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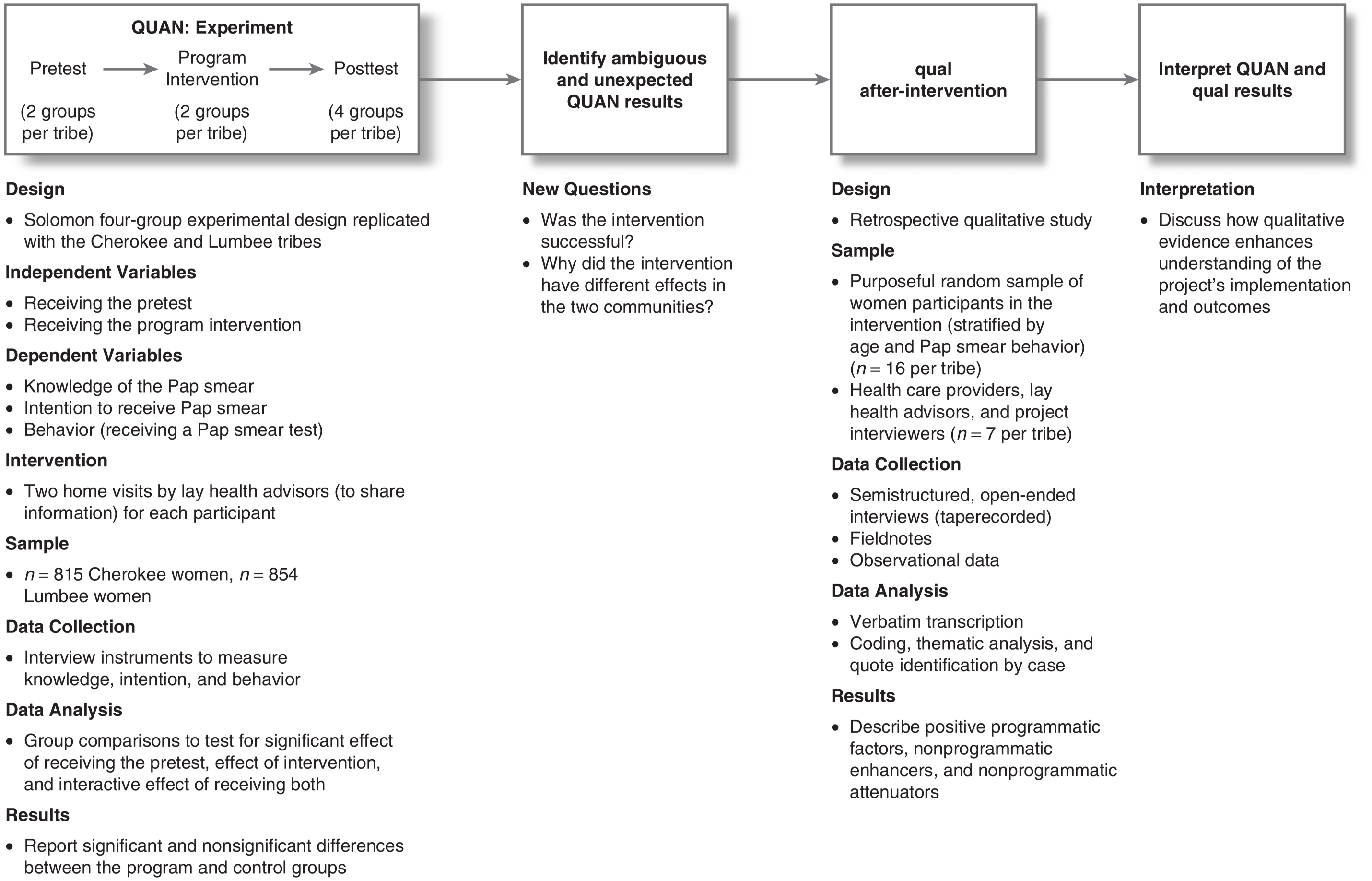
An Embedded Experimental After-Intervention Mixed Methods Design

Selection: **Messer, L., Steckler, A., & Dignan, M. (1999). Early detection of cervical cancer among Native American women: A qualitative supplement to a quantitative study. *Health Education & Behavior, 8*(26), 547–562.**

Editors' Introduction

Messer, Steckler, and Dignan (1999) evaluated a program aimed at reducing the rates of mortality from cervical cancer among Native American women in the Cherokee and Lumbee tribes of North Carolina. As depicted in the "QUAN" box in Figure 19.0, their study began with a rigorous experimental design using procedures such as random assignment, pre- and posttests, and attempting to control for confounding factors. After analyzing the results of the experiment, the authors were surprised to find a disparity in the program's effects between the two communities. Therefore, they added a qualitative evaluation to enhance their understanding of the factors related to the program's effectiveness (see the "qual" box in Figure 19.0). This study is an example of an embedded design with a qualitative "supplement" occurring after the completion of the main quantitative experiment. This study provides a model for reporting rigorous descriptions of both the quantitative and qualitative procedures in one article as well as articulating the need for a retrospective qualitative study after an intervention.



