women in the third year of the 3-year screening initiative.

Health disparities experienced by women in developing countries like Peru signal the need for innovative approaches to evaluate community perspectives and receptivity of implementation strategies aimed at reducing these disparities and improving the quality of follow-up care. Congruent with the mission of the NIH Fogarty International Center, this application will facilitate global health research and build partnerships between research institutions in the US and abroad. Moreover, this application will build capacity for future community-engaged strategies to stress the value of preventive health care, expanding upon previous clinic-based education approaches. This implementation evaluation study aims to address cervical cancer disparities in Andean Peru by partnering with CerviCusco, which is focused on cervical cancer screening and prevention in Cusco, an Andean city of approximately 400,000, and surrounding regions.

To address potential factors influencing the success of the novel screening program in community practice, Phase 1 of the proposed project will use RARE to conduct an implementation evaluation of the cervical cancer screening program. RARE strategies allow the researcher to collect data expeditiously concerning beliefs and perceptions around health, prevention and treatment of illness, and use of both traditional and biomedical health systems with a combination of methods. The anthropological methods used in this phase include focus group discussions, semi-structured interviews, and ethnographic observations. In Phase 2, formative findings will inform social marketing strategies to increase benefits and reduce barriers to screening through promotion strategies including radio spots and photonovella booklets. In addition, we will conduct a social network analysis survey to identify 'influencers' in women's social networks, who can promote the benefits of screening to peers. This project builds on prior expertise and experience in developing cervical cancer prevention and capacity building programs and a formalized collaborative relationship between CerviCusco and Georgia Health Sciences University (GHSU). The project will be guided by the following *specific aims*:

Aim 1: To evaluate the social, behavioral and cultural factors that impact cervical cancer screening uptake among Quechua women from the Cusco, Peru region using RARE.

Aim 2: To develop and pilot a brief social marketing intervention to increase cervical cancer screening uptake and appropriate follow-up care targeted to women in the Cusco, Peru region.

The proposed study will have significant public health implications and is expected to contribute to efforts to address cervical cancer, a major health problem identified by the World Health Organization. This innovative project incorporates participatory methods, community engagement, and social marketing in stages throughout conceptualization, planning, development, and pilot testing of the intervention. The project addresses the scope of work defined in the funding opportunity announcement, evaluating the social, behavioral, and cultural factors that affect the implementation of an evidence-based screening intervention in a new setting.

B. SIGNIFICANCE

B.1. Cervical Cancer in Peru. Cervical cancer continues to be the second most common cancer among women worldwide. Cervical cancer can be prevented when premalignant changes of the cervix are detected early and treated appropriately. Peru is characterized by exceedingly high cervical cancer incidence and mortality rates, with an age-standardized incidence rate of 34.5/100,000 population (South America overall is 24.1/100,000), and a mortality rate of 16.3/100,000 population (South America overall is 10.8/100,000). Of the approximately 9.5 million women aged 15 and over in Peru, 7.5% are estimated to harbor HPV infection, and among the infected population, 68.3% of cases are linked to high-risk types of human papillomavirus (HPV), types 16 and 18 (HPV Information Centre 2010). The numbers of cervical cancer cases are projected to increase by 84-86% in the 65 and older age group over the next two decades.

B.2. Human Papillomavirus and Cervical Cancer. HPV is easily transmittable through sexual contact; however, the virus can also be transmitted by skin-to-skin contact. Although most women are exposed to HPV, HPV infection only rarely progresses to cervical cancer in the general population. For those who do experience a progression, HPV typically progresses slowly to high-grade preinvasive lesions, and then to invasive cervical cancer. Co-factors related to progression of HPV infection to cervical cancer include high parity, tobacco smoking, duration of oral contraceptive use, and co-infection with human immunodeficiency virus (HIV). HPV is also a factor for anogenital, and head and neck cancers.

