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Impact of Barriers on Access to Health Care

In Socorro County, New Mexico

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An abstract of

A thesis submitted to the Faculty of the

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2012

Abstract

Impact of Barriers on Access to Health Care
In Socorro County, New Mexico

By Carrie McNeil

Abstract

Purpose: This study evaluates the impact of barriers to accessing health care within a poor, rural, tri-cultural New Mexico county. Specifically, the effect of barriers and demographics on whether a person (1) has a primary doctor, (2) seeks routine care, (3) rates health as fair or poor, and (4) experiences above average days with mental health symptoms, or (5) above average days with activities limited by mental health.

Methods: Predictive models for the above 5 outcomes were developed using SUDAAN to evaluate data adjusted for post-stratification weighting; data had been collected by participants (n=835) in a county-wide health needs assessment in 2011.

Results: Indicators related to poverty and rural residence were positive predictors for reduced use of health services and for reporting a poorer health status. Respondents citing cost as barrier to accessing care had increased odds of not having a doctor (OR 1.75 (1.16-2.63)) and of reporting poor health status (OR 1.59 (1.01-2.50)). Those with annual household incomes below $20,000 had higher odds of reporting increased days with mental health symptoms (OR 1.35 (0.93-1.94)), poor health (OR 1.47 (0.95-2.33)), and not seeking routine care last year (OR 1.47 (1.01-2.17)). Reporting distance as a barrier to accessing care increased the odds a respondent also reported poor health status (OR 1.89 (1.11-3.13)) and/or above average number of days in which activities were limited by overall health (OR 1.73 (1.07-2.80)). Additional significant predictors for the models included differences in ethnicity, having children in the household and identifying clinic hours and citizenship concerns as barriers to accessing healthcare.

Conclusions: In this study, demographics and barriers related to being rural and poor increased the chances that a person lacks a doctor or regular healthcare. Living in poverty and/or outside of the main city also increased the odds a person had poor health status.

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Introduction

The United States has arguably one of the technologically advanced, clinically specialized medical care programs in the world. Access to this care is limited for those who lack insurance, live in poverty or in rural areas without public transport to hospitals, or speak a different language from that of their providers. The rural Southwest faces particular challenges in addressing health disparities due to the diversity of cultures, language limitations, and large distances between residents and medical facilities.

This study provides a unique evaluation of barriers to accessing care in a tri-cultural, impoverished rural community served by Presbyterian Socorro General Hospital (PSGH) in Socorro County, New Mexico. This study will also evaluate whether identified barriers impact perceived health status and whether a person sees regularly a primary care doctor.

Most research on rural health focuses on white rural populations.[1] Disparities among ethnicities in access to care have been studied on a limited basis- often in urban settings. A 1998 study of Latino inner city parents cited cultural differences, poverty, lack of health insurance, transportation difficulties and long waiting times as the major barriers preventing their children from accessing appropriate healthcare.[2] A 2008 study found 21% of Latino children, 15.5% of Native American children in a nationwide survey were uninsured compared to 5.7% of white children.[3] A 2003-04 national survey showed 45.1% of Native American families listed transportation as a limitation to accessing care; compared to 3.9% of whites and Latinos.[4-5]

In evaluating health outcomes at a national level, researchers identified a difference in perceived health quality among whites, Latinos and Native Americans. Among whites, 68.7% reported being in good or excellent health compared to 41.8% of

Latinos and 55% of Native Americans.[6] In the 2003-04 study comparing whites to Native Americans and Latinos, whites were more likely to have a usual source of medical care and a doctor appointment within the past year. [7]

Living in a rural area geographically may also limit care. An *AJPH* 2004 editorial cites transportation, low density, fewer public funds, trouble recruiting medical staff and fragmented resources as challenges faced in providing rural healthcare.[8] In a national survey of rural health leaders, access to quality health services was cited as a priority.[9] One study suggests financial limitations to health care among rural families may be due to the fact that rural jobs are less likely to be unionized and have insurance. They indicate the primary resource is the land, not salary, among rural residents.[10] A North Carolina study also demonstrated transportation is a major issue for rural families who rely on family or friends for transportation.[11]

To date, sufficient evidence does not exist which examines the combined effects of ruralness, poverty and ethnicity on access to healthcare. Socorro County faces significant health disparities (Tables 1 & 2). More than twice as many people in Socorro County die from diabetes-related illness than would be expected based on the national average.[12] Socorro County has 12.4% low birth-weight babies compared to the national 7.6%. [13] One out of 7 mothers smoke and one in five infants are exposed to environmental tobacco smoke within this region[14]. Mental illness and substance abuse disproportionately impact this region. Socorro ranks above state averages for cocaine, ecstasy and prescription pain killer use.[15] Drug-related deaths are almost twice as prevalent in Socorro County as in the rest of the US.[16] Between 2001-2005, 40-60% of domestic violence cases in Socorro County involved alcohol and drug abuse. More than one in ten women are abused during pregnancy.[17]

While the health disparities are clear, the underlying limitations to accessing care have yet to be described for this population. In 2011, in order to determine community

perceptions of health needs and barriers to accessing care, PSGH sponsored a community needs assessment (CNA) targeting the population within the hospital service area of Socorro and eastern Catron Counties which was designed and supervised by this lead author (Appendix 1: Maps). The CNA focused on priority health issues including access to care.

Rural New Mexicans may face challenges accessing care due to issues associated with lack of insurance, poverty, provider shortages, language/cultural barriers and lack of transportation. In New Mexico 32/33 counties are designated federally as health professions shortage areas.[18] A 2010 report indicates a statewide deficit of 400-600 primary care providers and 1000 nurses. Provider shortages are considered to be gravely underestimated due to the fact a third of providers licensed in NM practice out of state and 17% of licenses are inactive.[19] With the 2014 statewide implementation of the U.S. Affordable Care Act, the state is projected to be short 2800 nurses by 2015 with an estimated increase in 350,000 accessing care. [20] New Mexico is 49th out of all the states in percentage of persons without insurance currently.[21]

PSGH provides care throughout the vast 6700 square miles of Socorro County as well as adjacent portions of Catron County (Appendix 1: Maps). PSGH is a 25-bed hospital with emergency facility, located 75 miles from the nearest trauma center in Albuquerque. Part of Socorro County is so remote; it is still considered officially "frontier." Distances across this mostly desert region of New Mexico can make reaching an emergency room or a general doctor office visit an entire day's activity impacting work hours, childcare needs and income (Table 3).

In Socorro County, 27.3% live in poverty and similar levels lack health insurance- 10 % more than state levels.[22] Most recent reports from the Centers for Disease Control and Prevention find that while 40% of adults nationally have at least 1 chronic disease,

an average 25% have not had health insurance for the past year. Forty percent of the uninsured suffering from chronic conditions such as diabetes skipped care due to cost.[23]

Table 1. Ethnicity, Poverty and Population Density for Socorro County, New Mexico and the United States

Values based on preliminary results of 2010 U.S. Census[24]

Location	American Indian/ Alaska Native	Hispanic	Non-Hispanic White	Below Federal Poverty Level (%) 2006-2010	Children in Poverty 2009	Population Density (Persons/ square mile)
Socorro County	11.7%	48.5%	37.6%	26.8	38.9%	2.7
New Mexico	9.4	46.3	40.5	18.4%	28.8	17.0
U.S.	0.9	16.3	63.7	13.8	20	87.4

Table 2. Socorro County Health Indicators Compared to New Mexico and U.S.[25]

Health Indicator	Socorro	New Mexico	US 90th percentile
Percent (%) Low Birth-Weight Babies 2008-2010	9.1	8.5	8.2
Heart –related Deaths (per 100,000) 2007-2009	247.1	203.8	190.9
Unintentional Injury (per 100,000) 2003-2007; U.S. 2003	79.6	62.3	37.3
Alcohol Related Deaths (per 100,000) 2007-2009; U.S. 2005-2007	64.6	52.9	28.1
Diabetes-related Deaths (per 100,000) 2008-2010	54.2	32.5	20.9
Teen Birth Rate 2007-2009 (per 1000 15-17 year-old girls)	41.1	31.6	20.1

Table 3. Distances from Study Sites to PSGH and Albuquerque Hospitals

Location	Miles to PSGH	Time to PSGH	Miles to ABQ	Time to ABQ
Socorro (city)	0-10	0-15 min	75	1-1.5 hrs
Magdalena	25	30 min	100	1.8-2 hrs
Alamo	58	1.2-3hrs	88.1 (dirt)	2-3 hrs
Veguita	36	45 min	44	1 hr
Rural	Varies	0-3 hrs	Varies	0.75-3.5hrs

Within Socorro County in the predominantly migrant town of Veguita, 89.2% of children live in poverty; in the Navajo community of Alamo, 72.5%.[26] In this Hispanic

(47.8%)[27] county, forty percent of homes do not predominantly speak English. Almost half of the residents live outside the main town-- sparsely spread-out, dotted in small towns, off of dirt roads and on ranches throughout the expansive landscape.[28] Transportation, education, economic and cultural disparities presumably make it difficult for many to access health services. In fact, the Socorro County Commissions Resolution 2005-52, "Code of the West" for new residents advises that emergency response times for healthcare in such a rural region cannot be guaranteed and may be slow and expensive.[29] Most federal definitions of "rural" would encompass all areas other than the city of Socorro; some classifications may describe the entire county as "rural."[30] For the purposes of data collected in the CNA, "rural" residents were defined as persons living within the service area of PSGH but not in the villages of Magdalena, Alamo, Veguita or in the City of Socorro.

