

## “Barriers to Pap Smears Among Latina MediCal Enrollees using GIS”

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### Abstract

Papanicolau (Pap) smears are highly effective in detecting cervical cancer in the earlier stages. However, Pap smear screening rates have been 15 to 30 percent lower among Latinas as compared to whites. This paper presents the use of GIS to measure three-year rates of Pap smear screenings among immigrant Latinas enrolled in managed Medicaid in central California. A total of 266 of the women had evidence of a Pap smear and 104 had no record of the screening within the past three years. Geocoded addresses were used to identify Pap smear status by residence and distance to medical clinics. Potential barriers included rural residential locations and distance to assigned clinics.

## **Background**

Cervical cancer remains the 10<sup>th</sup> most common form of cancer among women in the United States, with a projected 12,800 new cases and 4,600 deaths in 2000. In California, 1,300 new cases of cervical cancer were projected in 2000 (Landis, Murray, & Bolden, 2000). Between 1992 and 1996, the cancer incidence was 9.5 new cases per 100,000 women with 2.2 deaths per 100,000 Hispanic/Latina women in California (Cancer Facts and Figures for Hispanics, 2000-2001).

The Central Valley of California experiences a significant problem with cervical cancer mortality and morbidity. In comparison to California rates, there were 10.6 new cases per 100,000 women and 3.3 deaths (Mills, 1999). Cervical cancer rates are disproportionately higher among Hispanic/Latinas (17.5 per 100,000) as compared to non-Hispanic whites (8.5 per 100,000)(Mills, 1999). It is the third leading cancer diagnosed among Hispanic/Latino women, with a prevalence rate of 7.3 times higher than Caucasian women.

While cervical cancer is a common disease, it is highly curable with early detection through the use of Papanicolau smears (Pap smears). Preventive screening for cervical cancer with pap smears is universally recommended by numerous health groups (American Cancer Society, 1996; U.S. Preventive Services Task Force, 1996). Unfortunately, pap smear screening is underutilized among Latinas. Nationwide, only 74% of Latinas have had a pap smear within the last three years, well under the Healthy People 2010 benchmarks of 90% of women (Healthy People 2010, 2000).

Numerous factors have been identified that affect pap smear utilization rates in the general population. These factors have included age, race, education, state and country of origin, population density, health system, and ethnicity (NIH Consortium for Cancer Screening for Underserved Women, 1995; Ruchlin, 1997). Other known determinants of screening include quality of communication with the doctor, feeling respected by the provider, receiving answers to questions regarding cancer, discomfort of the pap smear itself, lack of knowledge about pap smears, lack of continuity with primary clinicians, and discomfort with the provider (Branoff, Santi, Campbell, Roetzheim, & Oler, 1997; Gordon, Rundall, & Parker, 1998). Predictors of lower pap smear screening rates among Hispanic women include greater age; lower levels of educational attainment; recent immigration/lower acculturation; less supportive male partners; lower socioeconomic status; greater embarrassment about medical examination; less awareness of risks of cervical cancer and benefits of screening. Hubbell, Chavez, Mishra, Valdez, 1996; Makuc, Fried, & Parsons, 1994). Additional determinants include fatalistic views of life; rural residence; inability to speak English; lack of reliable transportation; and, lack of access to female and Spanish-speaking clinical examiners.

Studies that have focused on the barriers to pap smear screening for Latinas and other minority women suggest that the determinants to utilization fall into three major categories: 1) qualities of the health care provider and the examination, 2) issues related to access to care, and 3) patient beliefs and attitudes about the disease in general and

cervical cancer in particular (Hubbell, Chavez, Mishra, & Valdez, 1996; Makuc, Freid, & Parsons, 1994; Chavez, Hubbell, Mishra, & Valdez, 1997).

Of particular interest, group model health maintenance organization coverage has been associated with significantly higher cervical cancer screening rates than indemnity plans or independent practice association (IPA) type health maintenance organizations (HMOs)(Gordon et al., 1998; Platt, 1998). While the impact of insurance status on cancer screening has been well documented, there is a dearth of literature on the interaction of managed health care systems and pap smear screenings among Hispanics/Latinas (Harmon, Castro, & Coe, 1996).