B.3. Cervical Cancer Prevention in Peru. Early detection of cervical cancer with Pap tests is the best strategy to reduce incidence and mortality rates in Peru, given that in low resource settings, the cost of the HPV vaccine is out of reach for most Peruvians (Paz Soldan, et al. 2008). However, because of the relatively high costs of the Pap test, previous prevention campaigns in Peru have employed the lower-cost, visual inspection with acetic acid (VIA) screening method (Winkler, et al. 2008). Moreover, because regular cervical cancer screening requires resources for both screening and follow-up, capacity for delivering health education, and regular contact with health care providers who recommend screening, low-resource countries such as Peru face serious challenges in reaching a large proportion of the population (Bayer, et al. 2011). Current national guidelines recommend Pap tests every 3 years for women between 30 to 49 years old. However, the reality is that many women never receive screening. Rough estimates place screening coverage between 7-43% of the eligible population (Paz Soldan, et al. 2008). One large study carried out in 20 of the largest cities in Peru found Pap test coverage to be 31% among young women (18-29 years old) (Paz Soldan, et al. 2008). The study found regional differences also, with women from the Andes significantly less likely to be screened than women from coastal region. Another study found a new cervical cancer screening program in the Amazonian region was only able to screen 36,759 women over a 3-year period (2000-03), a third of whom were new users, reaching 32% of eligible women (Robles, et al. 2009).

B.4. Andean Indigenous Women and Health Access Issues. Amerindians make up approximately 45% of the entire population of Peru. The indigenous people living in the Cusco region are commonly known as Quechuas, descendants of the ancient Incas. The Quechuas are the largest of any Amerindian group, numbering between 9 and 14 million people. Historically, they have been disenfranchised politically, impoverished, and systematically persecuted in Peru. Their native language of Quechua hinders equal advancements experienced by Spanish-speaking Peruvians. While many Quechuas live in Cusco, a city of 350,000, many Quechuas also live in remote rural areas, creating barriers to routine healthcare.

B.5. Barriers to Cervical Cancer Screening in Peru. In low-resource settings such as Cusco, Peru, structural barriers to cervical cancer screening include lack of access to health care, shortage of quality facilities and laboratories (outside of Lima, few facilities can perform cone biopsies or colposcopies), few trained personnel, distance to health care facilities, irregular hours of operation and long waiting times at the facilities, and lack of affordable options for follow-up care. Individual and cultural barriers include lack of a tradition of preventive health seeking behaviors, less exposure to biomedical procedures, low knowledge of cervical cancer, language barriers (for non-Spanish speakers), negative views of health care providers, lack of spousal support for health care seeking, anxiety and fear over potential negative diagnoses and of cancer (possibly related to the normative practice of performing hysterectomies to treat cervical abnormalities), shortage of female providers, and modesty regarding the exposure of one's body (Agurto, et al. 2004; Paz Soldan, et al. 2008).

B.6. Facilitators to Cervical Cancer Screening in Peru. Many providers perform Pap tests during antenatal pelvic exams, and consequently, women who have more children are more likely to receive multiple Pap tests. A multi-country qualitative study identified specific health benefits for cervical cancer screening among Peruvian women including: peace of mind after receiving negative results; sense of control and empowerment over one's own health; and reassurance against detection for other sexually transmitted infections or vaginal

infections (Agurto, et al. 2004). An additional facilitator of cervical cancer screening was social support from friends and family during the screening exam.

B.7. History of CerviCusco. CerviCusco, a Peruvian registered nonprofit association located in Cusco, is committed to improving the health and quality of life of Peruvian women through the primary and secondary prevention of cervical cancer (Ferris, et al. 2006). The CerviCusco clinic was constructed in 2008 and is a medical facility with four exam rooms, laboratory, consultation room, waiting room, reception area, and storage room. CerviCusco also conducts medical outreach campaigns to provide access to care for those women unable to travel to Cusco. CerviCusco collaborates with the Peruvian Ministry of Health, local health care providers, and the community to foster community acceptance and ensure program sustainability.

B.8. CerviCusco Mass Screening Initiative. To respond to gaps in screening coverage, in February 2011, the National Cancer Coalition and Becton, Dickinson and Company (BD) - a company with significant expertise in women's health and cancer - partnered with CerviCusco to implement the BD Surepath™ liquid-based Pap test by awarding a $1 million grant to provide free screening to approximately 75,000 women over three years in the Cusco region beginning in June, 2011. The complex nature of this unprecedented screening initiative will require marketing of the screening exam, coordination of outreach events, routine quality controls, appropriate follow-up of women with abnormal results, collaboration with the private and public sectors, and evaluation of outcomes (Munoz, et al. 2008). If funded, this research study will coincide with years 2 and 3 of this initiative.

