USE OF PREVENTIVE SCREENING FOR CERVICAL CANCER AMONG LOW-INCOME PATIENTS IN A SAFETY-NET HEALTHCARE NETWORK
Gertrude Adobea Owusu, BSc (Hons.) GDCS, MA, MPH

Dissertation Prepared for the Degree of
DOCTOR OF PHILOSOPHY

UNIVERSITY OF NORTH TEXAS
May 2003

APPROVED:
Susan Brown Eve, Major Professor
Cynthia Cready, Minor Professor
Erma Jean Lawson, Committee Member
Stanley Ingman, Committee Member
Ximena Urrutia-Rojas, Committee Member
Rudy Seward, Chair of Graduate Studies in Department of Sociology
Dale E. Yeatts, Chair of the Department of Sociology
David Hartman, Dean of School of Community Service
C. Neal Tate, Dean of the Robert B. Toulouse School of Graduate Studies

This study is a secondary analysis of survey data collected in fall 2000 from patients of a safety-net hospital and its eight community health outreach clinics in Fort Worth, Texas. The study examined three objectives. These include explaining the utilization of Pap smear tests among the sample who were low-income women, by ascertaining the determinants of using these services.

Using binary logistic regressions analyses primarily, the study tested 10 hypotheses. The main hypothesis tested the race/ethnicity/immigration status effect on Pap smear screening. The remaining hypotheses examined the effects of other independent/control variables on having a Pap smear.

Results from the data provide support for the existence of a race/ethnicity/immigration status effect. Anglos were more likely to have had a Pap smear, followed by African Americans, Hispanic immigrants, and finally, by Hispanic Americans. The persistence of the race/ethnicity/immigration status effect, even when the effects of other independent/control variables are taken into account, may be explained by several factors. These include cultural differences between the different groups studied.

The race/ethnicity/immigration status effect on Pap smear screening changed with the introduction of age, usual source of care, check-up for current pregnancy, and having multiple competing needs for food, clothing and housing into the models studied. Other variables, such as marital status, employment status and health insurance coverage had no statistically significant effects on Pap smear screening. The findings of this study are unique, probably due to the
hospital-based sample who has regular access to subsidized health insurance from a publicly funded safety-net healthcare network and its healthcare providers.

Given the importance of race/ethnicity/immigration status for preventive Pap smear screening, public education efforts to promote appropriate Pap smear tests among vulnerable populations should target specific race/ethnicity/immigration status groups in the U.S. within the cultural context of each group. Furthermore, publicly funded health programs for underserved populations such as the John Peter Smith Connections and Medicaid should be maintained and strengthened.
Copyright 2003

by

Gertrude Adobea Owusu
ACKNOWLEDGEMENTS

I am especially grateful to the Lord God Almighty for all His goodness toward me, including bringing me this far in my studies. I am also especially grateful to Drs. Susan Eve and Cynthia Cready, my major and minor professors, respectively. Dr. Eve recruited me to the University of North Texas (UNT), and has been with me through thick and thin in the process of my studies. Dr. Cready, who gave me special assistance with data analyses and statistics, has been like an angel God brought my way at the right time. My special thanks also go to the rest of my committee members—Drs. E. Lawson, who started the dissertation process with me, S. Ingman and X. Urrutia-Rojas for all their help, support and assistance.

I am also indebted to Dr. and Mrs. J. R. Oppong and their children whose home has been my home in Denton and who has given me all the support a Ghanaian ‘extended family’ would give. My special appreciation also goes to Dr. David Williamson, who was a part of my recruitment to UNT and gave me help in various ways.

I owe a special gratitude also to my family, especially the Akotos, who have always been there for me in various was, including taking care of my son Amanor so I would concentrate on completing my studies at UNT. To my sons, Amanor and Nana Osei, I remain indebted for your sacrifice for me whilst I studied. Akos (Lydia Owusu) is also worthy of mentioning. The “I am/we are praying for you” never ceased from my family.

My appreciation also goes to my friends who in diverse ways assisted and walked with me through the process of pursuing graduate level education at UNT. Worthy of mention here are Kathleen Wildwood, Afua Obeng-Manu, Vicky Ani Gyebi-Donkor, Gloria Osei, Esther Boateng, Sharon Walker, Rodney McDanel, Vanessa Gilbert-Cronen, Ernie Polydore, Janette Gleeton, Evans and Vera Odei, Jones and Afia Amanor Darkwa and Dr. A. R. Moore.
My bosses Kay Selby, Lynn Bissett and Betty Tomboulian at UNT Academic Publications remained my cheerleaders till the last end. Professor (Dr.) Nana Araba Apt of the University of Ghana, Legon, contributed immensely to my getting to the final stage of my Ph.D. studies. Dr. Foster Amey of Middle Tennessee State University was of special help. To others who have helped in various ways, whom I have not mentioned specifically, I remain indebted.

On another level, I am indebted to Dr. Susan Brown Eve and her team of investigators who made their data readily available for my use at no expense. Data used in this dissertation were collected under the auspices of a grant to Susan Brown Eve, Ph.D., Principal Investigator, Department of Applied Gerontology, University of North Texas; from the Texas Higher Education Coordinating Board’s Advance Research Program (Grant No. 003594-0120-1999).
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACKNOWLEDGMENTS</td>
<td>iii</td>
</tr>
<tr>
<td>LIST OF TABLES</td>
<td>vi</td>
</tr>
<tr>
<td>LIST OF ILLUSTRATIONS</td>
<td>vii</td>
</tr>
<tr>
<td>1. INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>2. RESEARCH QUESTIONS, THEORETICAL FRAMEWORK, LITERATURE REVIEW, MODEL AND HYPOTHESES</td>
<td>13</td>
</tr>
<tr>
<td>Research Questions</td>
<td>13</td>
</tr>
<tr>
<td>Background/Justification</td>
<td>14</td>
</tr>
<tr>
<td>Theoretical Framework</td>
<td>22</td>
</tr>
<tr>
<td>Literature Review</td>
<td>31</td>
</tr>
<tr>
<td>Access to Pap Smear Screening Among Specific Racial and Ethnic Groups</td>
<td>38</td>
</tr>
<tr>
<td>Theoretical Model</td>
<td>47</td>
</tr>
<tr>
<td>Objectives of the Study</td>
<td>52</td>
</tr>
<tr>
<td>Study Variables and Empirical Model</td>
<td>52</td>
</tr>
<tr>
<td>Hypotheses</td>
<td>57</td>
</tr>
<tr>
<td>3. METHODOLOGY</td>
<td>59</td>
</tr>
<tr>
<td>Research Design</td>
<td>59</td>
</tr>
<tr>
<td>Population and Sample</td>
<td>67</td>
</tr>
<tr>
<td>Statistical Analyses</td>
<td>70</td>
</tr>
<tr>
<td>4. RESULTS AND DATA ANALYSIS</td>
<td>97</td>
</tr>
<tr>
<td>Bivariate Analyses</td>
<td>98</td>
</tr>
<tr>
<td>Logistic Regression Analyses</td>
<td>110</td>
</tr>
<tr>
<td>Testing of Hypotheses</td>
<td>146</td>
</tr>
<tr>
<td>5. SUMMARY, CONCLUSION, POLICY IMPLICATIONS, RECOMMENDATIONS</td>
<td>169</td>
</tr>
<tr>
<td>APPENDIX</td>
<td>204</td>
</tr>
<tr>
<td>REFERENCE LIST</td>
<td>205</td>
</tr>
</tbody>
</table>
# LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Variables being examined in the study</td>
<td>53</td>
</tr>
<tr>
<td>2. Frequencies of the recoded dependent variable</td>
<td>80</td>
</tr>
<tr>
<td>3. Frequencies of race/ethnicity/immigration status</td>
<td>82</td>
</tr>
<tr>
<td>4. Frequencies of the control variable</td>
<td>91</td>
</tr>
<tr>
<td>5. Bivariate analyses of percentage having Pap smear ever by selected characteristics</td>
<td>99</td>
</tr>
<tr>
<td>6. Bivariate analyses of percentage having Pap smear within the last three years by Selected characteristics</td>
<td>103</td>
</tr>
<tr>
<td>7. Bivariate analyses of percentage having Pap smear within the past year by selected characteristics</td>
<td>107</td>
</tr>
<tr>
<td>8. Odds ratios from binary logistic regressions of Pap smear screening ever on selected factors</td>
<td>117</td>
</tr>
<tr>
<td>9. Odds ratios from domain-specific binary logistic regressions of Pap smear screening ever on selected factors</td>
<td>119</td>
</tr>
<tr>
<td>10. Odds ratios from binary logistic regressions of Pap smear screening within the last three years on selected factors</td>
<td>127</td>
</tr>
<tr>
<td>11. Odds ratios from domain-specific binary logistic regressions of Pap smear screening within the past year on selected factors</td>
<td>130</td>
</tr>
<tr>
<td>12. Odds ratios from binary logistic regressions of Pap smear screening within the past year on selected factors</td>
<td>135</td>
</tr>
<tr>
<td>13. Odds ratios from domain-specific binary logistic regressions of Pap smear screening within the past year on selected factors</td>
<td>139</td>
</tr>
<tr>
<td>14. Summary of significant effects from odds ratios from binary logistic regressions of Pap smear screening ever, within the last three years and within the past year on selected factors</td>
<td>172</td>
</tr>
</tbody>
</table>
# LIST OF ILLUSTRATIONS

<table>
<thead>
<tr>
<th>Figure</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The behavioral model for vulnerable populations</td>
<td>48</td>
</tr>
<tr>
<td>2. Empirical model of the effect of race/ethnicity/immigration status on Pap smear screening among low-income women</td>
<td>55</td>
</tr>
</tbody>
</table>
CHAPTER 1

INTRODUCTION

Chapter 1 is a summary of the rest of the study—chapters 2-5. Chapter 2 is on research questions, theoretical framework, literature review, model and hypotheses, and chapter 3 is on methodology. Chapter 4 covers results and data analyses. The final chapter, chapter 5, is on summary, conclusions, policy implications and recommendations.

The objectives of the study are (a) to explain the utilization of Pap smear tests among the group of low-income women who were patients in a safety-net healthcare system by ascertaining the determinants of using these services; (b) to highlight policy relevant variables that may lead to changes in utilization of Pap smear screening services for the populations of low-income women using safety-net healthcare networks; and (c) to add to the literature on utilization of preventive Pap smear screening. My primary interest is in women’s health and this study is primarily on utilization of Pap smear screening.