Most recently, California Medicaid programs have converted from fee-for-service to managed care. Over 50,000 Hispanics (close to 17% of all Hispanics in Fresno County) are now covered by managed MediCal (Sean Atha, California Department of Health Services MediCal Statistics Unit, personal communication, June 1999).

Geographical determinants may pose a significant barrier to obtaining health services in Fresno County. The County covers an area 6,018 square miles and is the fifth largest county in California. It is comprised of 15 incorporated and 24 unincorporated cities. At present, there are an estimated 799,407 people residing in Fresno County with approximately 80% living in the metropolitan Fresno-Clovis area. Based on 2002 population estimates, Hispanics constitute 44.0% of the total population in Fresno County (Dept. of Finance, 2001 Census Data)

Fresno County is the largest agricultural producer in the nation, with a high labor force. The primary crops in Fresno County include grapes, oranges, fruit (i.e., peaches, apricots, cantaloupes, tomatoes), nuts (i.e., almonds, walnuts, pistachios), and ground crops. In spite of this abundance, data indicates that approximately 40% of the residents experience “food insecurity” (hunger) at least once a year.

The purpose of this study was to examine the impact of geographical distance on pap smear screening rates for Hispanic/Latino women enrolled in a Medicaid managed care plan. The specific aims of the study were:

1. Identify determinants of pap smear screening by comparing three groups of Hispanic/Latina women enrolled in managed MediCal and assigned to a physician at one of four community health centers.
2. Measure proportions of Hispanic/Latina women within a Medicaid managed care system screened for cervical cancer and its precursors by a pap smear test within the preceding three years in accordance with American Cancer Society and United States Public Health Services Guidelines.
3. Determine the impact of geographical distance on pap smear screening rates among Hispanic/Latina women within a Medicaid managed care system.

## Procedures

Potential participants were identified through the MediCal chart abstraction phase. The U.S. Census Hispanic Surname Lists were used to identify potential Hispanic/Latina patients through medical charts/records at Sequoia Community Health Foundation, United Health Centers, Firebaugh Community Health Center, and Selma Community Health Center. The original list included 5,420 patients (585 from Selma, 2,484 from Sequoia, 2,228 from United Health Centers, and 123 from Firebaugh). After sorting out the males and restricting the women to between the ages of 18 and 65, only those surnames that were designated as “heavily Hispanic” (95% accuracy) by the U.S. Census were selected. A total of 728 Hispanic/Latina women were identified as eligible enrollees.

Chart reviews of Hispanic/Latina patients enrolled in a managed Medicaid system were reviewed for identification of participants in each of the three study groups. These study groups included 1) women who had been seen by a physician and had a pap smear screening within the past three years; 2) women who had been seen by a physician but did not have a pap smear screening within the past three years; and 3) women who had not been seen by a physician and did not have a pap smear screening within the past three years.

The Medical Chart Abstraction Form was designed to collect contact information and clinical information relevant to the study including the number of pap smears during the past three years and the nature and frequency of other clinical visits. The inclusion criteria comprised of age (18-65 years old), residence in the Central California Valley, current sexual activity or history of sexual activity, and enrollment in the selected Medicaid managed health care system. To avoid counting women who did not have a uterine cervix and women with possible pre-existing disease, women who had evidence of a hysterectomy or an abnormal pap smear more than three years earlier were excluded from the review. Additional covariates collected, where available, were age, address, parity (the ability of a woman to carry a pregnancy to a point of viability), current birth control method, date and outcomes of all documented pap smears within three years, frequency of prenatal care during preceding three years, and presence or absence in record of reminder systems for preventive health care.

A total of 728 eligible enrollees were identified from the medical records review. Of those eligible for the study, a total of 419 (58%) of the current medical record were located. In 73 cases, participants had an assigned record number but no chart could be located after three or more attempts. The remaining 236 enrollees had no evidence of any contact with their assigned community health center.

Charts were reviewed from each health center in approximate proportion to patient volume: 182 charts from one health center, 135 from a second, and 51 from a third. The remaining health center was much smaller and only two charts were reviewed. Pap smear completion rates within three years did not vary significantly between the three larger centers and ranged from 66% to 78%. Women who had a record of prenatal care

or a documented method of birth control were 1.7 (95% CI 1.4-2.0) times more likely to have a pap smear recorded as well.