The PSGH CNA data provide a unique opportunity to quantify how barriers to health care within a rural, poor, diverse southwestern community impact health. Specifically, evaluation of a subset of data from a 2011 countywide health needs assessment will be utilized in this study to determine:

1. After adjusting for demographics, which specific barriers impact:
    a. Whether a person has a primary care doctor
    b. Whether a person has seen a doctor within the past year
    c. Self-reported health status
    d. Number of past 30 days with mental health symptoms
    e. Number of past 30 days with activities limited by mental, physical health

Through developing multi-factorial, predictive models to better understand determinants of healthcare use and self-reported health-status, this study will help identify potential areas for future interventions to improve community health and healthcare access.

Methods

Data Source and Collection Methodology

This research evaluates the impact of barriers to accessing care on health-related issues through a secondary evaluation of cross-sectional, quantitative data collected during the 2011-2012 PSGH Community Needs Assessment.

Data include responses from a countywide survey conducted in English, Spanish and Navajo by trained survey administrators. Only 5% of surveys were conducted aloud; the majority of respondents answered in writing. The target population encompassed people living within the PSGH service area who were over 18 years old and willing to participate in the survey.

Survey questions were developed based on health needs and priorities identified from existing health data and input from local health experts and stakeholders. Prior to administration, the survey was piloted locally in Spanish and English both aloud and in writing. In order to maximize response rates, an outreach campaign was initiated one month prior to survey administration. Outreach efforts included meetings with local government and tribal officials, school leaders and healthcare providers, distribution of handouts about the survey through the schools and local water bills, media coverage and local signs. Due to the rural nature of the area, prevalence of private gated roads and guard dogs, a randomized household sample would not have been possible. In order to capture both rural and non-rural residents, convenience sampling locations were

identified from local stakeholder guidance and were sampled at various times of day and days of the week. Convenience samples primarily involved administrators actively addressing potential respondents by requesting his/her participation in a community health needs assessment. Convenient sites averaged 80% response rates, according to survey administrators. A systematic sample from households in the Veguita area had a response rate of 57.5% (non-respondents = refusals and not home). The first person over 18 years old answering the door was asked to answer the survey at every 4th household (count started with a randomly-chosen home in the northeastern quadrant of Veguita).

Survey sample sizes were based on targets calculated to detect a 10% difference between two groups with 80% power at 95% significance level. In order to ensure representation of under-studied tribal and migrant communities, sample sizes were calculated separately for each community/or strata including Alamo, Veguita, City of Socorro, Magdalena and "other" or "rural" areas.

All survey data were entered by two trained staff into Microsoft Excel 2003. One bilingual staff person entered over 80% of the surveys, including all of the surveys in Spanish. The remainder were entered by a separate trained staff person. Data entry for each survey was double-checked by the needs assessment coordinator (lead author); fewer than 5% of the surveys had an incorrect entry. Data were cleaned for utilization in SUDAAN by this author. With a few exceptions, all non-responses and "other" or write-in answers were coded as missing. Based on input from survey administrators, if a person did not write in the number of children in a household, the response was coded as not having children. For questions about "how many of the past 30 days…" in which someone wrote a number larger than 30, "30" was entered into the database. Questions about perceived barriers to accessing care were asked in a grid; based on survey administrator input, if a person only checked certain barriers as "yes" but did not check

any as "no," the remaining barriers were coded as "no" because many respondents only thought they needed to check those which were "yes." If some barriers were checked as "yes" and some as "no," any additional missing data were left as missing.

Post-stratification weighting of data corrected for the oversampling over people from certain areas. The weighting (Table 2) was based on the ratio of percentage of persons living in an area based on the 2000 U.S. Census to the percentage of persons sampled from an area during the CNA. At the time of the study, the 2010 census data had not been finalized.

Table 4. Post-stratified Weights Based On Sampling Conducted in the Socorro County 2011 Community Needs Assessment Samples

Strata: Location of Residence	Weights
Socorro City	1.2202
Magdalena	0.3720
Alamo	0.3723
Veguita	0.8657
Rural *	1.6331

*Based on 2000 U.S. Census

Data Analysis

Using SAS- based SUDAAN 10.0, descriptive data were assessed using a simple post-stratification weighted design without clusters. To minimize the impact of missing data when modeling the findings, imputed variables were created using the SUDAAN 10.0 Hot Deck Procedure based on non-missing data for age, gender and location of residence for the following. Using this method, five sets of imputed variables were calculated for ethnicity, smoking, income level (including if household income annually was under $20,000 or under $30,000), and the eleven different barriers to accessing care.

Models were developed in SUDAAN using PROC RLOGIST to determine if any barriers or demographics were significantly associated with a change in the likelihood:

- Respondent does not have a primary doctor (Model 1)
- Respondent has not seen provider for routine care this past year (Model 2)
- Respondent reports having poor to fair health as opposed to good, very good, or excellent health (Model 3)
- Respondent reports a higher than expected (based on state averages) number of mental health days (Model 4)
- Respondent reports a higher than expected (based on state averages) number of days in which activities are limited by health (Model 5)

Each model included the variables upon which values had been imputed: age, gender, and location of residence. Multiple imputed variables were included when needed as part of the model. Using a manual step-wise approach due to the fact that SUDAAN does not have an automatic stepwise program, barriers and other demographic variables were included one at a time using each different possible combination (Table 5). Predictors were kept in the models based on whether the beta value for a given variable was significant at alpha=10%. Two continuous outcome variables did not have linear distributions and, therefore, were dichotomized as below or above the state average. "Number of days in the past 30 days in which a person had mental health symptoms" was dichotomized based on above 4 or below 3 days as the state average has been 3.8 days.[31] "Number of days in the past 30 days in which a person had activity limited by mental and/or physical health" were dichotomized as 3 days or less and 4 days and higher due to the state average of 3.4 days.[32]

Emory Institutional Review Board approved this secondary data analysis through an expedited review in February 2012.

Table 5. Model Outcomes and Potential Predictive Variables

Model Outcomes	Predictors	
	Demographic (referent underlined)	**Barriers to Care** (referent=not a barrier)
Model 1 Likelihood person does *not* have at least 1 primary doctor **Model 2** Likelihood person has *not* seen a doctor within past year for routine care **Model 3** Likelihood person reports his/her state of health as fair or poor **Model 4** Likelihood person reports higher than state average number of mental health days (out of past 30 days) **Model 5** Likelihood person reports higher than state average number of days in which activities were limited by physical &/or mental health (out of past 30 days)	**Age (years)*** 18-24 25-44 45-64 >65 **Residence*** Magdalena Alamo Veguita Rural City of Socorro **Ethnicity**** American Indian Hispanic White **Kids at Home** Yes No **Annual household income**** <$20,000 >$20,000 **Gender*** Male Female **Smokes**** Yes No	**No transportation**** **Long distance to care**** **Difficulty scheduling appointment**** **Speaking different language from provider**** **Not having health insurance**** **Cost of medical care**** **Ability to take time from work**** **Concerns about citizenship**** **Not having a phone**** **Unable to find a quality childcare**** **Clinic not open nights and weekends****

*Variables by which other variables were imputed **Variables which were imputed five times

Results

After cleaning data, excluding any data from persons living outside of Socorro County and those who were under 18 years old, 835 surveys remained in the sample. The overall complete data set based on respondents of gender, age and location of residence had a sample size of 783. Gender had 5.63% responses missing; age, 0.06%

missing; and, location of residence, 0% missing. Out of the 835, Alamo had 145 respondents, Magdalena, 112; rural areas, 145; Veguita, 101 and the City of Socorro, 332. Model 1 had a total unweighted sample size of 767; Model 2, n=722 ; Model 3, n= 770 Model 4=730; and, Model 5, n=718. Variation in the sample sizes among the models was due to remaining missing data in outcome variable and/or in the different predictors.