Using secondary data collected by Eve, Koelln, Baumer, Trevino and Urrutia-Rojas (2000) from clients of the safety-net hospital and its community health outreach centers in Fort Worth, Texas, the study identified the strength of the mechanisms from race/ethnicity and immigration status, which influence the utilization of preventive Pap smear screening among a group of female low-income sample. The sample is a mixed one with most (60%) of them being racial and ethnic minorities, and immigrants. Such a sample is obviously a vulnerable one (Aday, 1993, 2001; Shi, 2001). The concept of vulnerability is explained later in this and subsequent chapters.
Research Questions

The study adapted and utilized the Behavioral Model for Vulnerable Populations to attempt to answer the following questions: 1) What is the role of race/ethnicity/immigration status in receiving Pap smear screening for preventing cervical cancer among a group of low-income, vulnerable women in the U.S.? 2) How is the relationship mediated by personal and family resources, such as health insurance coverage, employment for self, and having a usual source of care? 3) How is the relationship affected by competing needs for basic needs such as transportation, food, clothing and housing? 4) What will be the impact of healthcare system challenges such as experiencing difficulties with handling paperwork for healthcare? 5) How does health status affect the relationship? 6) What is the effect of demographic variables such as age and marital status on the relationship?

Background/Justification

The poor, minorities and uninsured are experiencing declining access to healthcare in America. Overall, they utilize preventive healthcare services less (Ferlay et al., 2001; Gotay and Wilson, 1998; Mandelson and Thompson, 1998; Martin et al., 1996; National Cancer Institute (NCI), 1999a; 2001a; Perez-Stable et al., 1994; Navarro et al., 1998; Ropes, 1991; Yi, 1994). Race/ethnicity/immigration status constitutes an important variable in the relationship between being poor in the U.S., access to healthcare, and use of preventive and promotive health services. Factors that hinder access to and utilization of needed healthcare may prevent early identification and treatment of disease, with the possibility that the care may be more expensive in the long run, in financial and human costs (Ropes, 1991).

The Papnicolaou (Pap) test or Pap smear is used to screen for cancer of the cervix (NCI, 2000; 2001a, b). Globally, cervical cancer is often the most common type of cancer among
Cervical cancer mortality rate in the U.S. is about 20-50% that of incidence rates. The highest age-adjusted incidence rate found in a national longitudinal study in the U.S. is 43 per 100,000. This occurs among Vietnamese women, which may suggest lack of prior screening. African American women have the highest age-adjusted mortality rates, followed by Hispanic women. Also, African American women have the highest mortality from cervical cancer in each age group, followed by Hispanic women in their late teens and early twenties. Chinese women aged 70 years or more rank next (Howe et al., 2001; NCI, 1996; 2001a).

There are indications of low Pap smear and other preventive health services use in the U.S. (Bolen et al., 2000; Coffield et al., 2001; Gotay and Wilson, 1998). This is particularly so for low-income women (Martin et al., 1996; Valdini and Cargill, 1997). About half of 15,700 patients who were estimated to develop cervical cancer in the U.S. in 2000 would never have had a previous Pap smear test (National Institutes of Health, 1996).

To a large extent, however, deaths from cervical cancer are preventable if detected and treated early. In fact, it has been amply demonstrated that Pap smear test is effective for the early detection and possible cure of cervical cancer. There is general consensus that in its earliest stages of development, cervical cancer is 100% treatable (Ferlay et al., 2001; NCI, 2001a). It, therefore, leaves much to be desired that some women in the U.S. fail to utilize Pap smear screening services.

Several explanations have been offered for this dismal situation, with race and ethnicity being the most cited covariates for these differences. Racial and ethnic minorities, particularly Hispanics, are known to have the worst Pap smear screening incidence (Gotay and Wilson, 1998; Martin et al., 1996; Perez-Stable et al., 1994). It has been suggested that part of the reason for the low-utilization of minorities in cancer screening prevention is that they have a history of negative
experiences with the healthcare system (Brown et al., 2000). Shireman et al. (2001) suggest that time costs associated with cervical cancer screening represent an important opportunity cost and need to be considered in studies which attempt to identify barriers to utilization of screening.

Nevertheless, even when preventive services are free and when there are no competing needs such as need for transportation, childcare, and health insurance, people may not utilize them (Mandelson and Thompson, 1998; Strong, 2000; Weinrich et al., 1995; York et al., 1999). Moreover, it may be easier for people to use preventive screening care for mammography than for Pap smear (Coughlin et al., 1997; Martin et al., 1996; Wee et al., 2001).

Theoretical Framework

The conceptual framework for this dissertation is the Behavioral Model for Vulnerable Populations (Gelberg, Andersen and Leake, 2000), building on the work of Aday (1993). Focusing on social structural variable of race/ethnicity/immigration status, this dissertation assessed the effects of this predisposition to vulnerability, and need for healthcare based on perceived health status, on utilization of preventive screening for cervical cancer.

Following Aday, several health services researchers have adopted the concept of vulnerability and its effect on the health of population subgroups in the U.S. These researchers include Andersen et al. (2000), Colantonio et al. (2001), Gelberg et al. (2000), Kosloski et al. (1999) and Shi (2001). Shi (2001: 520) defined vulnerability from the health perspective as the likelihood of experiencing poor health. She stated further that vulnerability is determined by the convergence of predisposing, enabling, and need characteristics at both individual and ecological levels. Vulnerability is relative, with some groups of the population being more vulnerable than others because they face a greater risk. Individuals who find themselves at the intersection of
these three determinants of vulnerability at all two levels are most vulnerable. Vulnerable populations have multidimensional health problems and consequently, greater health needs.

The concept of vulnerability as used by Aday (1993; 2001) is sociological. It stems from within the social structure, can be remedied by it, and focuses on the social determinants of health and illness. According to her, vulnerable populations have low social status and limited social or human capital. Aday defines vulnerability as “being at risk of poor physical, psychological, or social health,” based on the World Health Organization’s definition of health (Aday, 2001; World Health Organization, 1948). Aday’s list of vulnerable populations in the U.S. includes immigrants and refugees, high-risk mothers and infants, the mentally ill and disabled, the chronically ill and disabled, HIV/AIDS infected persons, alcohol and substance abusers, the homeless, the suicide prone and abusive families (Aday, 1993; 2001). Others include people of color, the poor and non-English speaking patients (Aday, 1993; Shi, 2001).

The Behavioral Model proposes three independent variables, which primarily determine the use of health services. These are predisposing, enabling and need factors. Predispositions to healthcare utilization include individual characteristics, which predict the propensity to use healthcare. These include demographic and social structural factors such as age, gender, race and ethnicity, level of education, marital status, family composition and health beliefs. Enabling factors are those that enable or impede use of healthcare services. Generally, these reflect family and community resources. They include social and emotional support, health insurance and income, availability of health and social resources and personnel, as well as utilization of these. Others are region of residence or geographic location. Finally, need characteristics encompass diet, exercise, use of health services, health status, self-perceptions of need and objective
evaluations of need, as well as satisfaction with care (Andersen et al., 2000; Colantonio et al., 2001; Gelberg et al., 2000; Kosloski et al., 1999).

The model suggests that these variables need to be considered when studying the use of health services and health outcomes for vulnerable populations. Predisposing factors to vulnerability might affect the use of health services and the health status of vulnerable groups (Aday, 1993, 1994; 2001; Gelberg, 1996; Gelberg et al., 2000; Kosloski et al., 1999; Rew, 1996). This study adapted and used Gelberg et al.’s (2000) Behavioral Model for Vulnerable Populations, concentrating on the social structural predisposing factors, particularly race/ethnicity/immigration status.

Variables Studied, Hypotheses and Statistical Procedures

The primary independent variable for the study was race/ethnicity/immigration status, categorized as African American, Hispanic American, Hispanic immigrant and Anglo. The dependent variable, Pap smear screening, was categorized as screening a) ever, b) screening within the last three years, and c) screening within the past year. Health behavior was measured by self-reported use or non-use of Pap smear services. Health insurance coverage, employment status and usual source of healthcare were used as intervening control variables. Additional intervening variables include check-up for current pregnancy, problems with handling paperwork for healthcare, competing needs for healthcare and health status.

It was expected that race/ethnicity/immigration status will affect utilization of Pap smear screening. Racial and ethnic minorities and immigrants were expected to be more vulnerable, compared to Anglos, thereby 1) exhibit lesser Pap smear screening; 2) the personal and family resources, check-up for current pregnancy, problems with handling paperwork for healthcare,
competing needs and health status were expected to intervene in the relationship between the independent and dependent variables; and 3) to partially explain the relationship between race/ethnicity/immigration status and having or not having preventive Pap smear tests. The study tested ten hypotheses.

A close-ended questionnaire, which had been pretested, was used in collecting the primary data. Measurements in the primary study were done at nominal and ordinal levels mainly. Consequently, the data were analyzed using frequencies, percentages, bivariate cross-tabulations and multivariate binary logistic regression. Significance test based on chi-squared was also used. Alpha level for the chi-squared test is reported at \( p \leq 0.05 \).

Research Design/Methods

The study is a secondary analysis using the female sub-sample of a previously existing survey data on working-age adults of 18 to 60 years collected in fall 2000. The original study for which the sample was collected aimed at examining use of healthcare services among working age adults who use a publicly funded safety-net healthcare provider. The sample of low-income adults who had been patients in the safety-net hospital or its community outreach clinics in July and August 2000 were selected to participate in interviews (Eve, Koelln, Baumer, Trevino and Urrutia-Rojas, 1999).

The sampling frame comprised of a total population of 10,000 patients from the list of patients seen in July and August 2000 in the safety-net hospital and its community outreach centers. It was collected from the payment office of the safety-net healthcare system. A final sample of 2,034 was drawn from the list of patients presented by the safety-net healthcare network, using Computer Assisted Telephone Interviewing (CATI) technique. The female sub-
sample of 1,382 (67.9%) was used as the unit of observation for this study. After exercising some restrictions, the sample was reduced to 1,170, which was used as the unit of analysis. 

Results/Findings

Results from the more rigorous binary logistic regression analyses provide support for the existence of a race/ethnicity/immigration status effect on Pap smear screening ever and within the last three years, but not within the past year. Moreover, the findings from the bivariate analyses support the significant effects of race/ethnicity/immigration status on Pap smear screening ever, but neither screening within the last three years nor within the past year. Recall bias could be playing a role here (Martin et al., 1996).

As was expected, both the multivariate and the bivariate analyses lend credence to the hypothesis that Anglos would be more likely to screen for Pap smears. Contrary to expectations, however, African Americans, followed by Hispanic immigrants, and finally by Hispanic Americans were more likely to have had a Pap smear, after whites. This was, however, for Pap smear screening ever and within the last three years, as mentioned already. This finding is not surprising, and reflects the fact that African Americans are more likely to qualify for public services, such as Medicaid, than do Hispanic Americans. This is because majority of African Americans are U.S. citizens. On the contrary, a large proportion of Hispanics are foreign born (U.S. Census Bureau, 2002). The finding that Hispanic immigrants were more likely to have had a Pap smear in this study remains a paradox.