B.9. Summary. *This project is significant because it will positively impact gynecological health among Quechua women living in rural, underserved, highland Peru through the implementation of a well-executed, participatory, implementation evaluation and social marketing intervention pilot study to maximize screening outreach opportunities*. To achieve a successful cervical cancer screening program, there must be resources for women to seek appropriate follow-up care in the event of abnormal Pap tests. CerviCusco is working diligently to maintain an integrated quality service infrastructure to facilitate positive outcomes and lower the number of women who present with untreatable, advanced stage cervical cancer. With this mass screening initiative, there is a unique opportunity to engage the community in health promotion and develop innovative social marketing strategies to increase participation rates among the indigenous Quechua population. Community participation has been found to strengthen implementation science (Green, et al. 2009).

C. INNOVATION

The proposed project is innovative because it will use RARE to conduct an implementation evaluation of the screening initiative and inform the design and piloting of a brief social marketing intervention to increase cervical cancer screening among indigenous Quechua women living in the region around Cusco, Peru. This combination of approaches (social network analysis, RARE) to produce formative research for a social marketing strategy is novel. In addition, creating Quechua language photonovellas (*fotonovela* or photographic soap opera booklet) using narratives on cervical cancer prevention is novel. The proposed project aims to include relevant stakeholders in planning and implementation of the social marketing strategy to build community capacity for future community-engaged research initiatives. Future intervention strategies generated from data collected in the proposed project can be disseminated and evaluated. The community-engaged approach will form the basis for potential future behavioral and therapeutic studies of underserved Quechua women and to further reduce incidence and mortality from cervical cancer in Peru.

D. APPROACH

D.1. Preliminary Studies.

D.1.1. Background and Expertise of Study Team. The proposed study aligns with the work that CerviCusco is currently conducting to screen underserved Peruvian women. Our multidisciplinary team brings extensive experience with health education and screening programs for underserved populations. Leadership and scientific direction are provided by **John Luque, Ph.D., M.P.H.** Dr. Luque has extensive experience developing and evaluating community health worker interventions, conducting implementation evaluation research, implementing social marketing programs, and performing ethnographic fieldwork in Andean South America (Luque, et al. 2007; Luque, et al. 2010b; Luque, et al. 2011). The project is supported by an outstanding team of researchers and clinicians with significant expertise in colposcopy, lower genital tract neoplasias, and cervical abnormalities (**Daron Ferris, M.D.**) and primary health care, and indigenous women's health - bilingual in Spanish/Quechua (**Yuleni Flores, M.D.**). We also have enlisted the consultant services of **Jonathan Maupin, Ph.D.**, who will work one-week per year, to assist with the qualitative data analysis and interpretation. Dr. Maupin is an expert on the analysis of structured ethnographic data and is bilingual in English and Spanish. Our team has an outstanding record of accomplishment with regard to study conceptualization and design, implementation, recruitment and data collection, instrumentation, data analysis, and dissemination.

D.1.2. CerviCusco. The CerviCusco medical clinic is staffed by a licensed Peruvian physician (Dr. Flores), nurse research coordinator (Lizett Luy), nurse midwife, and receptionist, as well as international medical providers on a rotating short-term basis. The constant staffing by a Peruvian physician and nurse research coordinator allows cervical cancer prevention activities to continue year-round. Dr. Ferris, an internationally recognized expert in cervical cancer, provides direct patient care at CerviCusco approximately 10 weeks per year. The screening, diagnostic and treatment methods include Pap tests with rapid turn-around, colposcopy with "see and treat" protocols for obvious lesions, cryotherapy, and electrosurgical loop excision procedures for treatment of cervical cancer precursors. All these services are provided free of charge to indigent patients. The following two subsections provide details on relevant preliminary studies that support the study aims.

D.1.3. CerviCusco Educational Video. CerviCusco partnered with students from the Medical Illustration program at GHSU to develop and implement novel educational videos with bilingual narration, both in Spanish and Quechua, to address low health literacy regarding cervical cancer. The culturally-sensitive animated videos discuss the pertinent anatomy, concept of cervical cancer prevention, Pap tests, visual inspection with acetic acid and Lugol's iodine screening tests, colposcopy, and electrosurgical loop excision. In May 2007, more than 1,500 women presenting for cervical cancer screening watched this video prior to their clinical evaluation. This brief educational intervention prepared women for their examination, helped allay fears and misconceptions, provided much needed knowledge about preventive health care, and addressed common concerns in the clinic setting. Complex biological concepts such as carcinogenesis were simplified to enhance participant understanding, such as emphasizing "healthy" versus "sick" cells. Exposure to the culturally-sensitive video helped to increase knowledge about cervical cancer prevention and reduce anxiety prior to the screening exam, based on physiologic responses (Ferris, et al. 2009).