Design

- Solomon four-group experimental design replicated with the Cherokee and Lumbee tribes

Independent Variables

- Receiving the pretest
- Receiving the program intervention

Dependent Variables

- Knowledge of the Pap smear
- Intention to receive Pap smear
- Behavior (receiving a Pap smear test)

Intervention

- Two home visits by lay health advisors (to share information) for each participant

Sample

- $n = 815$ Cherokee women, $n = 854$ Lumbee women

Data Collection

- Interview instruments to measure knowledge, intention, and behavior

Data Analysis

- Group comparisons to test for significant effect of receiving the pretest, effect of intervention, and interactive effect of receiving both

Results

- Report significant and nonsignificant differences between the program and control groups

New Questions

- Was the intervention successful?
- Why did the intervention have different effects in the two communities?

Design

- Retrospective qualitative study

Sample

- Purposeful random sample of women participants in the intervention (stratified by age and Pap smear behavior) ($n = 16$ per tribe)
- Health care providers, lay health advisors, and project interviewers ($n = 7$ per tribe)

Data Collection

- Semistructured, open-ended interviews (taperecorded)
- Fieldnotes
- Observational data

Data Analysis

- Verbatim transcription
- Coding, thematic analysis, and quote identification by case

Results

- Describe positive programmatic factors, nonprogrammatic enhancers, and nonprogrammatic attenuators

Interpretation

- Discuss how qualitative evidence enhances understanding of the project's implementation and outcomes

Figure 19.0 Visual Diagram of an Embedded Experimental After-Intervention Mixed Methods Design

SOURCE: Based on Messer, Steckler, and Dignan (1999).

Early Detection of Cervical Cancer Among Native American Women

A Qualitative Supplement to a Quantitative Study

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The North Carolina Native American Cervical Cancer Prevention Project was a 5-year (1989–1995) National Cancer Institute-funded, community-based, early detection of cervical cancer intervention implemented among two Native American tribes in North Carolina: the eastern band of the Cherokee Indians and the Lumbee. The initial quantitative analysis of the intervention showed modest effects and found that the intervention had different effects in the two communities. Due to the equivocal findings, a retrospective qualitative study was conducted. The qualitative study found that two types of factors influenced

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the intervention's results. The first were project and intervention characteristics, and the second were community and cultural factors over which the project had no control. The community and cultural factors took two forms: enhancers, which contributed to greater intervention effect, and attenuators, which created barriers to success. Examples of each factor are presented, and implications for cervical cancer detection among Native American women are discussed.

In the early l980s, when the study reported in this article was planned, cancer rates among Native American populations were generally lower than those of other Americans, yet the pattern of cancer occurrence was distinctive. For Native American women, cancer was the second leading cause of death (with diseases of the heart being first) in 1981.[1,2] Furthermore, Native American women experienced cervical cancer mortality at more than twice the rate of all other women in the United States. The Native American age-adjusted mortality rate for cervical cancer between 1984 and 1988 was 7.6 per 100,000, compared to 3.1 per (100,000 for all U.S. women).[3] Native American cervical cancer mortality rates for women living in the southeastern United States (based on data from the Nashville Indian Health Service) was 11.6 per 100,000 for the same 1984-to-1988 time period. This mortality rate was nearly four times the rate for all females in the United States.[3] This excess mortality from cervical cancer among Native American women was especially troubling because cervical cancer can almost always be effectively treated if detected at an early stage.[2]

By the early 1990s, the age-adjusted cervical cancer mortality rates for Native American women had improved. In the 1989-to-1993 period, the total U.S. rate was 3.0 per 100,000, the overall Indian Health Service rate was 5.8 per 100,000, and the Nashville Indian Health Services rate (all Native American women living in the southeastern United States) was 3.1 per 100,000.[4]

This article reports the results of a qualitative study that was designed to supplement the quantitative evaluation of a health education program for early cervical cancer detection among women in two Native American communities in North Carolina. The study reported in this article was supported by the National Cancer Institute and was based on mortality data available when the project was initially planned, that is, in the early 1980s.

Overview of the North Carolina Native American Cervical Cancer Prevention Project

The overall purpose of the North Carolina Native American Cervical Cancer Prevention Project (NCP) was the reduction of mortality from cervical cancer among Native American women in the Lumbee and Cherokee tribes of North Carolina. The intervention for the NCP was a community-based, individualized health education program. The intervention was based on social learning theory[5,6] and self-efficacy theory.[7,8] It also employed the minority health communication model;[9] the predisposing, reinforcing, and enabling causes in educational diagnosis and evaluation model;[10] and the communication-behavior change framework.[11,12] These social science theories and models were used to help develop the cancer detection and control messages delivered by lay health advisors to Native American women in the two communities.[13,14]

The target population for the NCP was women 18 years of age and older who were enrolled members of the Cherokee and Lumbee tribes of North Carolina. The goals of the program were to increase the proportion of the target population who (1) obtained Pap smears on a regular basis and (2) followed recommendations for follow-up diagnosis and treatment after an abnormal Pap smear.

The Two Study Communities

While both sites are home to Native American populations, the Cherokee and Lumbee tribes live in distinct areas geographically, physically, economically, and culturally. The Cherokees are a cohesive population with longstanding tribal traditions, while the Lumbees are somewhat less cohesive and are not formally recognized by the federal government. The Cherokee population is much smaller than the Lumbee, with approximately 1,400 women in the target population; it is geographically confined both by tribal land boundaries and mountain topography. The Lumbee tribe is much larger (with roughly 10,400 women eligible for the project) and is geographically dispersed over one of the largest counties in North Carolina.