In fact, the race/ethnicity/immigration status effect on having a Pap smear prevailed, even when the effects of other independent/control variables were taken into account. Anglos were still more likely than other racial/ethnic/immigration status groups to have had a Pap smear. This finding could be due to cultural differences between the different groups studied, fatalistic beliefs
stemming from culture, communication difficulties and/or barriers for the minority groups and
immigrants, and also due to reported discrimination against minorities within the healthcare
system (Bakemeier et al., 1995; Chavez et al., 1997; Hahn et al., 2001; Hubbell et al., 1996;
Oropesa et al., 2000; Ramirez et al., 2000).

Moreover, none of the variables studied fully supported the hypotheses. Age, having a
usual source of care, having a check-up for the current pregnancy, and having competing needs
for food, clothing and housing partially explained the effects of race/ethnicity/immigration status
on Pap smear screening. Age has the potential of both encouraging and discouraging having a
Pap smear, based on whether a woman is old or young. Not surprising, having a usual source of
care was also helpful for Pap smear screening. Nevertheless, having competing needs for food,
clothing and housing had the potential to overshadow the beneficial effects of having a usual
source of care. The effect of having a check-up for current pregnancy was substantively
important for Pap smear screening. This effect of having a check-up for current pregnancy could
be due to the significant effect of prenatal care for a current pregnancy as a trigger for Pap smear
screening as part of the prenatal care.

The effects of marital status, employment status, health insurance coverage, having a
problem with paperwork for healthcare, competing needs for transportation and perceived health
status do not explain the race/ethnicity/immigration status effect on having a Pap smear. These
variables, however, may have substantive importance. In fact, marital status and age served as
suppressor variables for the race/ethnicity/immigration status effect on having a Pap smear
within the last three years.
Strengths and Limitations

Conceptualizations of race and ethnicity in the U.S., and poverty status are problematic (Bavier, 2000/2001; Betson, 1997; 1998; 2000; 2001; Doyle, 1997; Hahn, 1992; Hahn et al., 1992; Osborne and Feit, 1992; Short, 2001; Short and Iceland, 2000; Siegel and Passel, 1979; Tapper, 1999). The study may have problems with reliability and validity by adopting some of these already existing problematic definitions of race and ethnicity. Furthermore, the study may have some limitations. These include a possible selection bias due to self-selection and non-response from some of the respondents. Also, the non-inclusion of individuals without a telephone, which is particularly an issue for immigrant households, is a problem. Immigrants are less likely to have telephone in their homes due to socioeconomic reasons, such as low income and high mobility (U.S. Census Bureau, 2002). Recall bias is another potential problem (Martin et al., 1996). The inability of the study to establish causality is common to all cross-sectional measures. Results cannot be generalized to populations outside those studied.

Alternatively, the study has several strengths. One of these is the race, ethnicity and immigration status effect. The mixed sample, with differences in race, ethnicity, country of origin, immigration status with diversified duration of stay in the U.S., and primary language, is another strength. This is very unique. The literature indicates, for instance, that minority populations in the U.S., particularly Hispanics, utilize Pap smear test the worse. Also, cultural norms associated with differences in ethnicity affect definitions of need for healthcare, and perceptions about physical examinations. The convenient use of high quality secondary data at no cost, and the expertise of the highly qualified diverse group of investigators for the primary study are particularly important (Babbie, 1998).
Moreover, the study adds to the literature on utilization of preventive Pap smear screening. First, its population is different from others in the literature. It is from a publicly funded county safety-net healthcare system. People who use county health facilities are normally those who are vulnerable and have to cope with several distracting aspects of such public healthcare systems, such as rationing of care and long waiting times. Studies show that healthcare system orientation and other related healthcare system factors limit the use of preventive healthcare (Cohen et al., 1991; Franks and Clancy, 1993; Lurie et al., 1993; Mandelson and Thompson, 1998; Wee et al., 2001). This makes the sample very different from all other samples described in the literature on this topic. Most studies use samples from private health networks.

Second, the low-income population studied here is often neglected in other studies. Third, the study focused on the effect of race, ethnicity and immigration status. In the U.S., race, ethnicity and immigration status give very important variables for social stratification and inequality. In particular, race and ethnic effect is known to largely determine access to resources such as health insurance, regular source of healthcare, and even referral for follow-up healthcare (American Public Health Association, 1982; Evans, et al., 1994; Ropes, 1991; Ob/Gyn News, 1989; Starr, 1982; Syme and Berkman, 1994). Lastly, the study contributes to the theoretical model being studied by elaborating and improving upon it.

Conclusions and Policy Implications

The study concludes that race/ethnicity/immigration status is a strong predictor of Pap smear screening, predicting screening ever and within the last three years, but not screening within the past year. Having a check-up for current pregnancy has a substantively important effect on having Pap smear tests. Having a usual source of care has a strong significant additive
effect on Pap smear screening within the past year. However, having multiple competing needs for food, clothing and housing may override the important effect of having a usual source of care on Pap smear screening. The results of the study may be underscored by the uniqueness of the sample used for this study, compared to the general population. Among other factors, they are relatively younger, with a median age of 34 years, 80% of them have some form of health insurance, including a subsidized premium, and nearly 90% of them have a usual source of care and access to safety-net providers who provide services in a hospital and conveniently located community health clinics. They may have also been exposed to the safety-net providers’ guidelines for Pap smear screening and other preventive health policies, if any.

Based on its findings, the study suggests, among others, that publicly funded healthcare programs for vulnerable populations such as The John Peter Smith (JPS) Connections and Medicaid be maintained and strengthened. Finally, the U.S. should reconsider having universal access to healthcare for all citizens, regardless of socioeconomic and cultural background. This need not be entirely free, but should be paid for primarily by states and the federal government with a minimal co-payment by patrons. Considering the importance of preventive public health policy, and the massive impact of communicable diseases such as tuberculosis and hepatitis, which are found mainly in immigrant populations in the U.S., the recommended universal access to healthcare should be extended to immigrants as well.

Future studies should probe more into this study’s finding that Hispanic immigrants utilized Pap smear screening more than Hispanic Americans. As recommended by previous researchers, studying Hispanic populations as one group is cautioned.
CHAPTER 2

RESEARCH QUESTIONS, THEORETICAL FRAMEWORK, LITERATURE REVIEW, MODEL AND HYPOTHESES

Introduction

Although the United States continues to lead the world in the development of new medical technology, its healthcare system is in a state of crisis. Contradictions abound. Organ transplants and other dramatic procedures arouse the emotional applause of the populace; yet to be a minority, less educated, or poor is to be subject to more suffering, disability, and premature death than other Americans. …In our personal lives, each of us is affected by our health or the lack thereof. We have come to expect access to quality care at a reasonable cost, yet for millions of Americans that expectation is no longer a reality (Ropes, 1991:1, 18).

This situation has not changed since the above-quoted publication was written (Ferlay et al., 2002; Gotay and Wilson, 1998; Mandelson and Thompson, 1998; Martin et al., 1996; National Cancer Institute (NCI), 1999a; 2001a; Navarro et al., 1998; Perez-Stable et al., 1994; Yi, 1994). This study identified the strength of the mechanisms from race/ethnicity/immigration status, which influence the utilization of Pap smear screening.

Research Questions

The following are the study questions: 1) What role does race/ethnicity/immigration status play in receiving Pap smear screening for preventing cervical cancer among a group of low-income, vulnerable women in the U.S.? 2) How is the relationship mediated by personal and family resources, such as health insurance coverage, employment for self or spouse, and having a usual source of care? 3) How is the relationship affected by competing needs for basic needs such as transportation, food, clothing and housing? 4) What will be the impact of healthcare system challenges such as experiencing difficulties with handling paperwork for healthcare? 5)
How does health status affect the relationship? 6) What is the effect of demographic variables such as age and marital status on the relationship?

Background/Justification

The focus of the study was on women’s health, and it concentrated on utilization of preventive Pap smear screening for women. This section reviews and analyzes the prevailing literature on cervical cancer and having Pap smear tests. Race/ethnicity/immigration status is an important covariate for utilization of health services (Byrd et al., 1996; Gotay and Wilson, 1998; Harlan et al., 1991; Hubbell et al., 1996; Mandelblatt et al., 2000; Martin et al., 1996; Navarro et al., 1998; Perez-Stable et al., 1994; Oropesa et al., 2000; Zambrana et al., 1999). Personal and family resources and competing needs affect utilization of health services (Andersen et al., 2000; Gelberg, Andersen and Leake, 2000; York et al., 1999).

Alternatively, even when preventive services are free and when there are no competing needs such as need for transportation, childcare, and health insurance, people may not utilize them (Ramirez-Zetina et al., 2000; Schwethelm et al., 1989; Strong, 2000; Weinrich et al., 1995; York et al., 1999). Health status may affect the utilization of health services (Burack et al., 1998; Gelberg, 1996; Gelberg et al., 2000; Mandelblatt et al., 1992). Finally, acculturation for immigrant women in the U.S. promotes better use of preventive and promotive health services than otherwise (Hubbell et al., 1996; Mandelblatt et al., 2000; Suarez, 1994; Wells and Horm, 1998).

The poor, minorities and uninsured are experiencing declining access to healthcare in America. Ethnicity surfaces as an important variable in the relationship between being poor in the U.S., health status, and access to healthcare. The situation for Hispanics seems to be
precarious with the number of Hispanics who are without a regular source of care being nearly
twice that of non-Hispanic whites.

Similarly, African Americans are substantially worse off than non-Hispanic whites, and
have fewer contacts with the healthcare system than other groups, despite their high rates of
chronic illness (Ropes, 1991). Factors that limit access to needed healthcare may prevent early
identification and treatment of disease, with the possibility that the care may be more expensive

Papnicolaou Test

Sometimes, cancer can be found before the disease causes symptoms. Screening checks
for cancer or for conditions that may lead to cancer in a person who does not have any symptoms
of the disease. The Papnicolaou (Pap) test, or Pap smear, is used to screen for cancer of the
cervix (NCI, 2000; 2001a, b). Globally, cervical cancer is often the second or third most
common type of cancer among women (cervical cancer and colorectal cancer virtually tied for
the second place after breast cancer). It has an incidence of about 400,000 each year,
predominantly among the economically disadvantaged, in both developing and industrialized
nations (NCI, 2001a). Worldwide, more than one in two women who were estimated to be
diagnosed with cervical cancer in 2000 would die from it (Ferlay et al., 2001).

In the U.S., cervical cancer is the third most common cancer (Advanced Medical
Technology Association, 2002). Cervical cancer mortality ranks 11th among all female malignant
in U.S. women are different from those of other female reproductive system cancers (State
University of New York, Albany, 1996). The current highest age-adjusted incidence rate in the
U.S. is 43 per 100,000, compared with 8.7 per 100,000 among white women. This occurs among
Vietnamese women, probably reflecting lack of prior screening, late diagnosis and a lesser likelihood to follow-up with treatment (Jenkins et al., 1999), and is 7.4 times the lowest age-adjusted incidence rate of 5.8 per 100,000 in Japanese women. Incidence rates of 15 per 100,000 or higher also occur among Alaska Natives, Korean, and Hispanic women.