D.1.4. Salud es Vida: Promotora Curriculum and Flipchart for Cervical Cancer Prevention and Control. The first phase of this NCI-funded study was conducted with Latina immigrants in the southern US (R03 CA 138123) and found that Mexican and Honduran women were less likely to be aware of HPV and the HPV vaccine than Puerto Rican women (Luque, et al. 2010a). The second phase of the study involved the development and evaluation of a lay health worker (*promotora*) curriculum and flipchart covering topics on cervical cancer screening and prevention (HPV vaccine). The development of the Spanish-language materials was designed and conceptualized by a multidisciplinary, bilingual team (Luque, et al. In Press). The positive evaluations of both the curriculum and flipchart demonstrated the *promotora's* interest in cervical cancer topics and in educating peers through small group education sessions. This preliminary research experience will be very helpful in anticipation of conducting the proposed research project in terms of design and analysis.

D.2. Research Design and Methods

D.2.1. Overview. The proposed study has two phases. Phase 1 will consist of Rapid Assessment, Response, and Evaluation (RARE) to collect data concerning beliefs and perceptions toward cervical cancer screening and use of both traditional and biomedical health systems. In addition, the data will be used to conduct an implementation evaluation of the screening program initiative. Phase 2 will involve the development and pilot testing of a social marketing intervention to increase benefits and reduce barriers to screening, based on the Phase 1 findings. In addition, social network analysis will be used to identify 'influencers' in women's social networks, as an adjunct to the promotion strategy, recruited to promote the benefits of screening to their peers.

D.2.2. Institutional Agreements. There is a formal Memorandum of Understanding between CerviCusco and GHSU (formerly, Medical College of Georgia; see 'Other Attachments'). In addition, CerviCusco has written an official support letter for the research project (see attachment - Letters of Support). Georgia Southern University will be subcontracting to GHSU, based on the latter's established relationship with CerviCusco.

D.2.3. Hiring and Training of Research Staff. In Phase 1 of the project, the PI will coordinate the hiring and training of the CerviCusco research staff. The project will support the hiring and training of one full-time (1.0 FTE), bilingual (Spanish/Quechua) research assistant and cover one-quarter of the salary of the existing nursing research coordinator (0.25 FTE). The research assistant will receive training in RARE methods from the RARE manual (Trotter and Needle 1999), provide assistance with data management (e.g., transcription, data entry), and assist with record keeping for the cervical cancer screening initiative.

D.2.4. Participants

RARE Implementation Evaluation. For Phase 1, we will enroll a random cluster sample of 30 indigenous Quechua women between the ages of 30 and 49 years old (aligning with national screening recommendations) to complete a semi-structured interview in a neighborhood identified by the CerviCusco outreach team as a priority area (low rates of screened women). Inclusion criteria are that they have received the liquid-based Pap test during the screening initiative. In addition, we will enroll 30 key informants: (1) a purposive clinic-based sample of 10 health care providers and 5 traditional healers (*curanderos*); and (2) 15 community leaders.

Social Marketing Pilot Intervention. For Phase 2, we will recruit 2 focus groups of 6-8 Quechua women (30-49 years old) to provide us with constructive feedback on a *fotonovela* booklet and radio spots that we will develop as part of our Quechua language promotional strategy for increasing cervical cancer screening. Next, we will conduct a social network analysis survey with a respondent-driven sample of 60 Quechua women beginning with 10 regular CerviCusco clients in a different priority neighborhood area than used in Phase 1 to identify potential 'influencers' among women who have already received regular cervical cancer screening.

D.2.5. Demographic and Clinical Variables. Through the use of a standardized self-report instrument, demographic information will be obtained from all study participants. Variables to be assessed include age, ethnicity, marital status, education, occupation, and income. The following clinical variables will be collected via self-report for community participants: date of last cervical cancer screening exam, date of last doctor visit, list of any chronic health conditions, tobacco use, history of abnormal Pap tests, history of cervical surgery, number of pregnancies, contraception methods, history of STI's, and family history of cancer.