Economically, the communities are different as well. Cherokee residents are employed primarily in seasonal work and tourism in souvenir shops, restaurants, and more recently, casinos. The Lumbee tribe members are more likely to be employed in year-round shift work or in agriculture.

Culturally, there is a pronounced contrast between the two communities. The Cherokee is a much more tribal and traditional culture. Almost exclusively Native American, the Indian presence is central to the community's existence. The community of Cherokee is the traditional home of the eastern band of the Cherokee Nation, with both historical and cultural implications. Native American spirituality and healing arts are practiced in Cherokee. In contrast, the town of Lumberton, the geographical focal point for the Lumbee tribe, is far more urban and nonnative. Robeson County, which contains Lumberton, is approximately one-third Caucasian, one-third African American, and one-third

Native American. Because the area is the transplanted home of a collection of tribes now known as the Lumbee, there is little historical significance, and the Native American presence is not a central focus of the area. Little Native American spirituality or healing is acknowledged or practiced, and the primary religion among tribal members is Christianity.

In terms of familial relationships, Cherokee is a matriarchal society, while the Lumbee's is a patriarchal one. Among the Cherokee, families tend to remain on the tribal lands, and those who leave often return. Lumbee families, in contrast, are much more dispersed geographically, with relatives reuniting for family gatherings and special occasions.

These community and cultural factors suggested to the NCP researchers that a culturally sensitive and community-oriented intervention model was necessary to conduct the educational program they were planning. The lay health advisor model, described below, was therefore selected as the main educational method to be used in the NCP.

The Use of Lay Health Advisors

The lay health advisor model employs social networks to encourage behavioral and social change. It attempts to do so by working with the natural social networks of a community, by strengthening already existing network ties, and by enhancing the total network through natural helpers.[13–16]

The lay health advisor approach has been used in a variety of church- and community-based programs to address numerous health concerns.[17–24] It aspires to empower lay persons by offering training, counseling techniques, professional knowledge, and support.[25,26] It is a cultural model that builds on the strengths within the community and considers the influence of naturally existing sources of social and community support.

Numerous steps were taken by the NCP's developers to make the project culturally appropriate and sensitive.[27] Employing lay health advisors to deliver the project's educational messages to Native American women was one such attempt.[28] Furthermore, the educational interventions were designed to address the specific differences between the Lumbee and Cherokee tribes. For example, it became apparent that religion and active church participation was an important element in the Lumbee population; churches were community resources commonly relied upon to help address barriers to health care, such as transportation and child care. Thus, the Lumbee lay health advisors inquired about church membership during the intervention and referred women to this source to address barriers to obtaining screening. In the Cherokee population, extended family was found to play a role similar to the church among the Lumbee. Accordingly, the Cherokee lay health advisors inquired about the family as a source of assistance for women with specific barriers to obtaining screening.

The project intervention involved two home visits to each participant by lay health advisors, called *project guides*. The project guides were local Native American women chosen because of their familiarity with the local communities and their acceptance within their communities as reliable sources of information.[29] The face-to-face, individual visits were conducted in each woman's home. At the initial NCP visit, the woman completed a computerized Health Risk Appraisal (HRA) adapted for Native Americans. Following the completion of the HRA, the project guide determined the woman's perceived barriers to obtaining a Pap smear. After barriers were determined, the participant watched a videotape discussing cervical cancer and Pap smears. The project guide then reviewed the tape with the woman. The first session ended with each woman being given a personalized folder with educational materials, a refrigerator magnet, and an appointment for a follow-up meeting with the project guide. At the second appointment, the project guide reviewed the HRA results, answered any questions the participant had about the educational material that had been left, and asked closure questions regarding the woman's plans for making or keeping an appointment for a Pap smear or follow-up care. The initial visit lasted approximately 45 minutes, and the second visit lasted about 20 minutes.[29]

The Quantitative Study

Study Design

The NCP study employed a Solomon four-group design with a total of 1,000 women per tribe participating in the project.[30] Participants were randomly assigned to one of four groups, each to contain 250 women. This research design was replicated in the Cherokee and Lumbee tribes (see Table 19.1).

As Table 19.1 shows, in each tribe 500 women were to receive the pretest, 500 women were to receive the intervention, and all 1,000 women were to receive the posttest. All three project components, the pretest, intervention, and posttest, involved individual, face-to-face interviews with participants conducted by Native American interviewers. The actual number of participants in each group completing the study is also shown in Table 19.1.

Among the Cherokee, 540 women completed the pretest interview, 481 women participated in the two-visit intervention, and 815 completed the posttest. There were 478 Lumbee women who completed the pretest, 431 who

Table 19.1 Study Design and Number of Participants

Design				*Number of Participants*		
Group	*Pretest*	*Intervention*	*Posttest*	*Desired Number*	*Actual Cherokee Number*	*Actual Lumbee Number*
1	O	X	O	250	210	211
2		X	O	250	238	216
3	O		O	250	175	220
4			O	250	192	207

NOTE: X indicates received intervention; O indicates completed pre- or posttest.

participated in the program, and 854 who completed the posttest. Of Lumbee women, 11.8% refused to participate in the project; 20.3% of Cherokee women refused to participate. Project outcomes determined the differences between the case group and control group on three factors: knowledge, attitudes, and behaviors with regard to cervical cancer and early detection.