For all U.S. women, the incidence rate is about eight per 100,000 (NCI, 1999a, b; 2000). Cervical cancer mortality rate in the U.S. is about 20-50% that of incidence rates (NCI, 1996). The American Cancer Society estimated that in 2001, 12,900 new cases of invasive cervical cancer were diagnosed in the U.S., and approximately 4,400 of these women would die from it (Ferlay et al., 2001; NCI, 2001a; The Imaginis Corporation, 2001). This means that one person out of less than every three persons diagnosed with invasive cervical cancer in the U.S. in 2001 would die.

African American women have the highest age-adjusted mortality rates, followed by Hispanic women. Although the death rates for African Americans have declined more rapidly than for whites, the African American death rate continues to be more than twice that of whites, at 205 per 100,000. The higher African American death rate is due to the high number of cervical cancer deaths among older African American women (NCI, 1999b). Also, African American women have the highest mortality from cervical cancer in each age group, followed by Hispanic women in the youngest age groups. Chinese women aged 70 years or more rank next (NCI, 1996; 1999a). Mortality rates are not available for comparison for Vietnamese, Korean, Alaska Native or American Indian (New Mexico) women (Miller et al., 1996a).

To a large extent, however, deaths from cervical cancer are preventable if detected and treated early. In fact, it has been amply demonstrated that Pap smear test is effective for the early detection and possible cure of cervical cancer. Annual Pap smear screening for cervical cancer
has contributed to about 75% decrease in cervical cancer mortality in the U.S. since the mid-1950s (NCI, 2001a).

Although cervical cancer incidence and mortality in the U.S. have both decreased dramatically since the past half-century, it still raises serious public health concerns in the country. Many women still do not have regular Pap tests (Bolen et al., 2000; Coffield et al., 2001; Gotay and Wilson, 1998; Hahn, Teutsch, Franks, Chang and Lloyd, 2001). Inadequate Pap smear screening to prevent cervical cancer was listed as one of 11 prevalent known risk factors among women in the U.S. (Hahn et al., 2001). This is particularly so for low-income women (Martin et al., 1996; NCI, 2001a; Valdini and Cargill, 1997). Poor women may be at a higher risk because they are not able to afford regular Pap smears (Ferlay et al., 2001; NCI 1999a; 2001a).

Research shows that majority of women who are diagnosed with invasive cervical cancer did not receive annual Pap smear screening for it. Also, about half of the women with newly diagnosed invasive cervical cancer had not had a Pap test in the past five years. Bolen et al. (2000) documented that in 1997, 20% of eligible women in the U.S. reported not having had a Pap smear in the preceding three years. About half of 15,700 patients who were estimated to develop an incidence of cervical cancer in the U.S. in 2000 will never have had a previous Pap smear test (National Institutes of Health, 1996). Gottlieb et al. (2001) studied five sites in Texas from 1994 for the next three years, to determine the effectiveness of a national preventive health practice campaign. They found that 70% of their female sample had used Pap smear at baseline. This increased to 81% within about three years of the program.

Data from the 1994 National Health Interview Survey (NHIS) indicate that about one fifth of women aged 18 to 64 had not had a Pap test in the past three years. The under-screened populations include older women, the uninsured, ethnic minorities, particularly Hispanics,
elderly African American women, and poor women (NCI, 1999a, b; 2001a). The Behavioral Risk Factor Surveillance System (BRFSS) data for 1992-1994 using a large sample of women revealed that among the sample aged 20 or older who had not had hysterectomies, the prevalence of inadequate Pap smear tests varied 2.4-fold, with the lowest (12.2%) among African Americans and the highest (29.1%) among Asian and Pacific Islanders. Overall, about 14.6% of women aged 20 years and older had not had Pap smears within the past three years (Hahn et al., 2001). Furthermore, all racial/ethnic groups in the U.S. have to make substantial effort to meet the U.S. Public Health Service’s health objective for the nation for 2000, for the use of Pap smear screening (Hahn et al., 2001).

Compared to diet and other lifestyle habits, prevention and control of cervical cancer using Pap tests is less complicated (NCI, 1999a). There are two ways to prevent cervical cancer. The first is to prevent the infections that increase the risk. The second is to get regular Pap smears that will detect pre-cancerous conditions. Both of these can be treated to stop the progression to cervical cancer. Pap smears are very effective in detecting pre-cancerous changes of the cervix. But their effectiveness depends on their being obtained regularly, because often a single smear will not show any abnormal cells even when dysplasia or cancer is present and the cervix appears abnormal. For example, a single normal Pap smear is not enough. Pre-cancers are completely curable when followed up properly. An estimated 50 million Pap smears are performed each year in the U.S., with up to 10% reported as abnormal (NCI, 1999b; The Imaginis Corporation, 2001).

There is general consensus that in its earliest stages of development, cervical cancer is 100% treatable. This becomes possible only if Pap smear tests are taken at this stage to detect and treat them effectively. Chances of surviving between onset and five years fall steadily as the
cancer advances into the nearby tissues, the bladder, rectum, and other remote sites (Ferlay et al., 2001; NCI, 2001a). It takes the commitment of women to take the tests and to follow-up after having an abnormal smear.

Given that for most of the time there are no symptoms of the disease until it has advanced, early and timely tests to detect it cannot be overemphasized. Not surprisingly, not having regular Pap smears is the single greatest risk factor for bad outcomes in women who develop cervical cancer (Ferlay et al., 2001; NCI 1999a, b; 2001a). Given this scenario, why is it that some women in U.S. fail to utilize Pap smear screening services?

Several explanations have been offered for this dismal situation, with race and ethnicity being the most cited covariates. Racial and ethnic minorities, particularly Hispanics, are known to have the worst Pap smear screening incidence (Gotay and Wilson, 1998; Martin et al., 1996; Perez-Stable et al., 1994). Results form the National Breast and Cervical Cancer Early Detection Program (NBCCEDP), which is for low-income uninsured women, confirmed the race and ethnicity bias of these two cancers (Benar, Lee, Piper and Richardson, 2001).

Data from the program is unique because it is the first race- and ethnic-specific rates of cervical cancer in the U.S. The results from this program with a sample of nearly 630,000 confirmed that American Indian or Alaskan Native women were the least likely to ever have a prior Pap smear. Not surprisingly, the Alaskan or Native Indian women had the highest proportion of abnormal Pap tests for the first program screens (4.4%), followed by African Americans (3.2%), whites (3%), Hispanics (2.7%), and Asian or Pacific Islander (1.9%). The data also indicated that white women had the highest rate of serious cervical lesions detected by biopsy (9.9 per 1000 Pap tests), followed by Hispanics (7.6), African Americans (7.1), American Indians or Alaska Natives (6.7), and Asian or Pacific Islanders (5.4).
The rates for serious cervical lesions by race indicate that contrary to the researchers’ assumption that white women were getting more follow-ups, white women were similar to the other racial groups. The only exception was that African American women with abnormal Pap test were less likely to get a follow-up (Benar, et al., 2001; OncoLink Cancer News, 2001).

It has been suggested that part of the reason for the low-utilization of cancer screening prevention by minorities is that they have a history of negative experiences with the healthcare system (Brown, Fouad, Basen-Engquist, and Tortolero-Luna, 2000). A number of NCI sponsored patterns of care studies strongly suggest that much of the cancer racial and ethnic disparities are due to disparities in availability of cancer control services and differences in treatment.

A difference in socioeconomic status has mainly been blamed for these disparities (NCI, 1999a). Shireman, Tsevat and Goldie (2001) suggest that time costs associated with cervical cancer screening represent an important opportunity cost and need to be considered in studies which attempt to identify barriers to utilization of screening. Martin et al. (1996) found that not having a usual source of medical care resulted in underutilization of Pap smear screening and other preventive cancer screening tests for women.

The Centers for Disease Control (CDC) and other institutes of the National Institutes of Health (NIH) have stated that minorities at all ages of life suffer poorer health and higher rates of premature death than the dominant U.S. population (NCI, 1999a). Cancer continues to take a disproportionate toll on the African American community. For example, five-year survival rates of the five leading cancers that affect women in the U.S., including cervical cancer, show that white women always have higher survival rates than African American women.

With the exception of stomach cancer, for which there is about the same survival rate, the story is the same for the five leading male cancers in the U.S. for African American men,
compared to white males (NCI, 1999a). Nevertheless, it has been demonstrated that even when preventive services such as screening for cervical cancer are free and when there are no competing needs such as need for transportation, childcare, and health insurance, people may not utilize it still (Strong, 2000; York et al., 1999). Moreover, it may be easier for people to use preventive screening care for mammography than for Pap smear (Coughlin, Etheredge, Parikh and McDivitt, 1997; Martin et al., 1996; Wee et al., 2001).

Another problem is that there have been conflicting guidelines and recommendations for cancer screening, with recommendations varying among expert groups. Furthermore, physicians and policy-making bodies have not agreed on the cost (risk)-benefit trade-off associated with particular screening strategies (Mandelson and Thompson, 1998; Woolf and Atkins, 2001). These may serve as barriers to cancer prevention.

The U.S. Preventive Services Task Force (1996) suggests a Pap test for women within the past 3 years. Recommendations from the NCI require that all women in the following categories should have an annual Pap test and pelvic examination: currently or ever been sexually active, or reached 18 years of age. After three or more consecutive satisfactory normal exams, a woman’s physician may order the Pap test less frequently at the physician’s discretion (NCI, 2001b).

A few studies have, however, shown an encouraging level of Pap smear use. Wee et al. (2001) found that 81% of their sub-sample of nearly 1,900 patients who were eligible for cervical cancer screening had at least one Pap smear documented in the last 3 years. Using a five-year national health survey data, Martin et al. (1996) reported that 89% of women 18 years and older had ever had a Pap smear test in 1987. This increased to 91% among the same population in 1992. Also, 38% of the same population reported having had a Pap test within the past year in 1987 while 43% said so in 1992.
In summary, the existing literature shows that cervical cancer is a prevalent problem worldwide. Also, it has an important racial and ethnicity dimension in the U.S. While the mortality rate is high, ironically, it is nearly 100% preventable if detected early. These call for a study that explains the racial and ethnic underpinnings of preventive Pap smear screening utilization rates in the U.S, among other factors.