D.2.6. Payment of Participants. Research participants completing the semi-structured interviews and surveys will receive a nonmonetary gift such as a cap, poncho, t-shirt, or personal care item (e.g., makeup compact).

D.2.7. Aim 1 (Phase 1): To evaluate the social, behavioral and cultural factors that impact cervical cancer screening uptake among Quechua women from the Cusco, Peru region using RARE.

D.2.7.a. Background. CerviCusco has provided cervical cancer screening for more than 20,000 women, colposcopic examinations for more than 1,700 women, and electrosurgical loop excision procedures for precursor lesions for 150 women. Therefore, the new initiative to screen 75,000 women over three years will reach previously unscreened women. This aim will evaluate the social, behavioral, and cultural factors toward cervical cancer screening from an implementation science perspective (Madon, et al. 2007). Rapid Assessment, Response, and Evaluation (RARE) is a rapid ethnographic assessment approach that allows the researcher to collect data expeditiously concerning beliefs and perceptions around health, prevention and treatment of illness, and use of both traditional and biomedical health systems employing a combination of quantitative and qualitative methods, and builds on Rapid Assessment Procedures (Scrimshaw and Hurtado 1987). Specific RARE techniques include: (1) key informant interviews; (2) focus groups; (3) intercept surveys; and (4) ethnographic observation. In contrast to traditional anthropological fieldwork, RARE typically takes 8-12 weeks to complete data collection (Trotter, et al. 2001). Other advantages of RARE are that it is based in the community, relatively rapid, focused, action oriented, and has an evaluation component. There are several situations where using RARE is an appropriate strategy including: (1) *to pretest a program or design and test materials*; (2) *for implementation evaluation*; and (3) *for outcome evaluation*. RARE collects data from three main sources: the community, household, and primary health care providers. We will begin with the drafting of a logic model to lay the groundwork for the evaluation (CDC 1999). Qualitative process data will inform community acceptability of the screening initiative. We will also conduct 'transect walks' - making direct observations from one end of a village to the other (Williams, et al. 2009). Dr. Luque is an expert in rapid ethnographic assessment and has applied this technique to conduct research on childhood acute respiratory infections in rural, Andean Ecuador in partnership with community groups (Luque, et al. 2008; Luque 2007).

To ensure cultural appropriateness, it is recommended that qualitative methods be used to assess individuals' beliefs, values, and behaviors during the development of intervention materials, particularly concerning health behaviors and beliefs (Patton 2002). Qualitative research attempts to elicit the insider's viewpoint or emic perspective, thereby facilitating the identification of new and unanticipated information, such as participant's perceptions of illness and treatment (Getrich, et al. 2007). The first study phase seeks to understand factors which might impact screening from both the health care provider and client perspectives.

D.2.7.b. Interviews. The semi-structured interview guide with CerviCusco clients will cover topics including beliefs about health maintenance (well women care) and illness, health-seeking behavior and decision-making, perceived severity of causes of cervical cancer using freelisting and ranking exercises (Weller and Romney 1988), knowledge and awareness of screening resources, spousal support for health-seeking, and narratives of cancer-related illnesses (see Appendix A). In addition to the structured qualitative tasks, there are questions from a validated cultural cancer screening scale, which found that for Latinas, cancer screening fatalism and negative beliefs about health care professionals are related to cervical cancer screening (Betancourt, et al. 2010). A Guttman scale of household wealth will be used based on a 10-item inventory (stove, radio, TV, bicycle, refrigerator, car, motorbike, tubed water, electricity, and sewage system) used in a prior Peruvian study (Winkler, et al. 2008). Home visits will include checklists to document obvious characteristics such as type of housing construction and presence of domesticated animals. An interview guide will be used for health care practitioners, traditional healers, and community leaders and will cover topics including types of resources, preventive activities for women's health, provider descriptions, provider knowledge and perceptions

concerning cervical cancer, attitudes toward patient's preventive practices, perceptions of patient/provider interaction with health care resources, and opportunities to increase cervical cancer screening in the target communities. The interview instruments will be developed in English, translated into Spanish, then into Quechua, and then backtranslated to Spanish by a study team member. The instruments will be pilot tested in Quechua with 2-3 volunteer individuals from the target population before administration. Interviews will be recorded using a digital audio recorder, transcribed verbatim by the study team, translated into Spanish, and saved in a text file to import into a qualitative data analysis software package. In addition to semi-structured interviews, the study team will record detailed fieldnotes from participant observation, as well as after conducting transect walks in neighborhoods.