Demographics

Demographic data on gender, income, and age were calculated by location (strata), gender and income level in order to better understand inherent differences in these areas prior to model development (Tables 6-8). These demographic data, adjusted by post-stratification weighting, show a countywide overrepresentation of women (60.15% countywide in sample, 49% census), though the demographics of hospital clients includes 61% women according to the local hospital. Magdalena had almost 70% female respondents, reflecting a greater degree of over-representation. Alamo had the youngest subset of respondents which may be accurate but may also reflect increased language barriers between elders and survey administrators. Magdalena had a higher proportion of seniors over 65 years old (31.25%) which is consistent with expected demographics. Consistent with local data pre-survey, Alamo and Veguita had the highest percentage of persons living on less than $30,000/year household income (135% federal poverty level for a family of 4 in this county).

Table 6. Respondent Age, Income, Number of Kids in Household and Smoking by Location of Residence [% (SE)]

Location of Residence	**18-24 yrs** <0.1% missing	**25-44 yrs** <0.1% missing	**45-64 yrs** <0.1% missing	**>65 yrs** <0.1% missing	**Women** 6% missing	**< $30,000 Household/yr** 22% missing	**Smokers **** 6% missing	**Average # kids* (95% C.I.)** 0% missing
Alamo	17(3)	43 (4)	35 (4)	4 (2)	62 (4)	76 (4)	23 (4)	2.94 kids (2.58-3.29)
Magdalena	5 (2)	28 (4)	36 (5)	31(4)	68 (5)	46 (5)	23 (4)	2.2 (1.9-2.5)
Rural	8 (2)	22 (3)	49 (4)	22 (4)	57(4)	48 (5)	17 (3)	2.18 (1.78-2.58)
Socorro	12 (2)	40 (3)	35 (3)	13 (3)	61 (3)	50 (3)	27 (3)	2.01 (1.84-2.19)
Veguita	9 (3)	45 (5)	33 (5)	14 (3)	62 (5)	67 (6)	18 (4)	2.19 (1.94-2.44)
County	**10 (1)**	**35 (2)**	**39 (2)**	**16 (1)**	**60 (2)**	**52 (2)**	**23 (2)**	**2.18 (2.04-2.32)**

*Only for persons reporting having children under 18 years old in household n=385. **Includes responses that persons smoke cigarettes now some days or everyday. Findings based on SUDAAN weighted estimates from data collected during the 2011 Socorro County, New Mexico Community Needs Assessment . Missing data not included in findings.

Table 7. Reported Barriers to Accessing Healthcare by Location of Residence [% (SE)]

Location of Residence	Lack of Transportation (8% missing)	Distance to clinic (6% missing)	Scheduling an Appointment (7% missing)	Language differences (7%missing)	Lack of Insurance (6% missing)	Cost of Care (6% missing)	Time from Work (7% missing)	Citizenship (8% missing)	No phone (7% missing)	Lack Quality Childcare (7% missing)	No nights or weekend hours (8% missing)
Alamo	37 (4.3)	60 (4)	63 (4)	35 (4)	45 (4)	55 (4)	46 (4)	21 (4)	33 (4)	24 (4)	61 (4)
Magdalena	10 (3)	27 (4)	35 (5)	8 (3)	27 (4)	47 (5)	22 (4)	8 (3)	11 (3)	8 (3)	36 (5)
Rural	10 (3)	19 (3)	34 (4)	6 (2)	23 (4)	39 (4)	24 (4)	5 (2)	5 (2)	8 (2)	29 (4)
Socorro	17 (2)	14 (2)	33 (3)	8 (2)	29 (3)	41 (3)	27 (3)	5 (1)	8 (2)	10 (2)	34 (3)
Veguita	25 (4)	53 (5)	48 (5)	32 (5)	35 (5)	56 (5)	29 (5)	32 (5)	23 (4)	24 (4)	44 (5)
County	17 (1)	23.26 (2)	37 (2)	12 (1)	29 (2)	44 (2)	27 (2)	9 (1)	11 (1)	12 (1)	35 (2)

Based on SUDAAN weighted estimates from data collected during the 2011 Socorro County, New Mexico Community Needs Assessment. Missing data not included in findings.

Table 8. Reported Barriers to Accessing Healthcare by Gender, by Income & for Persons over 65 Years Old [% (SE)]

	Lack of Transportation (8% missing)	Distance to clinic (6% missing)	Scheduling an Appointment (7% missing)	Language differences (7 %missing)	Lack of Insurance (6% missing)	Cost of Care (6% missing)	Time from Work (6% missing)	Citizenship (7% missing)	No phone (7% missing)	Lack Quality Childcare (7% missing)	No nights or weekend hours (8% missing)
Male	13 (2)	21 (2)	35 (3)	10 (1)	29 (2)	42 (3)	27 (3)	8 (2)	11 (2)	10 (2)	29 (3)
Female	18 (2)	23 (2)	37 (2)	13 (1)	28 (2)	44 (3)	26 (2)	9 (1)	10 (1)	13 (2)	37 (2)
>65 Years Old	15 (4)	21 (4)	27 (5)	8 (3)	20 (4)	34 (5)	9 (3)	7 (2)	11 (3)	5 (2)	23 (4)
<$30,000	24 (2)	31 (3)	37 (3)	17 (2)	39 (2)	54 (3)	31 (3)	15 (2)	14 (2)	15 (2)	38 (3)
>$30,000	7 (2)	14 (2)	37 (3)	6 (2)	14 (2)	33 (3)	25 (2)	4 (1)	5 (1)	9 (2)	32 (3)

Based on SUDAAN weighted estimates from data collected during the 2011 Socorro County, New Mexico Community Needs Assessment. Missing data not included in findings.

Model 1: Persons Having or Not Having at Least One Primary Care Doctor

On the survey, respondents answered a questions about whether they had one, more than one or no person whom they concerned a primary/regular doctor. While countywide weighted descriptive data showed 7 out of 10 persons had a primary doctor, discrepancies were apparent between locations. As an example, Veguita, the migrant community, had almost 30% fewer respondents stating they had a primary doctor compared to other locations (See Table 9).

Table 9. Outcome 1: Whether or Not Respondent Has At Least 1 Regular Doctor

	1 or more regular doctors	No regular doctor / Not sure
Alamo	58.87% (SE 4.16)	41.13% (SE 4.16)
Magdalena	66.36 (4.53)	33.64 (4.53)
Rural	74.82 (3.69)	25.18 (3.69)
Socorro	77.44 (2.31)	25.18 (2.31)
Veguita	48.45 (5.1)	51.55 (5.1)
Men	68.33 (2.91)	31.67 (2.91)
Women	74.23 (2.14)	25.77 (2.14)
<$30,000	68.08 (2.69)	31.92 (2.69)
>$30,000	78.14 (2.6)	21.86 (2.60)
County 2.4% missing	**71.90% (1.68)**	**28.1% (1.68)**

Based on SUDAAN weighted estimates from data collected during the 2011 Socorro County, New Mexico Community Needs Assessment. . Missing data not included in findings.

In order to better understand the determinants of having a doctor, a predictive logistic model was developed. Using the multiple- imputed variables and all additional

predictors listed in Table 5, (except for smoking), a model was developed to predict the likelihood a respondent did not have at least one primary doctor. Each barrier was assessed individually and in groups together; during this model development, it was apparent the barriers each appeared significant individually but were not significant when included with a similar barrier (for example, cost and insurance barriers). The barriers included in the final model stayed significant when other barriers were included in the model and contributed to the -2 log-likelihood. The final model (n=767, incorporating the 5 imputed models) had -2 normalized log likelihood ratio (chi-square) =99.51 with 10 degrees of freedom (Table 10).

When accounting for other predictors, men had lower odds of having a doctor than women, those 18-44 years old had lower odds of having a doctor than those over 65 years old, and those living in Veguita, Alamo and Magdalena were less likely to have a person considered their primary doctor than those in the city of Socorro. Respondents identifying cost or clinic hours as a barrier to accessing healthcare were more likely to not have a regular doctor.