Theoretical Framework

The following section discusses the theory being adopted for this study, its evolution and previous applications. The section also mentions other theoretical explanations that have been proposed in the scientific literature for use of healthcare services. The conceptual framework for this dissertation is the Behavioral Model for Vulnerable Populations (Gelberg, Andersen and Leake, 2000). Applying models of health services utilization to vulnerable groups can be especially helpful in identifying the challenges each group faces in obtaining needed services and may provide insights into maintaining or improving their health status (Gelberg et al., 2000). It will also help to unveil possible impediments to utilization of health services for vulnerable populations, and may lead to advocacy for safety-net providers who may run financial risks and possible closure otherwise.

Vulnerability

The concept of vulnerability is introduced in this section, after which various frameworks which have been used in studying utilization of health services are highlighted. The concept of vulnerability as used by Aday (1993; 2001) is sociological. It focuses on the social determinants of health and illness. According to her, vulnerable populations have low social status and limited social or human capital. Aday defines vulnerability as “being at risk of poor physical,
psychological, or social health, based on the World Health Organization’s definition of health as a ‘state of complete physical, mental, and social well-being [World Health Organization, 1948, p. 1]’” (Aday, 2001:xvii).

Aday’s list of vulnerable populations in the U.S. includes immigrants and refugees, high-risk mothers and infants, the mentally ill and disabled, the chronically ill and disabled, HIV/AIDS infected persons, alcohol and substance abusers, the homeless, the suicide prone, and abusive families (Aday, 1993; 2001). Others include people of color, the poor and non-English speaking patients (Aday, 1993; Shi, 2001).

Following Aday, several health services researchers have adopted the concept of vulnerability and its effect on the health of population subgroups in the U.S. These researchers include Andersen, Bozzette, Shapiro et al. (2000), Colantonio et al. (2001), Gelberg et al. (2000), Kosloski et al. (1999), and Shi (2001). Andersen et al. (2000) defined vulnerable populations to include women, drug users, ethnic minorities, and the less educated. Other studies have applied the concept of vulnerability to elderly people with dementia (Colantonio et al., 2001; Kosloski et al., 1999).

Shi (2001: 520) defined vulnerability from the health perspective as the likelihood of experiencing poor health. She stated further that vulnerability is determined by the convergence of predisposing, enabling, and need characteristics at both individual and ecological levels. Some groups of the population are more vulnerable than others because they face a greater risk. Individuals who find themselves at the intersection of these three determinants of vulnerability at all two levels are most vulnerable.

According to her, vulnerable populations have multidimensional health problems and consequently, greater health needs. They have been described variously as underserved
populations, medically underserved, medically indigent, medically disadvantaged, underprivileged, poverty-stricken populations, distressed populations, and American underclass.

Theories Explaining Utilization of Healthcare

In this section, some of the theoretical propositions that have been used to explain utilization of healthcare services are discussed. The need for good health, and during the lack of it, the need for a cure, are universal. Nevertheless, patterns of use of health services may differ for segments of the population, requiring the need to explain and/or study patterns of use of health services. Most importantly, nonuse of services cannot be attributed, for most of the time, to the lack of awareness of existing services (Kosloski et al., 1999). For preventive Pap smear screening specifically, lack of use may not always be due to lack of awareness about the services and cost of service (Chavez et al., 1997; Cohen and Rahaly, 1993; Gotay and Wilson, 1998; Hubbell et al., 1996; Jennings, 1997; Kosloski et al., 1999; Ramirez et al., 2000; York et al., 1999). Consequently, several theories have been propounded to explain patterns of health seeking behavior and use of health services.

Jennings (1997) applied the Theory of Planned Behavior in the study of Pap smear utilization among a group of African American and Latina women recruited from health and social service agencies. Her findings were that fatalistic beliefs, the bond of family and friends and other cultural beliefs in community members’ social norms regarding health habits, along with a positive locus of control of the individual, may influence decisions to get Pap smear screening. She also found that salient beliefs regarding advantages and disadvantages of getting a Pap smear test differed between African American and Latina respondents interviewed.

Jennings’ (1997) findings corroborate that of others, that ethnic minorities of color believe that the approval of significant others in their lives, such as friends, mother, son and
daughter, would promote Pap smear utilization (Bloom et al., 1987; Morris et al., 1994). Additionally, the belief among Latinas that obtaining a Pap smear is embarrassing is consistent with other findings and support cultural beliefs concerning modesty among Latinas. It has been document that Latinas are embarrassed by invasive procedures or the exposure of the body during physical examinations (Cohen and Rahaly, 1993; Jennings, 1997).

Fatalistic beliefs and attitudes have also been identified in the literature as a significant factor for negatively determining use of cervical cancer screening by some population subgroups, particularly, Hispanic women (Chavez et al., 1997; Ramirez et al., 2000). This is especially so among non-U.S.-born Hispanics (Chavez et al., 1997). Ramirez et al. (2000) found through their study of cervical and breast cancer knowledge, attitudes and screening behaviors among Hispanic women in the U.S., that Mexican Americans and Puerto Ricans have more negative or fatalistic views of cancer than Cuban or Central Americans.

Similarly, cultural beliefs have been found to explain the utilization of health services, including Pap smear screening. Kosloski et al. (1999) suggested that culturally based differences may underlie the tendency for minority populations in the U.S. to use fewer assistive social and medical services. Possibly, the differences in cultural beliefs among different minority groups translate into differences in attitudes and perceptions about need for particular health services. This affects the likelihood of use of health services.

Hubbell et al. (1996) studied predictors of Pap smear screening among Latinas and Anglo women, and found that Latina immigrants in the U.S. were more likely than their U.S.-born counterparts or Anglo women to hold cultural based beliefs about cervical cancer that may influence their having a Pap smear test. The Latina immigrants believed that factors such as having sex during menstruation was a risk factor to having cervical cancer. Logistic regression
analysis revealed that Latinas who held such beliefs were significantly less likely than others, to report receiving a Pap smear test in the past three years.

Related to immigration and cultural beliefs, language of preference and acculturation levels are also known to predict having a Pap smear and other healthcare services utilization. Ramirez et al. (2000) also found that language preference was one of the factors that predicted recent Pap smear screening. Similarly acculturation predicted having a Pap smear (Hubbell et al. 1996). In a study among low-income Mexican-American women 40 years and older who lived in the U.S.-Mexican border in El Paso County in Texas, Suarez (1994) found that gains in acculturation levels indicated by gains in English proficiency and use led to increases in Pap smear screening. Mandelblatt et al. (2000) argue that the variation in screening rates among Hispanic sub-groups may be explained, in part, by differences in language use and levels of acculturation.

History/Evolution of the Behavioral Model for Vulnerable Populations

The original Behavioral Model was developed in the late 1960s. It has been a leading model employed to explain utilization of health services as well as to define and measure equity in access to healthcare and to aid in developing policies to promote equitable access to healthcare (Aday and Andersen, 1974; Aday and Awe, 1997; Andersen, 1968; 1995; Andersen and Newman, 1973; Gelberg et al., 2000; Kosloski et al., 1999; Wolinsky, 1976; 1990). It proposes factors to consider when studying the use of health services and health outcomes for vulnerable populations (Gelberg et al., 2000). The original model posited that use of health services is a function of a predisposition to use health services, factors that enable or constrain the use of such services, and people’s need to use healthcare (Andersen, 1968; 1995; Gelberg et al., 2000).
Consequently, the Behavioral Model proposes three independent variables, which primarily determine the use of health services. These are predisposing, enabling, and need factors. Predispositions to healthcare utilization include individual characteristics, which predict the propensity to use healthcare. These include demographic and social structural factors such as age, gender, race, ethnicity, level of education, marital status, family composition, and health beliefs. Enabling factors are those that enable or impede use of healthcare services.

These generally reflect family and community resources, and include social and emotional support, health insurance, income, availability of health and social resources and personnel, as well as utilization of these, and region of residence or geographic location. Finally, need characteristics encompass diet, exercise, use of health services, health status, self-perceptions of need and objective evaluations of need, as well as satisfaction with care (Andersen et al., 2000; Colantonio et al, 2001; Gelberg et al., 2000; Kosloski et al., 1999).

The enabling and need factors are unique, in that predispositions to use healthcare alone are inadequate to motivate one toward their use. Thus, enabling characteristics reflect the fact that beyond predispositions to using health services, certain conditions must be met to enable/empower families to use them. Similarly, granted sufficient predispositions to use health services and the ability to do so, the service user must have a perception of need for and need to use the particular service (Kosloski et al., 1999). Need is presented in the behavioral model as a function of the extent of illness and or disability perceived by the user of service.

Andersen et al. (2000) elaborated need factors to encompass medical care providers’ evaluations of a patient’s need for care. Moreover, perceptions of need are not fixed, and can be affected by changes in beliefs about the need for assistance, which can vary across different
people (Andersen, 1995). Additionally, perceptions and estimates about need are influenced by cultural and background factors (Angel and Gronfein, 1988).

The Behavioral Model has been revised two times, expanded and elaborated upon. The first phase of the revision, which occurred in the 1970s, was modified to specifically include health services use for particular conditions and illnesses, consumer satisfaction, differential use rates of healthcare, social and support services by different ethnic groups. Others include use of health and related services by vulnerable populations such as HIV/AIDS patients, the homeless, older adults and people with dementia. It has also been used to assess assistive needs of people who provide care for such vulnerable groups (Colantonio et al., 2001; Gelberg et al., 2000; Kosloski et al., 1999).

A second phase of the revision which happened in the 1990s reshaped the model in two main ways. First, it recognized the possible behavioral practices that could occur at the individual level and the maintenance and improvement of health status as outcomes and goals of health services delivery. Second, it recognized that the Behavioral Model itself is dynamic; outcomes affect subsequent predispositions, enabling resources, need, and health behavior (Andersen, 1995; Gelberg et al., 2000).

Andersen and Andersen (1979: 384) enumerated several purposes that the original Behavioral Model may serve in health services research. These are:

1. to illustrate the interrelationships among the determinants of health services utilization;
2. to determine the equitability of the distribution of health services;
3. to aid the prediction of future health services needs;
4. to evaluate the impact of new healthcare delivery programs; and
5. to aid in policy development toward desirable amendment of the status quo.
Gelberg et al. (2000) elaborated on the original model and renamed it the Behavioral Model for Vulnerable Populations. It specifies traditional and non-traditional or vulnerable domains, which are particularly relevant to understanding the health and health-seeking behavior of vulnerable populations. The traditional domains, which are normally used to explain healthcare seeking behaviors and health outcomes for vulnerable populations, include demographic factors such as gender, social structural factors such as race/ethnicity, immigration status, personal and/or family resources such as health insurance coverage, and perceived health needs determined by factors such as health status. The vulnerable or non-traditional domains, which focus on social structure and enabling resources, were added to the original Behavioral Model to make it relevant for studying vulnerable populations (Gelberg et al., 2000).

Predisposing vulnerable domains include factors such as immigration status, acculturation, literacy, living conditions, sexual orientation, and psychological resources. Enabling vulnerable domains include personal and family resources, competing needs, availability and use of information resources, and community resources.