Study Results

The primary outcome measures used to evaluate the effectiveness of the NCP included knowledge of the Pap smear, reports of intentions to obtain a Pap smear within the next year, and self-reports of having had a Pap smear within the past year. As mentioned, the Solomon four-group design structured both the intervention and evaluation of the project in the Cherokee and Lumbee communities. This design was chosen to determine the extent to which the pretest interview influenced the effectiveness of the program. It was reasoned that discussing cervical cancer with women, even in the context of a pretest interview, could be associated with changes in knowledge, intentions, or even behavior. Analyses of the posttest data focused on testing the effect of receiving the pretest interview, the intervention, and the interactive effect of receiving both pretest interview and the program. Results from the data analyses are summarized in Tables 19.2 and 19.3.

Table 19.2 shows the results for the Cherokee population. As Table 19.2 indicates, among women who received the pretest interview, there were no significant differences in knowledge or intention between the groups that did and did not receive the program. For behavior, however, women who received the pretest interview and the program were more likely to report having Pap smears in the past year than were women who received the pretest interview but did not receive the program. For the groups that did

Table 19.2 Effects of the North Carolina Native American Cervical Cancer Prevention Project Intervention Among the Cherokee

	Pretest		*No Pretest*	
Dependent Variables	*Control*	*Program*	*Control*	*Program*
Knowledge (% correct on knowledge test)	76.1	76.7	76.0	86.9[a]
Intention (% of women indicating intent to obtain a Pap test)	47.9	45.7	48.4	48.0
Behavior (% of women who received a Pap test)	65.1	71.0[a]	62.5	76.0[a]

a. Indicates a significant difference between the program and control.

Table 19.3 Effects of the North Carolina Native American Cervical Cancer Prevention Project Intervention Among the Lumbee

	Pretest		*No Pretest*	
Dependent Variables	*Control*	*Program*	*Control*	*Program*
Knowledge (% of correct on knowledge test)	76.4	81.5	81.2	84.6[a]
Intention (% of women indicating intent to obtain a Pap test)	33.2	44.9[a]	53.9	46.1
Behavior (% of women who received a Pap test)	69.1	74.6[a]	66.8	74.0

a. Indicates a significant difference between the program and control.

not receive the pretest interview, significant differences in knowledge and behavior were found among women who received the program.

Table 19.3 shows the results for the Lumbee population. Significant differences in intention to obtain a Pap smear in the next year and in behavior (i.e., obtained a Pap smear in the past year) were found among women who received the pretest interview and the program. Among Lumbee women who did not receive the pretest interview, knowledge was greater for those who received the program.

The results shown in Tables 19.2 and 19.3 suggest that effects of the pretest interview and program were not entirely consistent in the two target populations. Significant differences between the program and control groups were found for one outcome, behavior (Pap smear in the past year), regardless of the pretest in the Cherokee population. In the Lumbee population, a significant behavior effect was found only among women who received the pretest and the program. Findings for knowledge and intention also differed in the two populations.

The disparity in effects between the two tribes was not anticipated by the project's developers. The quantitative evaluation techniques employed by the project provided little information that could explain the differences in how the intervention operated in the two communities. The need to understand both if the intervention was successful and why the intervention had different effects among the two groups led to the qualitative evaluation described below.

The Qualitative Study

The qualitative evaluation reported here helped compensate for the limitations of the larger quantitative study by providing additional information in the following areas: (1) it provided information from the project participants as to why and how the intervention may or may not have worked, (2) it helped identify causes or determinants of the program outcomes, and (3) it provided context sensitivity by placing evaluation findings in their social, cultural, historical, and temporal contexts.[31]

Study Design

The qualitative evaluation study was summative and retrospective. It took place after the intervention and quantitative data collection were completed and required the participants to reflect upon experiences in the project. Two types of qualitative data were collected: observational data and in-depth interview data. The observational data consisted of observations of the women participants' contexts. It did not include observations of the interventions.

Sample

Interviews with health care providers, project guides, project interviewers, and project participants were conducted for the qualitative evaluation. In Cherokee, interviews were conducted with 4 health care providers, 1 project guide, 2 interviewers, and 16 women participants. In the Lumbee tribe, 6 health care providers, 1 project guide, and 16 women participants were interviewed.

Within each community, a purposeful random sample of women who had participated in the intervention was drawn. Evaluators suspected that within the target population, subsets of women would provide different perspectives on the project: (1) women older and younger than 50 years of age and (2) women who did and did not receive a Pap smear during the course of the project. The age stratification was an attempt to illuminate the potential differences in effect. Additionally, the perspective of women who were not convinced to obtain Pap smears was hypothesized to differ from that of women who were compelled to obtain Pap smears. The purposeful random sample was an attempt to capture these differences.