Table 10. Outcome 1: Determinants of Whether Respondent Does *Not* Have a Regular Doctor

Variable	Referent	Odds Ratio (CI)	Beta (SE)	P-value
Male	Female	1.64 (1.12-2.38)	0.49 (0.19)	0.0100*
18-24 yrs old	>65 yrs	5.26 (2.50-11.11)	1.65 (0.38)	0.0000*
25-44 yrs old	>65 yrs	2.86 (1.54-5.26)	1.05 (0.32)	0.0010*
45-64 yrs old	>65 yrs	1.20 (0.64-2.27)	0.18 (0.32)	0.5670
Alamo	City of Socorro	2.00 (1.25-3.23)	0.69 (0.24)	0.0040*
Magdalena	City of Socorro	2.13 (1.23-3.70)	0.76 (0.28)	0.0074*
Rural	City of Socorro	1.45 (0.85-2.44)	0.37 (0.26)	0.1670
Veguita	City of Socorro	3.85 (2.22-6.25)	1.33 (0.27)	0.0000*
Cost Barrier	Not a Barrier	1.75 (1.16-2.63)	0.56 (0.20)	0.0066*
Clinic Hours Barrier	Not a Barrier	1.49 (0.99-2.27)	0.40 (0.21)	0.0577*

(* significant at alpha=0.10). Findings based on SUDAAN weighted estimates from data collected during the 2011 Socorro County, New Mexico Community Needs Assessment. . Missing data not included in findings.

Model 2: Persons Having Not Seen a Provider for Routine Care within 1 Year

The survey provided respondents the opportunity to state if they had seen a health care provider for a routine visit with 1 year, 2 -5 years, over 5 years or never. Since an annual wellness doctor's visit is recommended, responses were dichotomized into those who had seen a healthcare provider within 1 year for routine care and those who had not for the purposes of developing a model (Table 11).

Table 11. Percent of Respondents Who Had or Had Not Seen Doctor for Routine Care within Past Year [% (SE)]

	Provider within 1 year	Did not see provider within 1 year
Alamo	64.17 (4.39)	35.83 (4.39)
Magdalena	67.29 (4.56)	32.71 (4.56)
Rural	64.96 (4.09)	35.04 (4.09)
Socorro	64.06 (2.69)	35.94 (2.69)
Veguita	60.42 (5.02)	39.58 (5.02)
Men	62.36 (3.11)	37.64 (3.11)
Women	65.09 (2.48)	34.91 (2.48)
>65 Years Old	81.23 (3.87)	18.77 (3.87)
County 6.47% missing	**64.10 (1.89)**	**35.90 (1.89)**

Based on SUDAAN weighted estimates from data collected during the 2011 Socorro County, New Mexico Community Needs Assessment. Missing data not included in findings.

In evaluating which demographics and barriers to care might predict whether persons had not seen a provider for a routine visit within the past year, a model was created using the parameters in Table 3 and whether or not a person had a regular doctor. Smoking was not included. Income level was included at both the $20,000 and $30,000/year cutoffs—with $20,000 as a cutoff providing a stronger predictor. The final model included n=722, had an approximate Chi square (-2loglikelihood ratio) of 106.99 with 11 degrees of freedom (Table 12).

This model showed gender and location do not significantly impact whether or not someone has seen a doctor within the past year. This may be because the variance related to these parameters is included in the data of whether a person has a doctor.

Gender and location of residence were retained in the model as they were used to impute income and barrier data. Having at least one primary doctor is the strongest predictor of going to a doctor for routine care. Persons over 65 years old were significantly more likely to see a provider for routine care within the past year than each of the younger age brackets. Persons in households with annual income under $20,000 were significantly more likely to have not seen a doctor last year. Respondents with children under 18 years old at home were more likely to have seen a doctor for routine care.

Table 12. Outcome 2: Determinants of Whether Respondent Did *Not* See Provider for Routine Care Within 1 Year

Variable	Referent	Odds Ratio (CI)	Beta (SE)	P-value
Male	Female	1.05 (0.72-1.54)	0.05 (0.19)	0.7760
18-24 yrs old	>65 yrs	2.50 (1.08-5.88)	0.91 (0.43)	0.0326*
25-44 yrs old	>65 yrs	3.03 (1.54-6.25)	1.12 (0.35)	0.0015*
45-64 yrs old	>65 yrs	2.94 (1.56-5.56)	1.09 (0.33)	0.0009*
Alamo	Socorro	0.76 (0.44-1.30)	-0.27 (0.27)	0.3172
Magdalena	Socorro	0.99 (0.56-1.72)	-0.01 (0.28)	0.9648
Rural	Socorro	1.11 (0.69-1.79)	0.11 (0.24)	0.6589
Veguita	Socorro	0.79 (0.44-1.41)	-0.24 (0.30)	0.4163
<$20,000/yr	>$20,000/yr	1.47 (1.01-2.17)	0.39 (0.19)	0.0440*
Having 1+doctor	No doctor	0.20 (0.31-0.30)	-1.6 (0.21)	0.0000*
Kids in home	No kids	0.70 (0.46-1.06)	-0.36 (0.21)	0.0923*

* Significant at alpha 0.10 Findings based on SUDAAN weighted estimates from data collected during the 2011 Socorro County, New Mexico Community Needs Assessment. . Missing data not included in findings.

Model 3: Self-Reported State of Health

The survey asked respondents to describe their current state of health as excellent, very good, good, fair or poor. Descriptive results (Table 13) show that Alamo had the lowest percentage overall of respondents stating they had “excellent” health and

that those making under $30,000/year household income had half as many reporting "excellent" health as those making over $30,000/year.

Table 13. Reported State of Health by Location, Income and Gender [% (SE)]

	Excellent	Very Good	Good	Fair	Poor
Alamo	5.56 (1.92)	22.22 (3.48)	40.28 (4.1)	28.47 (3.77)	3.47 (1.53)
Magdalena	16.36 (3.54)	38.18 (4.65)	25.45 (4.17)	13.64 (3.29)	6.36 (2.34)
Rural	15.71 (3.09)	32.14 (3.96)	40 (4.15)	10 (2.54)	2.14 (1.23)
Socorro	16.51 (2.06)	29.97 (2.54)	34.25 (2.63)	17.13 (2.09)	2.14 (0.8)
Veguita	13 (3.38)	25 (4.35)	31 (4.65)	27 (4.46)	4 (1.97)
Men	15.87 (2.31)	30.63 (2.94)	38.94 (3.11)	12.44 (2.0)	2.11 (0.86)
Women	15.43 (1.88)	29.41 (2.31)	32.73 (2.39)	19.56 (1.94)	2.87 (0.81)
<$30,000	11.57 (1.92)	27.01 (2.63)	34.9 (2.81)	22.72 (2.39)	3.8 (1.09)
>$30,000	22.41 (2.68)	33.87 (2.99)	33.39 (2.99)	9.05 (1.75)	1.29 (0.69)
County 1.68% missing	**15.18 (1.4)**	**29.95 (1.77)**	**35.48 (1.85)**	**16.74 (1.38)**	**2.64 (0.59)**

Based on SUDAAN weighted estimates from data collected during the 2011 Socorro County, New Mexico Community Needs Assessment . . Missing data not included in findings.

The model dichotomized health status as fair/poor or excellent/very good/good in order to better understand true predictors of self-reported fair or poor states of health while adjusting for all other demographics. For this model, parameters including smoking from table 3 were included. Having a doctor or seeing a doctor were not included as it was not possible to determine direction of association. Final model (Table 14) had n=770, Chi-square=85 (-2Log Likelihood Ratio) with 14 degrees of freedom.

Men were half as likely to report poor or fair health as women. Those 18-44 years old reported a better health status significantly more than those over 65 years old, though those 45-64 years old did not have a significant difference from their elders.

Location of residence was not a significant predictor. Whites were less likely to report poor or fair health than either Hispanics or American Indians. Those with lower incomes had higher odds of reporting poor to fair health as did smokers compared to non-smokers. Persons reporting cost or distance to clinic as barriers to accessing care were more likely to report poor to fair health. Transportation as a barrier had a significant p-value when in the model but did not change the -2log likelihood when removed and, therefore, was not included in this model.