Finally, vulnerable need variables include perceptions and evaluated needs of conditions of special relevance to vulnerable populations, from the viewpoint of these vulnerable populations themselves. They include tuberculosis, mental sickness, substance abuse and AIDS, as well as evaluations of such need by their medical care providers (Andersen et al., 2000; Gelberg et al., 2000). These factors are grouped under the three independent variables of predisposing, enabling and need factors, which yield dependent outcome variables that may be within either the traditional or vulnerable domains, or both. The outcome variables are use of care and unmet need.
The revised and expanded model suggests that these variables need to be considered when studying the use of health services and health outcomes for vulnerable populations. Predisposing factors to vulnerability might affect the use of health services and the health status of vulnerable groups (Aday, 1993; 1994; 2001; Gelberg, 1996; Gelberg et al., 2000; Kosloski et al., 1999; Rew, 1996). Gelberg et al. (2000) applied the Behavioral Model for Vulnerable Populations to predicting physical health and the use of health services for homeless adults. Gelberg et al. (2000) conceptualized health status as both an outcome and a determinant of use of health services. They further defined determinants of use of health services as "need", and health outcomes to include patient satisfaction and compliance.

Previous Applications of the Behavioral Model for Vulnerable Populations

Employing a national database, Sakyi-Addo (2001) used the Behavioral Model for Vulnerable Populations for a comparative analysis of access to and utilization of healthcare between African American and non-Hispanic white males. His hypotheses were confirmed, that working-age African American men had less access to health services, experienced delay or difficulty in getting healthcare, and utilized healthcare providers and hospitals lesser than working-age non-Hispanic white males.

His findings were irrespective of the fact that possible confounders such as health and health insurance statuses, poverty status, having usual source of healthcare, and employment status were controlled for. Finally, both Colantonio et al. (2001) and Kosloski et al. (1999) have applied the Behavioral Model for Vulnerable populations to assess the needs and utilization of health and assistive social services for people with dementia and their primary caregivers.
Literature Review

This session presents a review of the literature on predictors of receiving Pap smear screening among low-income populations. In addition, there is a review of the literature on access to Pap smear among low-income Hispanics, African Americans and Anglos.

Predictors of receiving Pap smears. Differentials exist in access to and having a Pap smear test in the U.S. (Cohen et al., 1991; Coughlin et al., 1997; Navarro et al., 1998; Mandelson and Thompson, 1998; Martin et al., 1996; Miller et al., 1996b; Vincent, Greene, Hoercherl, and McTague’s, 1997; Wee et al., 2001). Being low-income, minority, and lacking or having inadequate health insurance have been identified as some of the key predictors of access to Pap smear screening in the U.S.

At the national U.S. level, race/ethnicity, having health insurance, a regular healthcare provider, a current employment, and low-income status predict the use of medical services and preventive screening examinations such as Pap smear (Mandelson and Thompson, 1998; Martin et al., 1996; Navarro, Senn, McNicholas, Kaplan, Roppe et al., 1998; Yi, 1994). Other predictors of receiving Pap smear tests include health practitioner factors such as physician acute-care orientation (Mandelson and Thompson, 1998; Wee et al., 2001) and gender of physician (Cohen, Ferrier, Woodward and Goldsmith, 1991; Franks and Clancy, 1993; Lurie, Slater, McGovern et al., 1993; Wee, Phillips, Burstin, Cook, Puopolo et al., 2001).

Others include giving financial productivity incentives to attending physicians (Wee et al., 2001) and subspecialty practice by a Primary Care Physician (PCP) (Wee et al., 2001). Patient barriers such as cost, lack of knowledge on risks and benefits, inconvenience; and health-care system orientation, such as focusing on illness and disease or on prevention (Mandelson and
Thompson, 1998) have also been identified as some of the markers of use of preventive health services such as Pap smear screening.

**Minority status.** In relation to cervical cancer screening, one study found that minority women were less comfortable than their Caucasian counterparts in interacting with male physicians (Brown et al., 2000). Furthermore, people with languages and/or cultures different from mainstream American ones may have barriers to access and utilization of Pap smear and other preventive cancer screening services (Gotay and Wilson, 1998).

**Access to healthcare and health insurance status.** Access to healthcare has been identified as a predictor of Pap smear screening and other preventive health services. Specifically, having health insurance and more frequent contact with physicians facilitate the use of preventive screening services for women (Denniston, 1981; Martin et al., 1996). Martin et al.’s (1996) study concluded that women without a usual source of medical care underutilize Pap smear tests. Related to SES and probably area of geographical residence is the relationship between a regular source of medical care and utilization of screening services.

Zambrana et al.’s (1999) study among a national sample of Hispanic women who were disproportionately low-income found that having health insurance and access factors were one of two main strong predictors of current cancer screening practices, including Pap smear. Access factors related to health insurance coverage stem from the largely privately oriented nature of the U.S. healthcare system (Aday et al., 1993; American Public Health Association, 1982).

Theoretically, patients required to pay more for their health will seek less of it, with cost sharing having the potential to decrease patients’ use of healthcare as well as their access to needed care. Individuals with health insurance tend to have a regular healthcare provider (Navarro et al., 1998). The lack of health insurance or the ability to pay high deductibles
translates into many Americans skipping regular preventive health screening and check-ups and delaying seeking medical care when problems first arise. This lack of preventive healthcare may prevent early identification and treatment of diseases and risks, which may result in higher morbidity and mortality, as well as higher fiscal costs later when the problems go untreated (Ropes, 1991).

Even though higher accessibility may not necessarily lead to higher utilization of health services (Mandelson and Thompson, 1998; Nothnagle et al., 2000; Ramirez-Zetina et al., 2000; Strong, 2000; Syme and Berkman, 1994; Weinrich et al., 1995; York et al., 1999), it is anticipated that for fatal events such as invasive cervical cancer, increased accessibility to healthcare will enhance utilization of preventive screening services.

**Physician and healthcare system factors.** Physician factors have also been indicated for use of preventive health services, including Pap smear. Several studies have found that patients of female physicians are more likely to use preventive screening services than those whose Primary Care Physicians (PCPs) are males (Cohen, Ferrier, Woodward and Goldsmith, 1991; Franks and Clancy, 1993; Lurie, Slater, McGovern et al., 1993; Wee et al., 2001). Wee et al. (2001) found that compared with patients whose physicians were men, those of women had significantly higher rates of Pap smears (and other services such as mammograms and cholesterol screening). These results persisted after patient socio-demographic characteristics had been controlled for. The authors also found that patients of PCPs who were practicing subspecialty medicine had significantly lower rates of Pap smear and other preventive screening services. For women without previous Pap smears, physician reminders may increase use (Burack et al., 1998).

Wee et al. (2001) studied a large sample of patients who saw internists from eleven academically affiliated primary care practices in Boston. They concluded that paying physicians
financial productivity incentives may discourage the performance of Pap smear and other preventive screening services, such as cholesterol screening. Financial incentives were, however, not associated with rates of mammogram, or influenza vaccination. Alternatively, women with a chronic illness may be recommended by physicians for at least one Pap test as such women use health services more frequently than other groups of women (Burack et al., 1998; Mandelblatt et al., 1992).

Socio-demographic characteristics. Other studies have found that socio-demographic characteristics associated with noncompliance with recommended guidelines for (breast and) cervical cancer screening include being of a African American race, and or minority status, older age, unmarried status, and rural residence (Bowlin, 1989; Coughlin et al., 1997; Dubay et al., 2001; Kleinman and Kopstein, 1981; MacLean, Sinfield, Klein et al., 1984; Martin et al., 1996; Miller, Siejak, Schroeder, Lerman, Hernandez et al., 1997; Peters, Bear and Thomas, 1989). Low-income women aged 65 years or older may not obtain Pap smear tests regularly (Mandelblatt et al., 1992).

Similarly, older minority women are underrepresented in screening programs, including cervical cancer screening (Mandelblatt, 2000). Coughlin et al. (1997) documented, for instance, that while an older age (50 and over) was not a barrier to the use of mammogram by a sample of women of all races in Louisiana studied in 1994, that same age was a barrier to them for Pap smear use in the same year.

Martin et al. (1996) concluded from their examination of trends in (mammogram and) Pap test screening in 1987 and 1992 using data from the National Health Interview Survey (NHIS) Cancer Control Supplements that older women aged 65 years or older, widows, and never-married women were less likely to have a Pap screening test. They also found that
Caucasian women were less likely than African-American women to have had a Pap smear test, with women of other races being the least likely of any race/ethnic group to have ever had one. Regardless of race, a 1987 NHIS data concluded that the most frequent reason given for lack of a Pap smear test in the last three months by all women interviewed was procrastination or the belief that it was not necessary (Harlan et al., 1991).

*Marital status and SES.* Married women are more likely to have Pap smear tests than unmarried women (Chavez et al., 1997; Martin et al., 1996; Weinrich et al., 1995). Weinrich et al. (1995) interpreted some of their findings to mean that some women “lacked external incentives for screening” which cause them to underutilize Pap smear and other preventive care services. These incentives were absence of family history of cancer, or being widowed.

Lower SES has also been shown to have a positive relationship with screening for cervical cancer (Kleinman and Kopstein, 1981; Maclean et al., 1984; Martin et al., 1996; Miller et al., 1997). Martin et al. (1996) specified from their five-year national study that women with less than 12 years of education were 40% less likely to have had a recent (mammogram or) Pap smear test compared to those with 12 or more years of education. These researchers reported from using data from two NHIS that women with less than 12 years of education had about a 40% reduced likelihood of having had a recent Pap smear examination (and breast cancer screening exam).

Vincent et al. (1997) studied over 2000 multi-stage cluster sample of Florida women in 1994, and confirmed that minority ethnicity (for Hispanics, but not for African Americans), household income of less than $10,000 per year, lower than high school education and lack of health insurance, but not age, decreased “ever-use” of Pap smears. Beyond “ever-use” and
“recency of use,” however, analysis examining concurrent Pap smear use with other preventive health services found that annual Pap smear testing fell at age 55 years onwards.

Among a group of Vietnamese immigrants living in Western Massachusetts, Yi’s (1994) findings confirmed most of the above stated characteristics for Pap smear test: compared to women who had never had a Pap smear test, women who were more likely to have been screened were older, married, had higher incomes, parity of one or higher, and lived in the U.S. longer.

Low-income status. Socio-economically disadvantaged women and those with poor access to healthcare have lower rates of Pap smear screening tests (Martin et al., 1996). Weinrich et al. (1995) corroborated the above stated findings. In their cross-sectional study of a group of 238 southern women aged 50 years and older to identify the predictors for participating in Pap smear screening in a socio-economically disadvantaged older population, they found that income and access to a phone were strongly correlated with participating in cervical cancer screening. Women who had never had Pap smear screening (17.2%) were significantly more likely to have no phone or be unable to use a phone. Other significant predictors were an annual income of less than $5,800, being a widow, and having no family history of cancer.