D.2.7.c. Recruitment. In Phase 1, community participants will be selected by random cluster sampling using CerviCusco's electronic medical records. Key informants will be recruited through snowball sampling. Interviews will take place either in their homes (clients, leaders, healers) or places of work (providers).

D.2.7.d. Data Analysis. Interview transcripts and observation notes will be analyzed using a combination of hand coding and MAXQDA® (Marburg, Germany) computer software. Dr. Luque and the research assistant will identify key themes as they read through interview transcripts and fieldnotes in Spanish. The *a priori* themes will be broadly based on the sub-codes identified in the initial interviews. A codebook will be developed to operationalize and define each of the themes for coding purposes. The two reviewers will reach agreement on coding procedures and establish coding accuracy. We will use the standard qualitative procedure of determining inter-rater reliability by generating Kappa coefficients. A coefficient of .80 is considered ideal. Codes will continue to be refined and defined until a Kappa coefficient of at least .80 is obtained. Participant demographics and close-ended responses will be entered into an Excel database and summarized with descriptive statistics. Structured responses (i.e. ranking) will be analyzed with cultural consensus analysis by Drs. Luque and Maupin, and subgroups will be visualized using multidimensional scaling (Luque, et al. 2010a).

D.2.8. Aim 2 (Phase 2): To develop and pilot a brief social marketing intervention to increase cervical cancer screening uptake and appropriate follow-up care targeted to Quechua women in the Cusco, Peru region.

D.2.8.a. Background. Social marketing is defined as the use of marketing principles and techniques to create, communicate, and deliver value for the benefit of target audiences and wider society (Kotler and Lee 2008). While commercial marketing is concerned with selling consumer goods, in social marketing the product is the behavior - 'bundle of benefits' - which the consumer 'purchases' in favor of the competing behavior. Social marketers conduct formative research with target audiences to assess knowledge, attitudes, perceptions and beliefs to inform the design of their communication materials and encourage target audiences to adopt new behaviors. Therefore, a social marketing strategy might seek to understand the barriers for engaging in a new behavior, in this case cervical cancer screening, and devise strategies for overcoming the barriers and increasing the benefits of receiving screening. Similar to commercial marketing, social marketing uses a marketing mix - blending of the 4 P's (product, price, place, and promotion) in intervention planning and implementation. In this case, the product, or behavior, is to encourage the target audience - Quechua women in the Cusco region aged 30-49 - to receive cervical cancer screening. The benefits will be identified in the qualitative research in Phase 1, and the team will devise a core product strategy, for example, "peace of mind after receiving negative results." The price is the emotional cost associated with embarrassment from receiving the exam and anxiety over possible positive results, and lost time from work and family responsibilities. A pricing strategy would be to offer free screening and follow-up and to educate clients about what to expect to reduce pre-exam anxiety. The place strategy is to inform clients of the transportation options to come to the stationary clinic or to utilize convenient mobile units which provide screening and follow-up. Finally, for the promotion strategy, we will use a media mix. This includes 'word-of-mouth' by engaging influential peers and outreach workers to spread the word on cervical cancer screening services. Other communication channels will involve the use of flyers and the *fotonovela* to advertise screening sites at weekly markets and the use of Quechua-language radio spots, which is low cost and can cover a wide range of communities.

D.2.8.b. Promotional Materials Development and Pretesting. Principal methodologies for concept development, message design, adaptation and refinement of intervention materials will reflect systematic approaches using NCI's Stages of Health Communication Model (USDHHS 2003). The materials will draw upon our qualitative research findings. Development of the materials will occur in three distinct phases: pre-production, production and post-production. The promotional materials will include the Quechua-language *fotonovela* and radio spots, disseminated through community venues and local radio stations, respectively.