Table 14. Outcome 3: Determinants of Self-Reported Poor to Fair Health

Variable	Referent	Odds Ratio (CI)	Beta (SE)	P-value
Male	Female	0.56 (0.36-0.88)	-0.57 (0.23)	0.0116*
18-24 yrs old	>65 yrs	0.14 (0.05-0.40)	-1.96 (0.53)	0.0002*
25-44 yrs old	>65 yrs	0.36 (0.19-0.69)	-1.02 (0.33)	0.0024*
45-64 yrs old	>65 yrs	0.68 (0.38-1.25)	-0.38 (0.3)	0.2134
Alamo	Socorro	1.20 (0.45-3.23)	0.19 (0.50)	0.7014
Magdalena	Socorro	0.83 (0.44-1.56)	-0.19 (0.32)	0.5639
Rural	Socorro	0.60 (0.31-1.15)	-0.51 (0.33)	0.1222
Veguita	Socorro	1.61 (0.88-2.94)	0.47 (0.3)	0.1166
Hispanic	White	2.17 (1.23-3.85)	0.93 (0.49)	0.0568*
American Indian	White	2.56 (0.97-6.67)	0.79 (0.29)	0.0074*
Household income <$20,000	>$20,000/yr	1.47 (0.95-2.33)	0.39 (0.22)	0.0802*
Cost as Barrier	Not a barrier	1.59 (1.01-2.50)	0.47 (0.34)	0.0434*
Distance as Barrier	Not a barrier	1.89 (1.11-3.13)	0.63 (0.26)	0.0177*
Smoker	Non-smoker	1.89 (1.16-3.13)	0.64 (0.25)	0.0110*

*Significant at alpha=0.10. Findings based on SUDAAN weighted estimates from data collected during the 2011 Socorro County, New Mexico Community Needs Assessment. . Missing data not included in findings.

Model 4: Number of Days with Mental Health Symptoms

Respondents wrote in on the survey how many days- out of the past 30 days- they had symptoms of anxiety, sadness, depression, stress and worry. Women, persons in Veguita and Alamo, and persons living in the lower income bracket all reported a higher average number of days. (Table 15)

Table 15. Average Number of Days during Past 30 Days with Mental Health Symptoms and/or Activity Limited by Physical-Mental Health Issues

	Number of Days Depressed, Anxious (95% CI) 7.07% missing	Number of Days Activity Limited by Physical &/or Mental Health (95% CI) 8.74% missing
County	**6.96** (6.24-7.69)	**3.42** (2.85-3.99)
Males	**5.5** (4.47-6.54)	**2.84** (2.01-3.66)
Females	**7.86** (6.85-8.87)	**3.59** (2.82-4.36)
<$30,000	**8.17** (7.0-9.33)	**4.49** (3.49-5.5)
>$30,000	**5.25** (4.23-6.28)	**2.06** (1.4-2.72)
Alamo	**8.3** (6.64-9.95)	**5.6** (4.1-7.11)
Magdalena	**6.66** (4.91-8.41)	**4.18** (2.61-5.75)
Rural	**5.0** (3.56-6.44)	**2.46** (1.38-3.53)
Socorro	**7.71** (6.63-8.79)	**3.41** (2.56-4.25)
Veguita	**8.04** (6.03-10)	**4.49** (2.57-6.42)

Based on SUDAAN weighted estimates from data collected during the 2011 Socorro County, New Mexico Community Needs Assessment. . Missing data not included in findings.

The distribution of the number of days was not linear; therefore, the data were dichotomized into those with mental health days 4 and over and those with 3 and under. The cutoff was based on the state average of 3.5 days with mental health systems out of the past 30 days. It is important to note this is still higher than the national benchmark of 2.3 days.[xxxiii]

Men had lower odds of having higher than expected mental health days than women. In terms of locations of residence, rural persons had a significantly decreased odds of having higher than expected mental health days. Persons with children in their home had a higher odds compared to those without, as did those with concerns about citizenship and insurance as barriers to accessing care. No differences were found comparing younger respondents to those over 65 yrs olds. This model (Table 16) had an overall sample size of 730, -2 log likelihood for the full model 940.95; chi-square 59.61 (df13).

Table 16. Outcome 4: Determinants of Higher Number of Days with Mental Health Symptoms than State Average

Variable	Referent	Odds Ratio (CI)	Beta (SE)	P-value
Male	Female	0.73 (0.52-1.04)	-0.31 (0.18)	0.0811*
18-24 yrs old	>65 yrs	1.73 (0.84-3.53)	0.55 (0.36)	0.1353
25-44 yrs old	>65 yrs	1.14 (0.63-2.03)	0.13 (0.3)	0.6684
45-64 yrs old	>65 yrs	1.52 (0.88-2.63)	0.42 (0.28)	0.1291
Alamo	Socorro	0.99 (0.61-1.59)	-0.01 (0.24)	0.9595
Magdalena	Socorro	0.95 (0.58-1.55)	-0.05 (0.25)	0.8411
Rural	Socorro	0.64 (0.4-1.01)	-0.45 (0.23)	0.0555*
Veguita	Socorro	1.0 (0.6-1.66)	0.0 (0.26)	1.0
<$20,000/yr	>$20,000/yr	1.35 (0.93-1.94)	0.3 (0.19)	0.1103
Smoker	Non-smoker	1.91 (1.27-2.9)	0.65 (0.21)	0.0022*
Kids in household	No kids in household	1.38 (0.95-1.99)	0.32 (0.19)	0.0879*
Citizenship as barrier	Not a barrier	1.63 (0.9-2.97)	0.49 (0.3)	0.1056
Insurance as barrier	Not a barrier	1.47 (0.99-2.18)	0.39 (0.2)	0.0534*

(*Significant at alpha=0.10) State average (>4 days/30days). Findings based on SUDAAN weighted estimates from data collected during the 2011 Socorro County, New Mexico Community Needs Assessment. Missing data not included in findings.

Model 5: Reported Number of Days with Activity Limited due to Mental and/or Physical Health Issues

Respondents were also asked to write in the number of days a month in which they were not able to work or had normal activities limited by mental and/or physical health issues. Basic descriptive percentages show a pattern similar to the responses to

the mental health day question—with women, poor people and persons in Alamo and Veguita having the highest number of days (Table 15). Due to absence of a linear distribution, this variable was dichotomized for logistic regression using the cutoff of the state average of 3.4 days/month.[xxxiv]

The model included 718 responses and had a log likelihood ratio of 41.28 (12 df). (Table 17). The model showed no significant relationship between limited activity days and gender or age. The model showed Alamo residents had a significantly higher likelihood to have more than expected days limited by health issues compared to the City of Socorro residents. Having children under 18 in the home was associated with a 50% higher odds of having more days with activities limited by health; those with distance as a barrier to care had a significantly increased (almost doubled) odds of having higher than expected limited activity days from health. Respondents with citizenship as a barrier to care also were more likely to have higher than expected limited activity days than persons without this barrier.

Table 17. Determinants of Having More Days Limited by Mental and/or Physical Health than Expected Based on State Average

Variable	Referent	Odds Ratio (CI)	Beta (SE)	P-value
Male	Female	0.81 (0.53-1.24)	-0.21 (0.22)	0.3329
18-24 yrs old	>65 yrs	1.13 (0.48-2.64)	0.12 (0.43)	0.7757
25-44 yrs old	>65 yrs	0.56 (0.28-1.15)	-0.58 (0.36)	0.1138
45-64 yrs old	>65 yrs	1.03 (0.53-1.99)	0.03 (0.34)	0.9387
Alamo	Socorro	1.65 (0.96-2.84)	0.5 (0.28)	0.0717*
Magdalena	Socorro	1.3 (0.73-2.31)	0.26 (0.29)	0.3657
Rural	Socorro	0.69 (0.38-1.23)	-0.38 (0.3)	0.2069
Veguita	Socorro	0.76 (0.37-1.53)	-0.28 (0.36)	0.4360
Kids in household	No Kids in HH	1.54 (0.97-2.45)	0.43 (0.24)	0.0662*
Smoker	Non-smoker	1.69 (1.06-2.71)	0.53 (0.24)	0.0289*
Distance is a barrier	Not a barrier	1.73 (1.07-2.80)	0.55 (0.24)	0.0250*
Citizenship is a barrier	Not a barrier	1.9 (0.95-3.81)	0.64 (0.35)	0.0701*

Based on SUDAAN weighted estimates from data collected during the 2011 Socorro County, New Mexico Community Needs Assessment. . Missing data not included in findings.

Discussion

The models created in this study demonstrated that, in fact, the presence of certain barriers to accessing care may either decrease one's use of healthcare or may impact self-perceived health status. In addition, the models reflected that demographic parameters significantly increased the odds of using healthcare or significantly impacted perceptions of one's current health status.

Model 1

Model 1 used demographic parameters and barriers to care from the 2011 Community Needs Assessment survey results to identify predictors of whether or not a respondent had at least one primary care or personal doctor. Basic descriptive analyses showed that persons living in the migrant community appeared to be much less likely to have a doctor than persons in the other areas; persons bringing home more than $30,000 household income appeared more likely to have a doctor than others countywide.