Mandelson and Thompson (1998) concluded about their sample from Western Washington that regardless of the definition of low-income status used, women in the sample who had a low-income status were less likely to have recently had a Pap smear. This was irrespective of the authors’ assertion that the nature of coverage of the health plans that their sample used is such that cost should not be a barrier to receiving screening.

Social support. Social support may also promote having a Pap smear. Having social support has been shown to promote the use of cervical and breast cancer screening services for minority
populations in the U.S. (Bloom et al., 1987; Gotay and Wilson, 1998; Jennings 1997; Morris et al., 1994).

**Self-motivation and self-selection.** Finally, the importance of self-motivation and personal health-related choices and behaviors have been emphasized in the literature. Overall, women who use other preventive care services have a higher tendency to screen for (breast and) cervical cancer (Denniston, 1981; Weinrich et al., 1995; Zambrana et al., 1999). Weinrich et al. (1995) found that their sample of socio-economically disadvantaged elderly women who had never had a Pap smear screening were also significantly found to not have made use of other screening exams such as a rectal exam, not even for some of those services that were at no cost to them. Having a healthy lifestyle such as not smoking also predict use of other feminine cancer preventive screening (Zambrana et al., 1999).

**Inconsistent findings.** While some of the predictors of Pap smear screening such as low SES/income and minority ethnic status have been consistently agreed upon among researchers, there have been conflicting findings about others such as education and age (Coughlin et al., 1997; Vincent et al., 1997; Yi, 1994). For instance, Martin et al. (1996) did not find race to be a significant indicator of underutilization of female preventive services use, and concluded that race and ethnic differences in the rates of Pap smear (and mammogram) screening tests may be narrowing.

Similarly, and inconsistent with other findings, Yi (1994) did not find education to be a significant predictor of Pap testing. Educational level, type of health insurance, and employment status were not significantly related to a previous Pap smear screening experience among her sample. Nor was age a barrier. Yi (1994) found that the mean age of a previous Pap smear test
user in her sample was 37.0 (s.d. = 12.7) compared with mean age 30.7 (s.d. = 13.4) for non-
previous user. Probably, a higher mean age would have made a difference.

Access to Pap Smear Screening Among Specific Racial and Ethnic Groups

From the foregoing, it is obvious that race and ethnicity are very important predictors of
utilization of preventive Pap smear screening. The next section, thus, focuses on access to and
having a Pap smear test among Anglos, African Americans, and Hispanics (both U.S.-born and
immigrants), the three main racial and ethnic groups in the U.S., and also for this study.

Access to and Pap Smear Screening Among Low-Income Hispanic Women

Hispanic women in the U.S. have particularly been cited as being worst off in having
access to and/or underutilizing preventive screening services, including Pap smear screening
(Byrd et al., 1996; Harlan et al., 1991; Hubbell et al., 1996; Mandelblatt et al., 2000; Navarro et
al., 1998; Oropesa et al., 2000; Zambrana et al., 1999). Hispanic women have been particularly
difficult to reach for cancer screening tests, including Pap smear screening (Navarro et al., 1998).

Interestingly, Wells and Horm (1998) found a negative association between residing in
communities with moderate or high concentration of Hispanics and prior cervical and breast
cancer screening. Residing in areas of moderate or high low-income or poor Mexican immigrants
who have lived in the U.S. for less than five years had the same effect. Among Hispanics,
Mexican women immigrants in the U.S. are particularly the least likely to be screened for any
procedure (Zambrana et al., 1999).

Navarro et al. (1998) studied cancer screening tests of Pap smear in the past year,
monthly self-examination, and professional breast examination in the past year among low-
income and low SES women of reproductive age in Texas, Arizona, Southern California, and
Colorado. They found that overall, Hispanic women were significantly less likely to use these tests, compared to other ethnic and racial groups (African American, American Indians, Asian and Pacific Islander) studied at six sites in these states.

Hispanic women’s Pap smear screening and other preventive health screening exams is affected by a multiplicity of factors, including economic, cultural and communication barriers. Specifically, Hispanic women are known to experience a culture-based embarrassment for Pap smear test (and mammography) (Bakemeier et al., 1995; Hahn et al., 2001). Hahn et al. (2001: 390) specified that Hispanic (and Asian and Pacific Islander) women particularly, have a cultural characteristic of “extreme privacy” of the lower torso. This may affect Pap smear screening among such groups. Also, they experience a greater sense of fear and hopelessness concerning a diagnosis of cancer (Bakemeier et al., 1995).

Furthermore, it may be that Hispanic women experience a greater burden with the purported lack of referral by low-income women for further health services/examination by physicians (Bakemeier et al., 1995). This barrier to access to Pap smear screening by Hispanics may be enhanced by a language barrier between Hispanic patients and physicians who do not speak or understand Spanish (Bakemeier et al., 1995). The lack of or inadequate English handicaps Latina immigrants to the U.S. by the time of entry (Oropesa et al., 2000). This limited human capital may interact with their lack of adequate resources such as money and social support, to limit them in performing preventive heath-related behaviors (Oropesa et al., 2000).

Zambrana et al. (1999) conducted a study on cancer screening practices among five subgroups of Hispanic women using the 1990 and 1992 NHIS of 2,391 women who reported being Hispanic. The five subgroups of Hispanic women were found to be disproportionately low-income and at risk of being under screened. They were Mexican-Americans, Mexicans, Puerto
Ricans, Cubans, and other Hispanics. The Mexican subgroup was found to be the least likely to have had any preventive cancer screening procedure. Findings for each screening practice showed that having a usual source of care positively predicted obtaining Pap smear screening and two other feminine cancer screening tests within the last three years.

Other factors that predicted using Pap smear screening were being married, being more than 50 years of age, and having knowledge of breast self-examination. Zambrana et al. (1999) concluded that access factors and prior screening more strongly predicted current use of the feminine cancer screening procedures, including Pap smear, than did language and ethnic factors. A prior NHIS data collected in 1987 found that Hispanics, particularly those who spoke Spanish solely or for most of the time, were the least likely group to have received a Pap smear test within the past three years (Harlan et al., 1991).

In a study among low-income Mexican-American women 40 years and older who lived in the U.S.-Mexican border in El Paso County in Texas, Suarez et al. (1994) concluded that Pap smear screening increased with increasing social network. Among the six measures of social network used, number of close friends was the most important predictor of having a Pap smear (and mammogram). Among the same group of women in the El Paso County in Texas, Suarez (1994) found that gain in acculturation levels indicated by gains in English proficiency and use led to increases in Pap smear screening.

Health workers’ view about preventive screening practices among Hispanics corroborated those found by studies among the general population. A group of 520 primary care physicians and other health workers in communities with relatively high concentration of Hispanic populations in Colorado were interviewed to determine the attitudes and practices among healthcare providers in the community concerning preventive feminine screening such as
Pap smear, mammography, clinical breast examination and breast self-examination. Major barriers to screening Hispanic women perceived by this group of health workers were cost, lack of transportation, childcare, and release from work. Other barriers identified were fear of diagnosis of cancer, patients considering the test unnecessary, discomfort and embarrassment (Bakemeier, 1995).

Fatalistic beliefs and attitudes. Fatalistic attitudes have been identified by the literature as a significant factor for negatively determining cervical cancer screening by Hispanic women in particular (Chavez et al., 1997). Ramirez et al. (2000) found through their study on cervical and breast cancer knowledge, attitudes and screening behaviors among Hispanic women in the U.S., that Mexican Americans and Puerto Ricans had more negative or fatalistic views of cancer than Cuban or Central Americans. They also found that knowledge of screening guidelines, age, education, income, and language preference were related to recent Pap smear screening.

Chavez et al. (1997) studied a large sample of Hispanics, both U.S.- and foreign born, and a relatively smaller but large sample of Anglo women on the influences of fatalistic attitudes on self-reported Pap smear tests. It was found that Latino immigrants (non-U.S. born Hispanics) were more likely than U.S.-born Latinas or Anglo women to have fatalistic beliefs. They also found that fatalistic beliefs independently predicted Pap smear screening by Latinas but not Anglo women.

After adjusting for potentially confounding variables, it was found, for example, that Latinas who believed that fate was a risk factor for cervical cancer; those who felt they would rather not know their disease status, and those who thought there is nothing one can do to prevent cervical cancer, were less likely than others to report that they had had a Pap smear test within the three years preceding the interview. Other predictors of Pap smear screening in the past three
years found among the Hispanic sample were marital status, health insurance status and immigration status. Insured, married, and U.S.-born Latinas were more likely than uninsured, unmarried, and Latina immigrants to have a Pap smear test.

Hubbell et al. (1996) corroborated the findings of Chavez et al. (1997) in a study of predictors of Pap smear screening among Latinas and Anglo women. Hubbell and colleagues found that Latina immigrants in the U.S. were more likely than their U.S.-born counterparts or Anglo women to hold cultural based beliefs about cervical cancer that may influence their having a Pap smear. The Latina immigrants believed that factors such as having sex during menstruation was a risk factor to having cervical cancer.

Logistic regression analysis revealed that Latinas who held such beliefs were significantly less likely than others, to report having a Pap smear in the past three years. Other factors such as acculturation, health insurance status and marital status were independent predictors of having a Pap smear among the sample.

*Caution against overgeneralization of Latinas.* Beyond the general picture of low utilization of Pap smear screening services for low income Latina women, and Latina women in general, several studies have indicated that there is considerable variation in the use of healthcare services in general, and preventive health screening services in particular, including Pap smear screening, among subgroups of Hispanics in the U.S. (Chavez et al., 1997; Mandelblatt et al., 2000; Oropesa et al., 2000; Ramirez et al., 2000; Zambrana et al., 1999).

Ramirez et al.’s (2000) study concluded that there are variations in the factors related to Pap smear (and mammography) screening among Hispanic populations, as these populations themselves are very diverse (Ramirez et al., 2000; Zambrana et al., 1999). Mandelblatt et al. (2000) argue that the variation in screening rates among Hispanic sub-groups may be explained,
in part, by differences in language use and levels of acculturation. In fact, there are indications that levels of knowledge about guidelines for preventive health services such as Pap smear screening, may differ among several Hispanic groups who have low-income status. This depends on whether they are immigrants (foreign born), U.S.-born, live in rural or urban communities, and live in Mexico or in the U.S., are Puerto Ricans, or Cuban Americans (Guendelman et al., 2001; Ramirez et al., 2000).

Consequently, the literature cautions against subsuming Hispanics under the generic “Latina” label in relation to use of healthcare services among this racial/ethnic group (Oropesa et al., 2000; Ramirez et al., 2000). From the foregoing, there is the need to clarify and address ethno-regional characteristics among Hispanic populations when promoting cancer screening (Ramirez et al., 2000).