**GIS Mapping Procedure.** All known addresses of the Hispanic/Latinas enrolled in a managed health plan were geocoded and mapped using Arcmap 8.3. Of the total number of addresses geocoded, 35 could not be matched by hard coded addresses. Of these, 30 were matched by post office boxes. The remaining five addresses were eliminated due to residence location not being in Fresno County.

Shortest Path Analysis was utilized to determine the distance between women's recorded residence and the nearest health center. The Spatial Analysis Functions of GIS, Network Analysis used shortest path algorithms to determine the shortest distance path from residential address to the nearest health center. The coordinate plain for the data set was NAT 27. The point-to-point distance was calculated using a set of sub routines from the ARC Toolbox: Arc Info Toolset. All layer and datasets were converted into complimentary format/coverages by using the *ArcToolbox: ArcInfo: Conversion Tools: Export from Shapefile: Shapefile to Coverage*. (Note: it is very important to ensure that the beginning data set utilizes the same Coordinate Set.)

After converting each shapefile into the proper coverage, the *ArcToolbox: ArcInfo: Proximity: Point Distance Routine* was utilized to develop a columnar database that was compatible with the SPSS statistical analysis package. Statistical data was analyzed using the Analysis of Variance with Scheffee's test to determine statistically significant differences between the three groups.

## Results

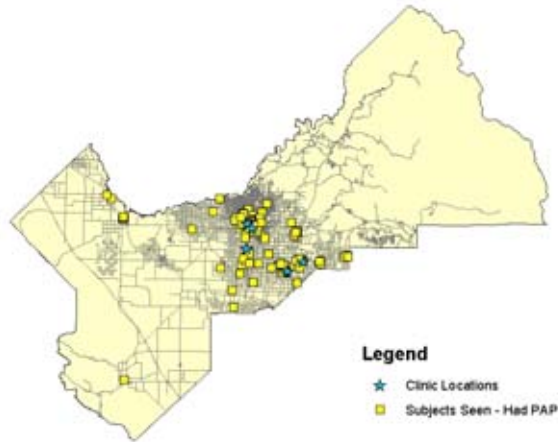
A total of 457 Hispanic/Latina women were identified from medical charts from five clinics in Fresno County. All women had been enrolled in a managed care plan and were eligible for coverage of pap smear screening. Based upon medical chart evidence of a pap smear screening, the participants were classified in to three groups with 1) 174 participants having seen a physician and been received a pap smear examination; 2) 80 participants having seen a physician but had not received a pap smear examination; and, 3) 203 participants having not seen a physician and had not received a pap smear examination.

Shortest distance from residence to the assigned managed care clinic varied significantly between the three participant groups. As displayed in Figure 1, the mean shortest distance for their residence to the assigned managed care clinic for Hispanic/Latina women who had seen a physician and been given a pap smear examination was 4.56 miles, with a range of .1 miles to 38.0 miles. As shown in Figure 2, the mean shortest distance from their residence to the assigned managed care clinic for Hispanic/Latina women who had seen and not been given a pap smear examination was 3.52 miles, with a range of .1 miles to 39.9 miles. Figure 3 displays the distribution of shortest distance of residences to the assigned managed care clinic for Hispanic/Latina women who had not seen a physician and had not received a pap smear examination. The mean shortest

distance for this group was 8.28, with a range of .2 miles to 47.9 miles. Figure 4 displays the relationship between shortest distance to the assigned clinic and all three participant groups combined.

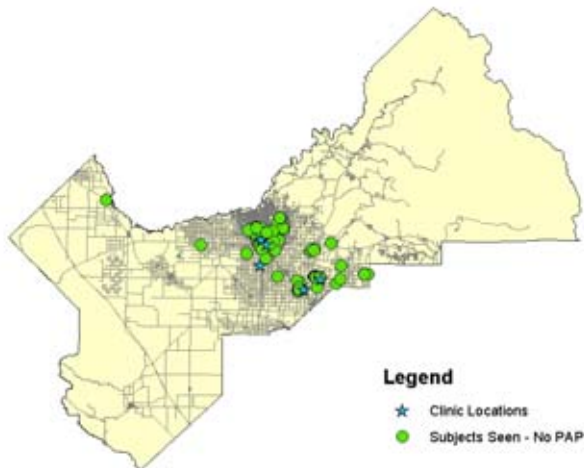
**Figure 1.** Distribution of Hispanic/Latina women enrolled in managed care who had seen a physician and received a pap smear examination.