The model confirmed that, when adjusting for other demographics and reported barriers to healthcare, the residents in predominantly migrant Veguita were one-fourth as likely to have a doctor as the people in the city of Socorro. Persons in Alamo and Magdalena were half as likely. Veguita (Appendix 1), unlike Socorro, Alamo and Magdalena, does not have any primary care clinics. Magdalena's clinic, at the time of the survey, had been using *locum tenens* providers and did not have a regular provider present. The lower level in Alamo may reflect a lower use of care or, possibly, the fact that they may not see the same provider on subsequent clinic visits. Alamo has a clinic open Monday-Friday, available to all residents on the reservation.

Men were less likely to have a doctor than women. This is consistent with the knowledge that women are the primary consumers of healthcare within this community. Outreach to men in the community about men's health concerns may be useful in helping men choose to access care. Persons under 44 years old were less likely than those over 65 years old to have a regular doctor. This may be due not only to the fact that those over 65 years old have a higher likelihood of chronic illness but also to the fact that those over 65 years old are eligible for Medicare, making paying for healthcare more possible than for their younger counterparts. Healthy choices in diet, exercise and smoking in those under 44 years old may lead to healthier senior years. Therefore, outreach to improve use of medical services in the younger generations may be indicated. Further evaluation is needed to determine if the younger persons are not using care due to financial concerns or lack of knowledge about need for routine wellness care.

Adjusting for age, gender, and location of residence, the model showed that those who found cost to be a barrier to care were much more likely to have a personal doctor. This may indicate a need for improving community knowledge on existing options for lower-cost care, such as the sliding payment scales at the non-profit clinic in the City of Socorro and in Magdalena. Expansion of community-based health services, in which promotoras provide care within the communities, may also be a way to decrease cost and provide care through a consistent provider. Clinic hours were also a significant barrier to respondents. The county lacks any after-hours care other than at the emergency room, potentially making it less likely a person will seek care for an urgent but not emergent need on nights and weekends. The clinic hours barrier may also reflect other time-related barriers, such as needed childcare or being able to take time off of work.

Overall, Model 1 demonstrated a need to develop provider-patient relationships among men, persons under 44 years old, and persons living in Alamo, Magdalena or

Veguita. Frequent provider turnover within this region suggests consideration of expansion of community-based promotoras to provide a consistent healthcare liaison with these communities may be an option. Additionally, both improving knowledge of existing health care financing options and improving low-cost care will help those who, due to cost barriers, were about 30% less likely to have a regular provider. The model also demonstrated that an evaluation as to why people need an after-hours clinic (is it due to after-hours issues or lack of being able to take daytime hours away from work/childcare) is important to remove this as a barrier to care. Having an after-hours, non-emergency clinic may improve the number of persons with a regular doctor—so long as providers working those shifts were consistent.

While other barriers were significant individually, the final model found only cost and clinic hours to remain significant. Due to the fact these parameters absorbed the variance explained by the other barriers, one cannot totally exclude those other barriers as potential predictors. For this model, income levels were not significant indicators on their own; however, economic issues were included in the parameters of residence and cost as a barrier.

Model 2

Descriptive analyses of who had seen a doctor within the past 1 year, 1-2 years, 2-5 years or never demonstrated that persons in Veguita and those with <$30,000 reported annual household income had highest number of persons not seeing a doctor within the past 5 years. It is also noteworthy that Alamo had 17% missing data for this question. The model evaluated not only the impact of demographics and barriers to care

but also, logically, whether or not someone had a primary doctor. The model focused on who had or had not seen a doctor within 1 year.

The strongest predictor, by far, was whether or not a person had a primary doctor—persons with a doctor were almost 5 times as likely to have seen a provider within the past year for a routine visit. Model 1 demonstrated that several groups did not have a regular doctor; this model indicates those groups will also be at greater risk of not going in for routine annual doctor's visits. Gender and location of residence were not significant in this model but, as significant predictors of having a doctor, may be accounted for within that parameter.

For this model, everyone under 65 years old was about a third as likely to have seen a doctor for routine care compared to those over 65 years old. This may be due to chronic issues in the >65 year old cohort or to the fact those >65 years old have Medicare covering routine annual healthcare visits. Income was also a significant determinant; those with household incomes under $20,000/year were 30% less likely to have seen a doctor within the past year. Having children under 18 years old within the home was a protective factor making persons 150% more likely to have seen a doctor for routine care. This could be due to various factors including children coverage with state-supported health insurance, children may bring more illnesses into a home, having the responsibility of caring for children makes people more likely to take care of themselves, and persons using WIC or other child-related services may be more aware of low-cost healthcare options for families.

Model 2 again shows poverty impacts use of medical care services. It also shows outreach to persons without children regarding need for routine visits may be useful. Above all, Model 2 clearly shows that making sure people have a person they consider a regular/primary-care doctor is critical to ensuring they receive annual wellness care.

Models 1 and 2 discussed use of healthcare- who has a doctor and who goes to the doctor. Models 3-5 evaluate impact of barriers and demographics on self-reported health care status. The relationship between state of health and use of care is a challenge to describe. Persons with illness may go to the doctor more, or may go less if unable to reach medical care. Persons with more days with poor mental health or limited activities may see a provider more, or could easily be too depressed to get care at all. Therefore, Models 3-5 do not include the outcomes from Models 1 and 2 and focus solely on demographics, which- for these models- included smoking status, and barriers to accessing healthcare.

Model 3

A likert scale outcome was provided in the survey to help people report their current state of health, ranging from poor to fair to good to very good to excellent. Descriptive analyses shows persons in Alamo and those making under $30,000 report having "excellent" health less often. The model consolidates the outcome of self-reported health status into two groups for logistic regression: fair/poor and good/very good/excellent.

Many factors showed up as significant determinants of health status. Men report having good to excellent health almost twice as often as women; those under 44 years old report much better health than those over 65 years old; whites were almost twice as likely to report good heath as those self-identified as Hispanic or American Indian (in this location, Navajo). Smokers were half as likely to report a current good-excellent state of health as those not smoking at all.

Poverty again played a role. Respondents from households with < $20,000 /year and those for whom cost is a barrier to care were 30%-40% less likely to report good health. Unlike in earlier models, Model 3 included both household income and cost as a barrier in the model as significant predictors. Distance as a barrier to health care also appears to negatively impact how a person feels. The model does not describe why this is the case. It may be that unhealthy people find distance is a barrier because they are not able to receive care. Alternatively, people with a barrier of long distance to care may feel worse even if they receive care simply due to the exhaustion or suffering from traveling to the doctor while ill for a long distance over bad roads.

Women report poorer health though they were more likely to see a doctor annually and to have a personal doctor in the first two models. Further evaluation of whether women are receiving sufficient care to improve quality of life and of why they report poorer health would be advised. Young persons report better health and, from earlier models, do not use healthcare as frequently. These findings reiterate a need to educate younger persons on the need for visits to providers for preventive care—as a self-perceived notion of health may not indicate true underlying medical health status. Smokers clearly are at higher risk for many chronic and acute health conditions. This community has higher prevalence of smoking compared to national levels—smoking cessation and prevention efforts are indicated.

The ethnic differences, even when adjusted for income levels, are difficult to explain. Cultures may differ in how they define health as good or poor. Cultural inequities in terms of not just income level but housing, hours worked, family responsibilities may all play a role in terms of how one feels.

Model 4

Descriptive findings showed persons in Veguita, Alamo and those with lower income were anxious, sad, depressed, stressed or worried more often than a quarter of the time. These values greatly exceed state levels of 3.8 days out of past 30 days.

The model shows men less likely to have these "mental health" days than women; which may partially explain why women report a poorer overall state of health. Rural people were less likely to report poor mental health compared to those in the city of Socorro. Income under $20,000 was significant at 11% (not 10%) but changed the – log likelihood and, was kept in the model, as it shows a trend of poorer persons to have more mental health days. Persons concerned about insurance as a barrier to care were 50% more likely to have higher than expected days with poor mental health. The city of Socorro and the Alamo Clinic provide mental health services on an outpatient basis; mental health as a local need was a top priority identified in the development of the original survey. Providing community information about which insurance companies locally cover mental health services, what types of mental health support are available without cost may potentially decrease mental health days among those with insurance concerns. Smokers were twice as likely to have mental health days; this may be due to overall poor health status from smoking or may be related to the fact that an addiction to one substance may be comorbid with other addictions or mental illnesses.

The model shows having children under 18 years old in the house increases odds of having higher than expected number of mental health days which may be due to the fact that a person with increased responsibilities may be sleep deprived and/or more likely to feel worried. Model 2 showed children in a home increased likelihood persons seek healthcare annually- though model 2 did not separate out persons seeing a provider for mental or physical health issues.