To identify women to be interviewed, a random sample of 20 women was drawn from the participant list for each tribe. Of the 20, 10 women were over 50 years of age, and 10 were 50 years of age or younger. Then, within each age group, 5 women were chosen who reported getting cervical cancer smears during the course of the project, and 5 women were chosen who reported not getting Pap smears. Twice as many women were drawn in each condition as were desired to ensure 20 women would be interviewed. Of the 20 who consented to be interviewed, a total of 16 interviews were eventually completed—4 women in each condition in each community. Fully half the requested women declined to participate in the evaluation. The reason cited was feeling they had given enough time to the project already.

Data Collection Procedures

A semistructured, open-ended interview format was used in all the interviews. The interviews were conducted in a sequential fashion. The initial meeting with the principal investigator and project manager informed the creation of the interview questions to be used with project guides, project interviewers, and the health care providers. The interviews with the guides, interviewers, and providers then influenced the development of the interview questions used with the Native American women.

Observational data were collected in a variety of settings including individual homes, local establishments, places of work, and health care facilities and were recorded three times per day during data collection. In addition, extensive field notes were made immediately following each interview.

All interviews were tape-recorded. Each interviewee was informed prior to taping that the interview would be transcribed, his or her name would not be associated with anything he or she said, and if at any time he or she wished the recorder to be turned off, it would be. Interviews with project guides and project interviewers lasted approximately 1 hour. They were asked about their duties, how they felt about their job, what they perceived women got out of the project, and about perceived reasons for and barriers to the project's success.

Health care providers were interviewed next. A health care provider was a physician or nurse representing a health care facility that performs Pap smears on Native American women in each study community. The providers interviewed were the individuals who performed cancer screens on the Native American project participants. Interviews took place at each provider's health care facility. Provider interviews lasted approximately 1 hour and asked about provider awareness of the project, perceived reasons for and barriers to the project's success, changes in levels of service, and typical Pap smear appointment procedures.

Native American women who had participated in the project were the last group to be interviewed. The majority of the interviews occurred in the participants' homes. The interviews lasted approximately 35 minutes and asked about participants' general impressions of the project, the aspects of the program that encouraged them to follow the NCP cervical cancer screen guidelines, those elements of the NCP that were less compelling in their Pap smear decision making, and important lessons they learned from the project.

Data Analysis

All interviews were transcribed verbatim; they were then reviewed for accuracy and to allow the addition of evaluator comment lines. Comment lines are evaluator notes that indicate the speaker's feelings and pertinent reflections from the conversation. While the project staff, provider, and participant data were analyzed separately, the data analysis process was the same for each.

The evaluation plan was to conduct cross-case content analysis. For cross-case analysis, answers from different participants were grouped by topics within the interview guide. An example of a topic would be "feelings about the project" This process allowed the interview questions to constitute a descriptive analytical framework for data analysis. The cases were separated by condition. For instance, one condition was "Lumbee women over 50 years of age, no Pap smear." The responses to a particular question given by the four Lumbee women in this condition were considered a case. The Lumbee case could then be compared with the Cherokee case of the same condition, or it could be compared with another Lumbee case of a different condition (i.e., Lumbee women 50 years of age or younger, with Pap smear).

"Content analysis is the process of identifying, coding, and categorizing the primary patterns in the data. This means analyzing the content of interviews and observations."[32] The content within each case was coded, and themes were generated for each topic of the interview guide. Quotations were identified from the transcripts, which characterized each theme, and cross-classification matrices were generated to summarize the case analyses.

Strategies employed to enhance the integrity of the data and the evaluation included testing of rival hypotheses, comparing different kinds of cases, testing negative cases, and triangulation of sources.[32] In considering rival hypotheses, the researcher tries to find alternative ways of organizing or explaining the data. If on comparing different kinds of cases, an evaluator gets similar responses to questions, the researcher can feel fairly secure the response is somewhat universal (to the population under investigation). In testing negative cases, the researcher's understanding of patterns and trends is increased by considering the instances and cases that do not fit the pattern. Finally, triangulation of sources involves checking the consistency of different data sources within the same method.[32] Each of these methods was employed to validate the results and enhance the credibility of the qualitative findings.

Results

As described above, the qualitative data were originally stratified and analyzed by age and Pap smear condition because the research team expected to find differences among these groups. However, these differences did not emerge. Participants responded similarly regardless of their age or whether they had obtained Pap smears. For that reason, the results presented below are in the aggregate rather than by stratified group.

The qualitative data analysis found several elements of the program that all participants responded to positively. These programmatic components help explain the beneficial effects of the program. The qualitative study also found several nonprogrammatic factors that affected the project outcomes. These nonprogrammatic factors are reported below as *program enhancers* and *program attenuators*.

Programmatic Factors

Three programmatic elements were identified as having positive effects in both the Cherokee and Lumbee communities. The first was that the participants in both communities generally liked the project and the project guides. They enjoyed having their awareness levels increased, feeling cared about, feeling encouraged to take better care of themselves, and feeling that they were helping others at the same time they were helping themselves. Women also liked the home visits and having misinformation corrected. The fact the project was designed for Native American women specifically made participants feel important. The guides were almost uniformly perceived to be competent, nice, respectful, informed, caring, and to genuinely enjoy their work. The participants' positive feelings about the project may help explain the NCP's positive effect in the two communities.