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**Figure 2.** Distribution of Hispanic/Latina women enrolled in managed care who had seen a physician and had not received a pap smear examination.

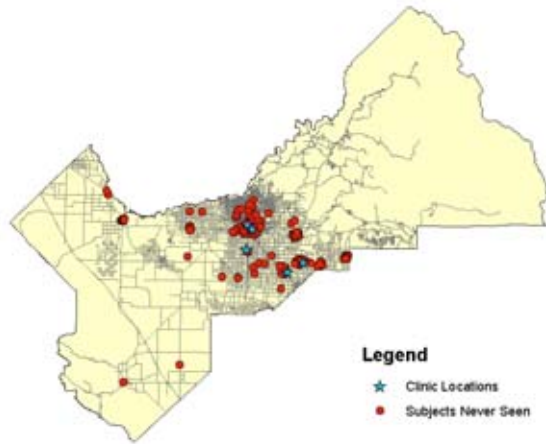
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**Figure 3.** Distribution of Hispanic/Latina women enrolled in managed care who had not seen a physician and had not received a pap smear examination.

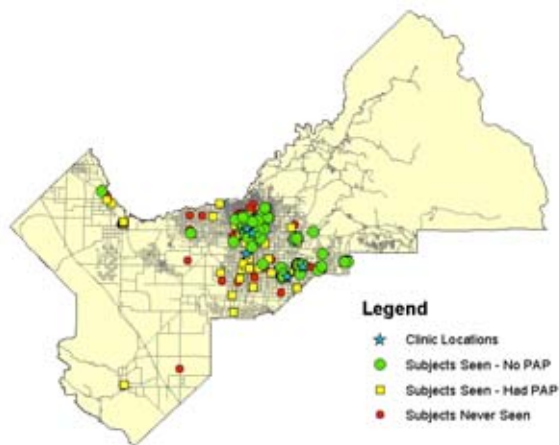
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**Figure 4.** Distribution of Hispanic/Latina women enrolled in managed care and pap smear screening group

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One-way analysis of variance was used to determine statistically significant differences between the mean shortest distance from participant residence to the assigned managed care clinic and participant category. As shown in Table 1, there was a statistically significant difference ( $p=.001$ ) between the participant categories and the mean shortest distance traveled to the assigned clinic. Participants who resided closer to their assigned clinic had a significant statistically increase in having been seen by a physician and had a pap smear screening as compared to those who traveled further from their residence. Participants who traveled further to their assigned clinic were less likely to have seen a physician and to have had a pap smear screening.

**Table 1.** Analysis of Variance for shortest distance to assigned clinic and participant category.

	Sum of Squares	Df	MS	F	Sig.
Between Groups	1911.56	2	955.78	12.009	.001
Within Groups	36134.66	454	79.59		
Total	38046.22	456			

**Discussion and conclusions.** Geographical distance and insurance coverage have been considered to be contributing factors in access to health care services. The use of GIS mapping is a useful tool in identifying the distribution of health care access use. Contrary to the study hypotheses, the distribution of Hispanic/Latina women in managed care programs reside in the metropolitan Fresno/Clovis area as compared to the rural counties. Overall, travel distances to assigned clinics are located within areas that are accessible to the targeted population.

In addition, the barrier of ability to pay for services is reduced for patients enrolled in managed care programs. In the present study, all participants had been enrolled in managed care programs and the costs of the pap smear screening were covered as a part of their benefits.

It should be noted that the present study addresses the issue of geographical access among Hispanic/Latina women who were enrolled in a managed health care plan. This group of participants may be very different from other Hispanic/Latina women who are underinsured or noninsured. Underinsurance or the lack of insurance can significantly reduce utilization of preventive health care procedures.

As displayed in the geographical distribution of participant categories, it is apparent that there are “clusters” of patients within a close proximity of the assigned clinics that are not accessing pap smear screening. While geographical distance was a significant factor for obtaining a pap smear screening, it appears that other variables may also influence



accessing this preventive procedure including clinic hours of operation, participant work schedules, and other transportation factors.

In spite of this, it is evident that a significant number of Hispanic/Latina women still do not have access to these potentially lifesaving services. Overall, GIS mapping provides an extremely useful tool to identify the distribution of populations for assessing access to health care services.

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