Persons with citizenship concerns report higher than expected numbers of days with poor mental health. Not being a citizen and concern about deportation may, in and of itself, increase the days a person is anxious and worried. Not being a citizen may also lead to a sense of isolation from one's culture –potentially, lending to sadness or depression. Persons who are not citizens may have concerns about seeking health care due to concerns about being reported as being illegal residents in a community.

Model 5

Having suboptimal health may or may not impact one's daily life. The survey included the question about who had days with limited activities to better understand the impact of self-perceived health status on daily life and productivity. Descriptive analyses were inconclusive due to overlapping confidence intervals for average number of days when comparing demographics to each other.

The model did not find gender or age as significant factors. Out of the locations assessed, only those in Alamo had a higher likelihood of reporting more than expected days of limited activity. Persons in Alamo live an hour from Socorro and half an hour from Magdalena where they need to go to get groceries, pick up mail, do laundry and- for many- work. These distances may make it much more difficult for persons in Alamo who are not feeling well to complete daily activities.

Reported mental health days and limited activity days were higher for persons with children. This may be due to the fact a person with kids in the home has more responsibilities and more activities—increasing the chances all activities could be completed if a person was not feeling well. This relationship of health status and having children in the home needs further exploration and evaluation as to whether improved

childcare or promotoras who could provide family-health care in the home will help people with children in the home feel healthier. Each location, including the City of Socorro, have extremely limited to no formal childcare available.

Just as smokers had poorer self-reported health, they had almost 70% higher odds of having higher than expected limited activity days. These findings make sense because smoking leads to so many severe illnesses including asthma, chronic heart disease and cancers.

In this model, persons reporting distance to care or citizenship as barriers to care had higher than expected days limited by health. With a similar pattern found as with mental health days, it is probably poor mental (more than physical) health may be contributing to the limited activity days among persons reporting these barriers.

Conclusions

Demographic Differences in Access to Care and Status of Health

Demographic determinants were significant in all models- though, were not the same across all models. Gender differences reflect a potential need for outreach to men to increase use of routine, wellness services and a need to better understand why women report poorer overall health. Further investigation as to why Hispanics and American Indians report poorer overall health status is also indicated. Models showed a need to improve use of routine care among persons under 44 years old, despite their reported good to excellent current health status. Due to the significantly poorer health status and reported days with poorer mental health or limited activities among smokers, community health may be helped through improved smoking cessation and prevention programs. Childcare programs and/or healthy-family initiatives may help lower the

number of poor mental health and limited activity days among those with children in the home. People reporting clinic hours as a barrier were less likely to have a doctor- an evaluation of the role of childcare in this issue would be useful as well.

Impact of Being Rural and Poor on Accessing Care and Health Status

Poverty and geography became apparent as key socio-environmental determinants to health care use and health status. Persons with household income less than $20,000/year or with cost or insurance as a barrier to care were found to be significantly less likely to have a doctor, less likely to use routine care, more likely to report poor health and more likely to report higher than expected poor mental health days. Not all residents living outside of the city of Socorro report distance as a barrier to accessing care—presumably, because they may work in town or have ready transportation to town. However, persons reporting distance as a barrier showed up as having significantly poorer outcomes on each of the health status questions. Distance concerns may not have shown up as significant on the model describing predictors of having a primary care doctor because each of the most distant locations showed up as significant in those models. Distance as a barrier may also be an issue for Model 2 but incorporated into the parameter describing who has a primary doctor. While it would be logical that anyone who knows they have a primary doctor would be more apt to visit a doctor annually, this finding is crucial in a community known for high provider turnover as it indicates lower turnover and consistent providers may improve healthcare.

Being poor in a rural area means more than facing challenges paying bills- rural poor may not be able to find transport to a clinic, may not have the education to understand need for routine wellness visits and may not have time between working

multiple jobs to go to a daytime clinic. The fact that poverty and distance related demographics and barriers were present in all 5 models demonstrates that rural poverty is a determinant of health in this county.

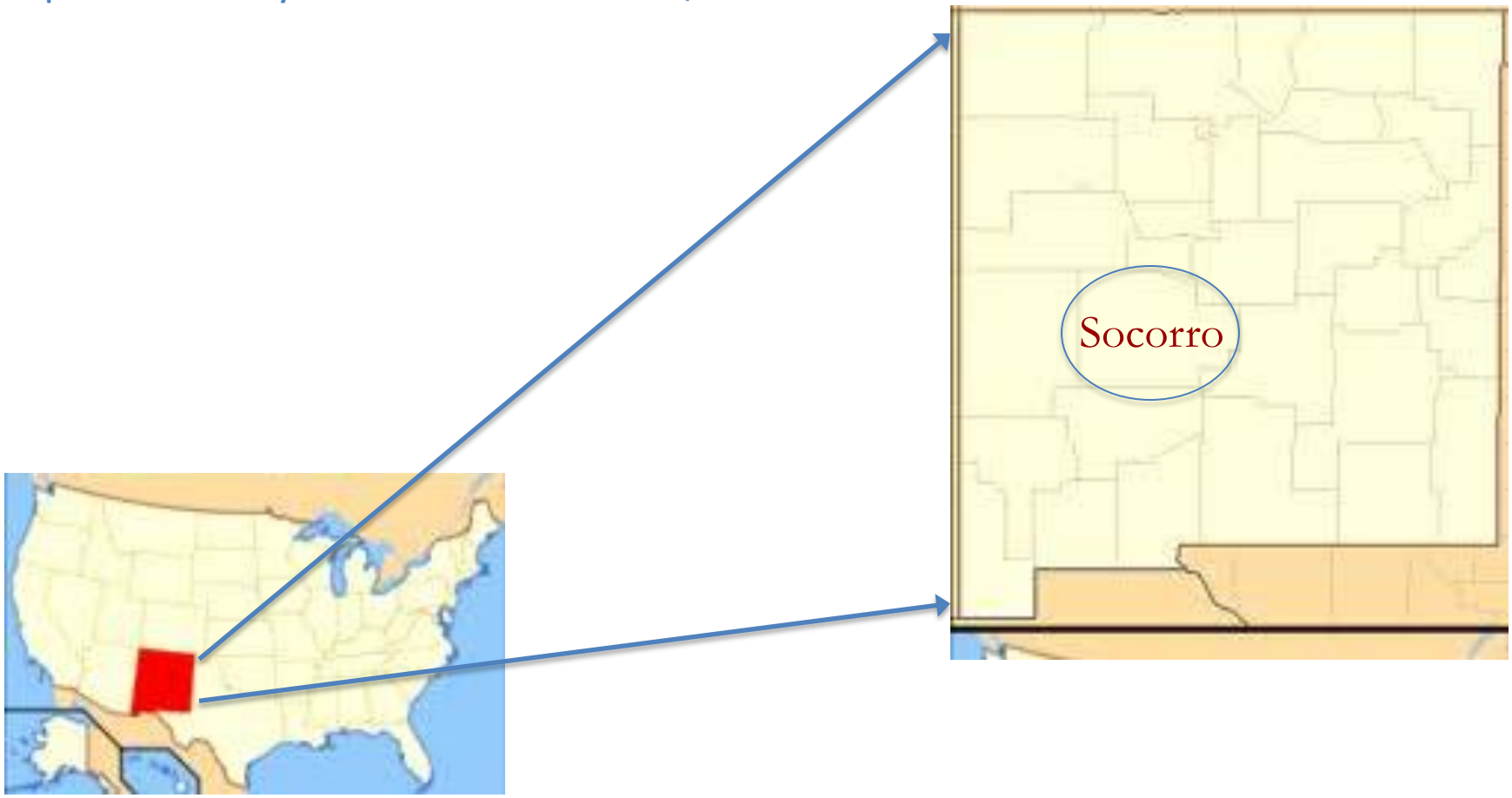
This research was limited by the accuracy of responses on a survey, by the accuracy of imputed data—particularly for income which had over 1/5 of respondents not answering or declining to state as well as by the 5% missing data for gender (which was used for imputation). The analyses were also complicated by the fact that relationships between health care use and self-reported health status are not unidirectional. Additionally, in each model, many more barriers were shown as significant when added to the model on an individual basis. However, the stepwise addition of various other barriers would change a parameter to no longer being significant. Cost and insurance; clinic hours, time from work and childcare often seemed to correlate but only the parameter remaining significant was kept in the model. Ideally, any follow-up studies will create one variable for financial barriers, one for distance and one for time. The way the data were reported in this study did not allow for those changes ex post facto. So, any programs created to address these significant barriers should not assume the other barriers in the survey are not important. Program development to address barriers will include more detailed information gathered through community-member and stakeholder qualitative input.