> I thought it was great. . . . Indian women are more focused on their own children as opposed to focused on their own health. And this just lets someone

> be aware of their self for just a few minutes of the interview. (Cherokee woman, 50 years of age or younger, with Pap smear)
>
> I was glad it was aimed at Indian women to make them more aware of what they need to take care of their bodies. . . . Sometimes you read all this stuff in magazines and so forth and you don't really feel like it has much to do with Indian women. (Cherokee woman, over 50 years of age, with Pap smear)
>
> She [the project guide] was very thorough. . . . I thought she was real good and explained whatever I needed to know. And made sure I understood everything. (Lumbee woman, over 50 years of age, no Pap smear)

The second programmatic factor was that some women in both the Cherokee and Lumbee communities indicated they had already formed the habit of getting a yearly Pap smear and would have continued to do so independently of their project experience. Said one woman, "I always get a Pap smear every year. . . . Sometimes it might go 14 months, but every year" (Lumbee woman, 50 years of age or younger, with Pap smear). Another woman said, "I think it [the project] was just more of a reminder to me since I already affiliated it [the cervical cancer screen] with the same routine I go through every year when I get my physical" (Lumbee woman, Over 50 years of age, no Pap smear). For these women, therefore, the project served as a reminder about information they already knew and as a reminder to get their annual Pap tests.

The third programmatic factor found to explain the project's success relates to the salience of the cancer detection and control messages to the Native American women. The most common messages were (1) it is important to get regular Pap smears, (2) early detection of cervical cancer results in early treatment and better long-term health outcomes, and (3) women need to take care of themselves if they are to be able to take care of the loved ones that depend on them. Women also reported learning more about cancer generally. These messages seemed to hit home with Native American women. "It made me think more about making sure I get a checkup . . . how necessary it really is" (Cherokee woman, 50 years of age or younger, with Pap smear). "If you go get the Pap smears, and the cancer, it's caught in the early stages, there's help for you" (Cherokee woman, over 50 years of age, with Pap smear). "Somebody's depending on you, you know what I'm saying? . . . Got to take care of yourself so you can take care of them" (Lumbee woman, 50 years of age or younger, no Pap smear).

The qualitative evaluation found supplementary reasons for the project's success in the Cherokee community which relate to the community's close-knit nature. Interviewees reported the NCP was successful in the Cherokee community because project personnel were perceived to have spent time "laying groundwork," were knowledgeable about the community and were genuinely trying to return power to the women of the tribe. Tribal government and service providers were aware and supportive of the project, and women participants knew other women in the community who were also participating in the project and could discuss their experience. “He [the principal investigator] spent time laying the groundwork. He met with our tribal council, met with our doctors, and really seemed to know and respect the population he was working with” (Cherokee health care provider). By contrast, the Lumbee tribe is still striving for federal recognition and therefore has a less powerful tribal system and is much more diverse geographically and ethnically. Lumbee interviewees did not report appreciating the groundwork project personnel put into the community prior to the NCP’s implementation. One service provider echoed a common sentiment when he said, “I remember one proposal, but I didn’t know it had occurred; I don’t recall awareness of this project going on” (Lumbee health care provider).

Nonprogrammatic Factors

In both the Cherokee and Lumbee communities, there were concurrent, nonprogrammatic factors that affected the results of the NCP. These factors can be characterized as program enhancers and program attenuators.

Program Enhancers

Enhancers Occurring Among the Cherokee

Among the Cherokee, three additional program enhancers were detected. During the course of the NCP project, a Women’s Evening Clinic was initiated by the Indian Health Service hospital located in the community. The Women’s Evening Clinic was a full service, after-hours, monthly clinic exclusively utilizing women practitioners. It provided child care, refreshments, and was eagerly supported by Cherokee project guides. The clinic served to increase access, provided a woman-friendly environment, and addressed some of the most common barriers cited by the Cherokee women for not getting cervical cancer screening. Many NCP participants stated that they would not have received a Pap test had it not been for the Women’s Evening Clinic. “I don’t know I would have gotten one [a Pap smear] without the Women’s Clinic. . . . It certainly made it a lot easier” (Cherokee woman over 50 years of age, no Pap smear).

The second non programmatic enhancer was the existence and use of the Cherokee Hospital Diabetes Clinic. Because diabetes is so prevalent among Native Americans, a number of women reported attending the diabetes clinic every few months to be checked and have their medication refilled. The doctors working in the diabetes clinic encouraged women to keep up with their annual exams, among them cervical cancer screens, and would often ensure a woman received a cancer screen the same day as her visit to the diabetes clinic. One woman reported, "Usually I'm there [at the diabetes clinic] and they just do it right then. They're not gonna stop and say, 'Did you have an appointment for this today'" (Cherokee woman, 50 years of age or younger, with Pap smear). The Cherokee women's reports are in contrast to other studies that have found diabetic women were no more likely to have obtained cervical cancer screens than nondiabetic women.[33–35]

Third, within the Cherokee community, there were several deaths due to cancer during the course of the NCP. Because Cherokee is such a close-knit and interrelated community, these cancer deaths caused general cancer awareness to be raised considerably. "Especially in this community here where ya know everybody and are sort of interrelated and everyone knows aunt, uncles, cousins, whatever who just died from cancer . . . it makes you aware of it" (Cherokee woman over 50 years of age, no Pap smear). NCP participants reported being powerfully affected by the cancer deaths in their community and pursuing cervical cancer screens as a result.