D.2.8.c. Procedures. For the *fotonovela*, the research team first will draft a creative brief which will be based on the Phase 1 formative research findings (cancer prevention narratives), identify the most popular message

concepts, and then create outlines and flowcharts to describe the information a typical user will encounter and need. Next, we will partner with students from the GHSU Medical Illustration Program to create flowcharts, draft scripts and storyboards. Each storyboard will depict graphics, appropriate text or narration, testimonials, vignettes, and character generator or interactive sequences as appropriate. The message will be produced according to community feedback in terms of preferred format, style, language, tone, use of examples and testimonials. Once initial concepts, scripts and storyboards are generated, we will begin learner verification.

D.2.8.d. Learner Verification Iterations. The learner verification approach used in our study is modeled after the research and work of Doak et al. (1995) and strives to reduce miscommunication of messages. It involves verifying or checking the materials with the audience relating to a number of elements: acceptability, attraction, understanding, self-efficacy, and persuasion. Learner verification is especially helpful during the development phase of educational materials/media and offers multiple feedback loops for improvement and revision as product moves from concept to final development stage. For example, participants are asked: "*What is the main message here? How clear is the information? How appealing is this presentation method? What works well and what does not?*" With these approaches, consideration is given throughout the materials/media development process to rely on learners to guide the content and its presentation format. In sum, learner verification and revision uncover specific format or content features of a message that are not understood, and help to ensure that the content is consistent with the characteristics of the intended audience, such as literacy level, language, and other variables known to affect learning and understanding.

D.2.8.e. Focus Groups. Because of the formative nature of learner verification, only small samples at each iterative stage are needed. It is a two-part process involving assessment customized to the information to be verified and involves interviews to obtain additional responses about the elements. Ongoing learner verification with potential users at up to three different points will ensure that a satisfactory final product is developed. Learner verification may include focus groups with participants to obtain feedback about the materials. We will recruit 2 focus groups of 6-8 Quechua women between the ages of 30-49 to provide us with constructive feedback on the *fotonovela* and radio spots as part of our promotional materials development strategy.

D.2.8.f. Procedures and Analysis. Learner verification measures will be conducted after each of the draft iterations of the materials. A series of questions and structured guides will be prepared in advance relating to the elements to be verified. Responses will be recorded verbatim. The data will be summarized to direct modifications and revisions for the next draft. We expect that our efforts will yield understandable and acceptable promotional materials to promote cervical cancer screening among the Quechua population.

D.2.8.g. Social Network Survey. To identify additional communication channels for the *fotonovela*, we will recruit a respondent-driven sample of 60 Quechua women beginning with a sample of 10 new CerviCusco clients from the screening initiative from 2 purposefully selected adjacent towns (5 participants/town) to identify 'influencers' regarding health information in women's social networks (Valente and Fosados 2006). For the respondent-driven sample, the 10 clients will each refer us to 6 peers with whom they share health information, whom we can in turn also recruit to complete the survey (Valente 2010). Other types of ties explored in the survey include family ties, financial ties (e.g., lends money to), and other types of social support (e.g., transportation and child supervision). Survey participants will also be asked to report on the 6 alters they identify regarding ties between alters (e.g., knows each other, or friend or family tie; see Appendix B). The resulting networks will be analyzed with UCINET 6 (Lexington, KY) to identify influential opinion makers based on betweenness centrality scores (Hanneman and Riddle 2005). The women with the highest centrality scores will be selected for a 'word-of-mouth' promotion strategy using the *fotonovelas* as the augmented product.

D.2.8.h. Pilot Intervention. The brief social marketing intervention using the *fotonovela* dissemination and radio spots will be launched for a 3-month pilot campaign in the middle of the last year of the 3-year screening initiative, as part of a last 'push' to reach the target of 75,000 women. CerviCusco Pap test screening rates will be monitored during this 3-month period. The short-term, impact evaluation goal will be a 20% increase in number of women screened in CerviCusco and rural mobile clinics from baseline to 3-month follow-up.

D.2.9. Project Timeline

Year 1	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Hire/Train Research Assistant, IRB Approval	■	■	■									
Logic model construction, rapid ethnographic assessment				■	■	■						
Analyze results, process evaluation							■	■				
Develop social marketing promotional materials – radio and print									■	■	■	■
Year 2	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**
Pretesting iterations, focus groups	■	■										
Social network survey			■	■								
Analyze results, baseline measurement of screening at month 18			■	■	■	■						
Pilot intervention and follow-up measurement at month 22							■	■	■			
Impact evaluation of pilot, manuscript preparation, R01 planning										■	■	■

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