Despite limitations, all models identified significant differences between how residents across this vast county use health services and feel about their health. Socorro County is plagued with disproportionate levels of diabetes, mental illness and other conditions. Disparities in health indicators cannot improve if affected or at-risk persons cannot access healthcare. This study has identified cost and distance as critical barriers to accessing care. Additionally, the identified demographic predictors for lower care or

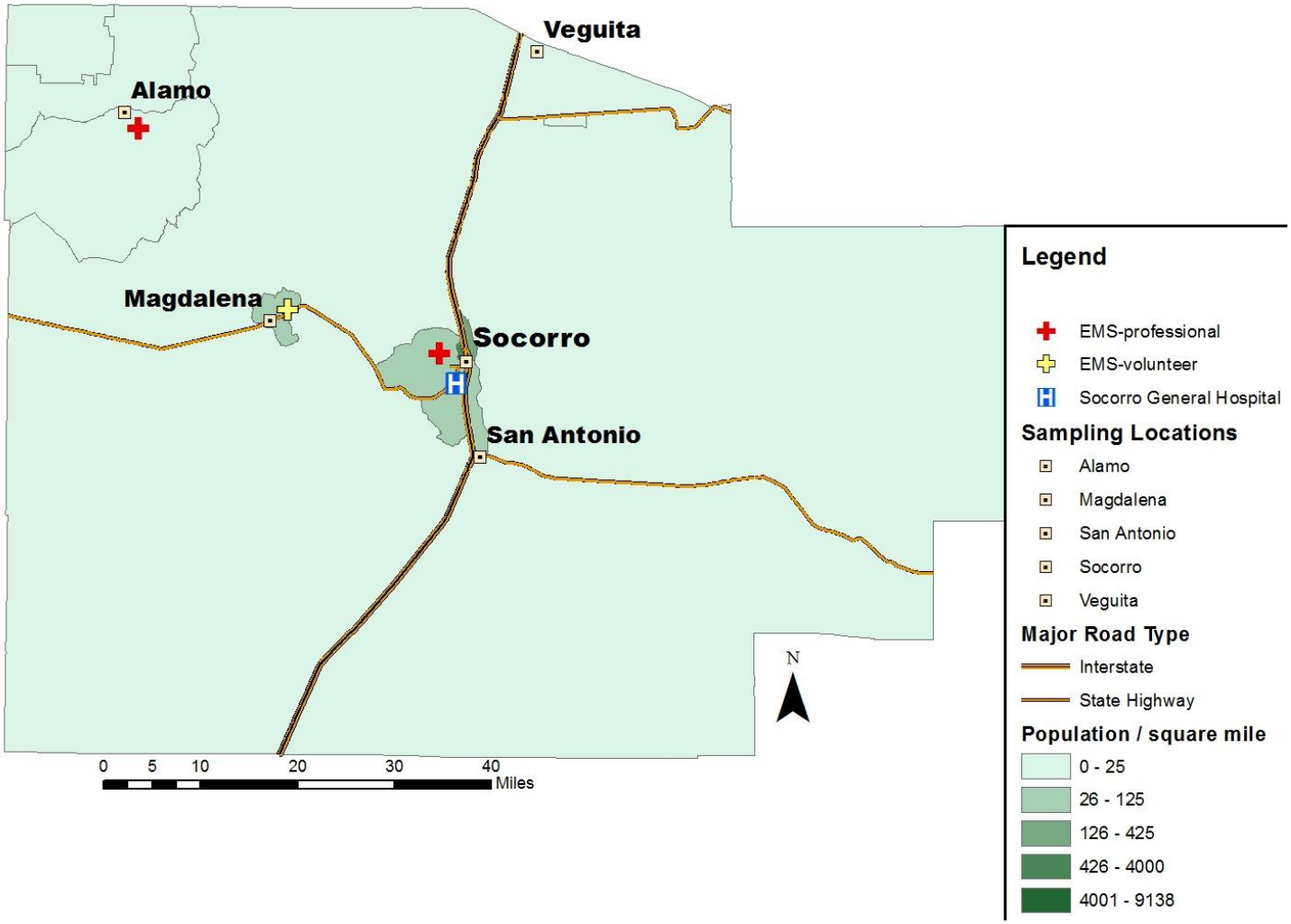
poorer health status may be useful in prioritizing health outreach efforts. This study not only demonstrated that those living in Alamo and Veguita were more likely to face not having or seeing a doctor despite being more likely to report poorer health. Future research on this issue and program development prioritizing these communities is indicated by these data.

Appendix 1: Maps

Map 1: Socorro County location in the Southwestern Quadrant of New Mexico



Map 2: Sampling Sites for the 2011 Socorro County Community Needs Assessment



Map developed with ARC-GIS using of data from the 2000 U.S. Census from the New Mexico Resource Geographic Information System (rgis.unm.edu). Population based on census blocks.

Appendix 2: Survey Questions from 2011 Socorro County CNA

Note: Only includes questions used specifically in these analyses

Where do you live?
(San Antonio and other small villages were included within the Ranch/Farm/Rural Category; persons beyond the county were excluded)

☐ (01) Alamo
☐ (02) Magdalena
☐ (03) Ranch/Farm/Rural
☐ (04) San Antonio
☐ (05) Socorro (City)
☐ (06) Veguita
☐ (77) Other _____

What is your age? (check appropriate box)
(The two samples from persons under 18 were removed prior to this analysis)

☐ (01) Under 18 years
☐ (04) 45-64 years
☐ (02) 18-24 years
☐ (05) 65+ years
☐ (03) 25-44 years

Gender?

☐ (01) Male
☐ (02) Female

What is your ethnicity? *(For the model, this variable was consolidated into Hispanic, White and AI/AN due to very low % other ethnicities)*

☐ (01) American Indian/Alaska Native
☐ (02) Asian/Pacific Islander
☐ (03) Black/African American
☐ (04) Hispanic/Latino
☐ (05) White
☐ (99) Not Sure
☐ (77) Other _____
☐ (88) Do not want to answer

How many children <u>under the age of 18</u> live in your household?
_____ number of children
(For this project dichotomized into having or not having children in household)

About how long has it been since you last visited a doctor for a routine checkup (not an exam for a specific injury, illness)? (CHECK 1)
(For this project, 02, 03, 04 & 05 were combined)

☐ (01) Within past year
☐ (02) 1-2 years ago
☐ (03) 2-5 years ago
☐ (04) Over 5 years
☐ (05) Never
☐ (99) Don't Know

Do you have one person you think of as your personal doctor or health care provider? (CHECK 1)

(For this project, 01 & 02 were combined)

☐ (01) Yes, only one
☐ (03) No
☐ (02) More than one
☐ (99) Not Sure

In general, would you say your health is (CHECK 1)
(For this project, 04 & 05 were grouped; as were 01, 02 & 03)
☐ (01) Excellent
☐ (02) Very Good
☐ (03) Good
☐ (04) Fair
☐ (05) Poor

During the past 30 days, how many days did you feel sad, anxious, stressed, depressed, or worried? _____ days (#0-30)

During the past 30 days, how many days did physical or mental health problems keep you from doing your usual activities, like work and recreation? _____ days (#0-30)

There are many reasons people decide to not seek medical care when they are sick. (CHECK 1 BOX FOR EACH LINE)
Do any of the following reasons make it <u>difficult</u> for you to seek medical care for yourself or family member?
☐ **Yes** (01) ☐ **No** (02) ☐ **Not Sure** (99)
a) No transportation to the doctor's office/hospital/clinic
b) Long distance to the doctor's office/hospital/clinic
c) Difficulty scheduling an appointment
d) Speaking different language from health care provider
e) Not having health insurance
f) Cost of medical care
g) Ability to take time from work
h) Concerns about citizenship
i) Access to phone to call health care provider
j) Unable to find a quality childcare
k) Clinic not open nights and weekends
☐ Other reasons that make seeking healthcare more difficult when you or a family member is sick: _____

Do you now smoke cigarettes (*not* traditional/ceremonial tobacco)?
(For this study: "smokers" include both every day and someday smokers)
☐ (01) Every day
☐ (02) Some days
☐ (03) Not at all
☐ (99) Not sure

What is your household's yearly income? (CHECK 1)
(Evaluated in the models for </>$20,000; </> $30,000 and by decile)
☐ (01) <$10,000
☐ (02) $10,000-$19,000
☐ (03) $20,000-$29,000
☐ (04) $30,000-$39,000
☐ (05) $40,000-$49,000
☐ (06) $50,000- $59,000
☐ (07) $60,000-$69,000
☐ (08) >$70,000
☐ (99) Do not know

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