Enhancers Occurring Among the Lumbee

In Robeson County, home of the Lumbee Indians, the Robeson County Health Department (RCHD) conducted a breast and cervical cancer project that also employed an outreach worker. The project began shortly after the commencement of the NCP. The RCHD project was designed to encourage women to receive yearly exams; project employees stated they saw a large percentage of Native American women. The second nonprogrammatic enhancer involves strict quality control measures instituted in all health care settings during the NCP's tenure in the community. The rigorous quality control measures were designed to ensure all health care clients received their yearly exams, including cervical cancer screens. To do so, the health care providers within Robeson County actively encouraged women to take detective measures and were held accountable for doing so.

> All providers are constantly reminded every time they open up a record that a Pap needs to be given. And we review records every month. If a woman needed a Pap, came in, and didn't get one, the provider is out of compliance and in big trouble. I'd say we've done more Paps based on this peer review every month than anything. (Lumbee health care provider)

It would be difficult to separate the effects of the NCP from the effects of these other efforts.

Program Attenuators

Attenuators Occurring in Both Communities

Community elements also served to attenuate the effects of the NCP. Three attenuating factors were reported by both Cherokee and Lumbee project participants. First, the project was perceived by some women as an invasion of their privacy. This perception persisted despite the fact that all women consented to participate in the project. One woman reported,

> They just got too personal with their questions . . . like which kind of social groups I belonged to and some of the details of your sex life. I didn't feel like that related to any of the Indian health. I guess I'm a private person so some of them I answered and some I didn't. (Cherokee woman, 50 years of age or younger, no Pap smear)

As a result, some women refused to cooperate with the interviews and the overall project.

The second common attenuator was the reported cultural belief that one does not go to the doctor unless one is sick. This belief conflicted directly with the NCP's instructions to get a yearly cervical cancer screen. A project participant said, "Well, you just don't go to the doctor unless you're sick. . . . If things are going okay, you just don't question it" (Lumbee woman, over 50 years of age, no Pap smear). Another explained it this way: "We're very passive about things, certainly about personal health problems that you need to aggressively attack, may be . . . Indians have survived so much and it seems our instinct is that if you are passive enough you can survive anything" (Cherokee woman, over 50 years of age, with Pap smear).

The third nonprogrammatic attenuator involves the behavior of physicians in both the Cherokee and Lumbee communities. Women consistently reported that their physicians told them they no longer needed cervical cancer screening if they were over a certain age (i.e., 50 years of age), had experienced menopause, or had undergone a partial or complete hysterectomy.

> No, I haven't had one [a cervical cancer screen] in a lot of years. I had different doctors tell me that I didn't need it. Some said after 15 years they didn't give Pap smears. See, I had a complete hysterectomy and they said that was why. The doctor explained it all to me. (Cherokee woman, over 50 years of age, no Pap smear)

Furthermore, the women reported believing their physicians' advice over that of the NCP. Physicians providing women with inaccurate information regarding the need for cervical cancer screens would directly decrease the effect of the NCP.

Attenuators Occurring Among the Cherokee

The Cherokee program participants reported two additional attenuating factors. The first is due to the fact that Cherokee is a primarily tourism-based economy, with the summer season providing the bulk of each family's yearly income. The NCP took place over several years, with some components transpiring during the summer. Cherokee women reported annoyance that the project took place during the summer season, thereby taking up some of their valuable income earning time. "Well, the summertime is hard. . . . Most women are working two jobs plus trying to keep their kids out of trouble. . . . No one had time to sit and talk about cancer and got mad when you pushed a little" (Cherokee project guide). The second nonprogrammatic attenuator has to do with the Cherokee people's relationship with and feelings about the health care available to them. While they were appreciative of free medical care, they identified certain practices of the local Indian Health Service hospital as barriers to getting the medical care they needed. Women and health care providers reported it generally took several months to get an appointment for a nonacute condition; even with an appointment, there is often a waiting time of several hours; when a woman walks in without an appointment, she will often have to wait all day to see a doctor; the hospital's hours are Monday through Friday, 8 a.m. to 5 p.m., thereby requiring a patient to take time off work; and patient information at the hospital is not perceived to be confidential. "A lot of people can't afford to go anywhere but up here at the hospital to get their Pap smears and they're not real comfortable with the facilities. That's the biggest problem nobody talks about" (Cherokee woman, 50 years of age or younger, with Pap smear). Because the hospital is the only tribal health care provider, the participants' negative feelings toward the hospital attenuated the effects of the NCP because the primary behavioral message of the project was that women should get annual Pap tests by their regular health care providers.

Attenuators Occurring Among the Lumbee

The Lumbee participants also reported their relationship with the local hospital as a program attenuator. Because the Lumbee are not a federally recognized tribe, they are ineligible for Indian Health Services. There is no hospital exclusively serving the Native American community. The public, not-for-profit, local hospital is the only one in Robeson County; the next closest hospitals are located 30 minutes north and south of Lumberton. Several interviewees commented on rumors that the local hospital treats its Native American clients poorly. While no woman could say she had experienced this effect directly, there was an overall negative perception of the hospital within the community. This perception affected project outcomes because women were reticent to visit a hospital they perceived to be discriminatory.

> Course, no one will say it directly, but just the other day a woman was telling me that for generations, the Indian population has had a problem with the health department. And everyone knows they've had a long-standing problem with the hospital. . . . There used to be a double standard at the hospital [for Whites and Native Americans]. I think it's a carryover from that. (Lumbee health care provider)

Discussion

The qualitative study, launched as a result of ambiguous quantitative results, found two types of factors that influenced the projects results. The first was characteristics of the project and the intervention itself. The second was community and cultural factors over which the project did not have control. There were two categories of such community and cultural factors: enhancers, which contributed to greater intervention effect, and attenuators, which created barriers to success.

Project factors that contributed to intervention effectiveness were that Native American women in both communities liked the project, the guides, and the notion of contributing to their larger communities. The guides were perceived to be competent, effective, and to care about their communities. Also, the project's messages about the importance of regular medical checkups, including Pap tests, were highly salient to the Native American women. The project reinforced many participants' commitment to annual Pap smears. Among the Cherokee, the project was seen as helping empower the community due to its linkage to and support by the tribal government.

Despite careful attention to randomization and the prevention of contamination between the case and control groups, community and cultural factors beyond the researchers' control profoundly affected the project's implementation and outcomes. Factors that enhanced the effect of the intervention in the Cherokee community were the initiation of a women's clinic, the prevalence of women using the diabetes clinic, and increased awareness of cancer due to several deaths in the community. Among the Lumbee, the initiation of a breast and cervical cancer outreach program by the RCHD and local service providers' rigorous quality control efforts enhanced program effects. Factors that tended to attenuate the intervention's effect were some women's perception that the project was an invasion of privacy; the cultural belief that one does not go to the doctor unless sick; some doctors' inaccurate information about the need for Pap tests; the project's timing during an economically important season, thus reducing some women's willingness to participate; and perceived lack of confidentiality and discrimination by health care providers in both communities. These findings are significant because they point to the importance of community and cultural factors on target populations.

Both the quantitative and qualitative evaluation indicated that the Cherokee community should have been successful at getting women in for cervical cancer screens. Some of the factors thought to predispose the Cherokee women to success include the close-knit nature of the community, the presence of family nearby to help provide transportation and child care, the provision of free health care at the tribal hospital, and the timely initiation of the Women's Evening Clinic. The quantitative evaluation indicated that the Cherokee experienced only mild change in attitudes, behaviors, and intentions with regard to getting cervical cancer screens. The qualitative evaluation demonstrated that were it not for the Women's Evening Clinic, women would have pursued even fewer Pap-smear appointments than they did. Contrary to expectation, women reported the local, free health care provider to be one barrier to not getting Pap smears. These data encourage community interventionists to objectively assess community resources. Resources may exist that are not well utilized for compelling reasons. Community members themselves are the only reliable information source regarding what works and what does not work in their communities.

Of additional interest was how well the lay health advisor model worked among the Cherokee and Lumbee. The literature suggests that community acceptance in Native American communities is crucial. The use of lay health advisor project guides was invaluable to the project's success. Given the delicate nature of the material the guides were discussing with participants, to have attempted the intervention with anyone other than locally known, liked, and respected women would have significantly reduced the projects success.

Study Limitations

The qualitative study was done after the quantitative study was completed and was added onto the project to help explain the equivocal quantitative findings. The retrospective nature of the evaluation potentially contributed to inaccurate recall of project activities, individual behavior, and immediate perceptions of the project. Retrospective limitations could affect the accuracy of the qualitative evaluation's findings. Finally, due to a limited budget, the qualitative study was done on a very small scale: one researcher conducted all interviews in both communities in 2 months, transcribed and analyzed the data, and produced the report.

Implications for Practice

1. *The combination of qualitative and quantitative methodologies proved useful.* The qualitative study produced information that was able to help explain and interpret the equivocal quantitative findings. The qualitative study could have been even more useful if it had been planned for and carried out throughout the project, including an initial community assessment planning phase.

2. *Cultural and community factors both enhanced and attenuated the intervention's effect, thus contributing to the ambiguous quantitative results.* Assessment of community and culture are necessary before beginning and then during a project such as the NCP. Examples of using qualitative methods to conduct community assessments prior to beginning a public health intervention exist in the literature.[31]

3. *Despite the mixed quantitative results, the lay health advisor approach was successful.* Clearly, the project guides were a strength of the intervention method. The moderate success of the project should not be considered an indictment of the efficacy of the lay health advisor approach. Rather, Native American women reported the guides to be one of the most compelling elements of the project.

4. *Project participants in one community reported feeling empowered by the intervention.* While this was not an explicit goal of the project, the women indicated that their increased sense of power contributed to their decision to seek cervical cancer screens. This finding suggests the empowerment of project participants to be a worthwhile goal.

5. *Awareness of the economic and cultural cycles of a community can be important to an intervention's outcome.* These cycles affect both the participant's ability and desire to complete a project.

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