Access to and Pap Smear Screening Among Low-Income African American Women

In 1975, African American women showed lesser tendency to utilize preventive health services (American Public Health Association, 1982). Among a group of low-income African American elderly women studied by Mandelblatt et al. (1992), it was discovered that the major reason for not having Pap smear (and mammography) screening exams were that a physician had not recommended them or that the women lacked knowledge that they needed such a test. Among these women, age, health status, education, perceived susceptibility and benefit, satisfaction with life, and knowledge of test intervals were independently and significantly associated with Pap smear screening.

Despite the picture painted above concerning African American women, Harlan et al. (1991) concluded from their analysis of national cervical cancer screening that through to age 69, African American women are screened at higher or similar rates as whites. Martin et al. (1996)
corroborated the finding that African American women are more likely to have had a Pap smear test than Caucasian women.

Access to and Pap Smear Screening Among Low-Income Anglo Women

Compared to minority women, there seems to be a disproportionately low amount of research and information on Pap smear tests and other preventive services on Anglo (non-Hispanic Caucasian) women. Interestingly, the available literature and work done may be more inclined toward minority women, particularly those of Hispanic origin, and to some extent, African Americans. An extensive search of the literature I conducted found much less information on Anglos, unlike racial minorities.

Interesting as this may seem, given that Anglos are the dominant racial group in the U.S., it is understandable because minority populations in the U.S. suffer a disproportionate share of mortality and morbidity (American Public Health Association, 1982; Syme and Berkman, 1994; Ropes, 1991). Also, they have inequitable access to the healthcare system (American Public Health Association, 1982; Brett et al., 1994; Kogan et al., 1994; Mackay et al., 2001; Oropesa et al., 2000; Ropes, 1991; Zambrana et al., 1999) and are more difficult to reach with preventive cancer screening services (Navarro et al., 1998). Minority groups in the U.S., thus, may use preventive services less (Mandelblatt, 2000; Oropesa et al., 2000), pre-empting the need to focus research in this area on them.

In the study by Chavez et al. (1997) cited above, it was found that while fatalistic beliefs independently predicted Pap smear screening by Hispanic women, it did not predict Pap smear screening for Anglo women. The study also found that similar to the Hispanic sample studied, Anglo women who were married used cervical cancer screening services more than their unmarried counterparts. Additionally, health insurance status and immigration status predicted
having a Pap smear test for the sample. Furthermore, although some studies have documented that Anglo women may receive less Pap smear screening than African American women (Harlan et al., 1991; Martin et al., 1996), Anglo women may have greater Pap smear screening rates than Hispanic women (Perez-Stable et al., 1994).

Selective Migration and Relative Deprivation

Selective migration, alternatively called healthy migrant hypothesis (Abraido-Lanza et al., 1999), has been used by health services researchers and others to explain differential use in health services by immigrant groups, compared to indigenous populations. One of such pairs of groups used to support this thesis is Mexico- and/or south America-born versus native-born Hispanics in the U.S. Although a good amount of such studies have focused on birth outcomes, morbidity and mortality ratios, others such as Veugelers and Guernsey (1999), Fichter et al. (1988) and Golding and Burnam (1990) have been on other health issues and health indicators.

Basically, the selective migration thesis states that persons who are healthier and/or have better coping skills migrate, while, alternatively, those who are unhealthy or have weaker coping skills either choose not to migrate, or if they do, engage in selective return—a return to their home country (Abraido-Lanza et al., 1999; Golding and Burnam). In such comparative studies, results for immigrants have been more favorable, relative to results for native-born/national groups.

These findings are regardless of the fact that the migrant populations have worse socioeconomic status and other quality of life indicators. Moreover, these studies control for primary study variables such as level of education, income, cultural and social psychological variables. These researchers find greater vulnerability among the native-born populations for the
study variables, relative to the immigrant populations (Abraido-Lanza et al., 1999; Fichter et al.,
1988; Golding and Burnam, 1990; Guendelman et al., 1999; Veugelers and Guernsey, 1999).

Other researchers such as Crosby (1982), and Golding and Burnam (1990) have used
relative deprivation as an alternative hypothesis to the concept of selective migration to explain
the relatively better off status of migrant populations, compared to native-born persons. The
relative deprivation thesis postulates that some groups of people engage in social comparison to a
reference group, enabling them to draw a conclusion about their subjective well-being.

Golding and Burnam (1990) cite an interesting example, that, Hispanic immigrants may
have a more favorable view of themselves, in comparison to a reference group in Mexico/south
American. On the other hand, U.S.-born Mexican Americans may consider themselves
disadvantaged, in comparison to other U.S.-born groups. Golding and Burnam (1990) cite studies
such as (Parker and Kleiner, 1966; Pettigrew, 1967) and (Crosby, 1982) for using the theory of
relative deprivation for explaining the experiences of disadvantage groups and women,
respectively.

In this study, although my search of the literature did not find any linkage between these
theories and having preventive Pap smear screening, findings from the Hispanic immigrants,
compared to the Hispanic American sub-samples may or may not lend themselves to either or
both theses of selective migration or relative deprivation.

Summary of Literature Review

In summary, a multiplicity of factors such as access to healthcare and health insurance,
physician factors and healthcare system orientation, socio-demographic factors, minority status,
immigration status and ability to speak English affect access to and screening for Pap smear
among low-income women in the U.S. Others include knowledge of screening guidelines, social support and self-motivation.

Out of these, race, ethnicity, and related cultural beliefs and orientations toward screening services, the healthcare system, as well as health orientation in general, play key roles in the use of these services. Furthermore, it has been demonstrated that low-income status and barriers to access alone may not explain inadequate utilization of these important preventive and promotive services. Rather, psychological dispositions, personal barriers and social support may positively impact access to preventive Pap smear screening services.

Theoretical Model and Hypotheses

This last section of chapter 2 concentrates on an adapted version of the theoretical model being used for the study. Also, the section specifies ten hypotheses for the study.

Theoretical Model

Figure 1 below shows an adapted version of the Behavioral Model for Vulnerable Populations (Gelberg, Andersen and Leake, 2000) being used for this study. As in the original Behavior Model (Andersen, 1968), there are three independent variables. These are predisposing, enabling, and need factors. They predict the propensity to use health services and health outcomes. Theoretically, each of the components of the predisposing, enabling, and need factors will make an independent contribution to explaining Pap smear screening for the sample. As in the Behavioral Model for Vulnerable Populations (Gelberg et al., 2000), each independent variable has either a traditional or vulnerable domain, or both. Self-perceptions of heath status, which is subjective, will be the measure for need for healthcare.
This study adopts and applies the revised and expanded Behavioral Model for Vulnerable Populations (Gelberg et al., 2000). The study is adopting the Behavioral Model for Vulnerable Populations because, as explained previously, it is a revised and elaborated outcome of the original Behavioral Model (Andersen, 1968). The original model is a health services utilization model that has been used extensively with increasing success over the last three decades by health services researchers to explain patterns of use of health services among marginalized groups such as those being studied. These researchers include Aday, Andersen, and Fleming (1980); Aday, Fleming, and Andersen (1984) Andersen (1968); Andersen and Newman (1973); Andersen et al. (1975; 1976; 2000); Chappell and Blandford (1987) and Colantonio et al. (2001).
Its elaboration and expansion from the original model makes it particularly important for this study. As stated previously, in addition to the traditional domains that have customarily been used as explanatory variables for patterns of health services utilization, the Behavioral Model for Vulnerable Populations (Gelberg et al., 2000) affords an advantage of a non-traditional domain for theorizing about health services utilization behavior among vulnerable populations such as the subjects of this study. Moreover, it is anticipated that the original Behavioral Model will evolve as a dominant paradigm in health services research on access to care, particularly for vulnerable populations, in the near future (Gelberg et al., 2000; Wolinsky, 1988).

The model is an important framework for this study because the predisposing factors to vulnerability have the potential of affecting the sample’s use of health services (Gelberg et al., 2000). Low-income status in the U.S. is known to be a major predictor of use of health services in general, and preventive and promotive health services such as Pap smear screening (American Public Health Association, 1982; Bakemeier et al., 1995; Mandelson and Thompson, 1998; Martin et al., 1996; Regan et al., 1999; Ropes, 1991; Weinrich et al., 1995; Valdini and Cargill, 1997). Even when health services are free, the relationship between low-income status and the poor utilization of health services may still prevail (Mandelson and Thompson, 1998; Ramirez-Zetina et al., 2000; Schwethelm et al., 1989; Weinrich et al., 1995; York et al., 1999).

Thus, there is the need to investigate the relationship between health services utilization of the sample of predominantly low-income women and their health status. Majority of this group of women being studied also have one or more socio-demographic variables that predispose them to poor utilization of health services in the U.S. These include racial minority status (American Public Health Association, 1982; Aday, 1993; 2001; Byrd et al., 1996; Gotay and Wilson, 1998; Harlan et al., 1991; Hubbell et al., 1996; Kogan et al., 1993; Mackay et al.,
2001; Mandelblatt et al., 2000; Navarro et al., 1998; Oropesa et al., 2000; Regan et al., 1999; Ropes, 1991; U.S. Census Bureau, 2001; Zambrana et al., 1999), being an immigrant or non-U.S.-born (Chavez et al., 1997; Dubay et al., 2001; Yi, 1994; Zambrana et al., 1999) and being in the U.S. for less than five years (Oropesa et al., 2000; Wells and Horm, 1998).

Others include having language barriers stemming from speaking a language other than English or having little fluency in English (Bakemeier et al., 1995; Mandelblatt et al., 2000; Oropesa et al., 2000). The rest include lack of or inadequate health insurance coverage (Navarro et al., 1998; Nothangle et al., 2000; Zambrana et al., 1999; excluding Yi, 1994), lacking a usual source of medical care (Martin et al., 1996; Zambrana et al., 1999) or being without a regular healthcare provider (Martin et al., 1996; Yi, 1994).

More importantly, these barriers determine the health outcomes of vulnerable populations (Aday, 1993; 1994; 2001; American Public Health Association, 1982; Evans et al., 1994; Ropes, 1991). Furthermore, the above-mentioned predispositions affect the utilization of preventive and promotive healthcare services for Pap smear screening (Gotay and Wilson, 1998). Also, this multiplicity of confounders such as being low-income, minority, and immigrant may play a role in reducing vulnerable women’s access to health and preventive care services. For instance, they introduce several competing needs in the daily routines of such women, reducing their chances of using these services at earlier stages when prevention and cost-cutting are more viable (Gelberg, et al., 2000).

In this study, the competing needs I will measure are needs for transportation, food, clothing and housing. I also investigate the effect of a healthcare system barrier, having problems with paperwork for healthcare, and having had check-up for current pregnancy. Finally, health
Pap smear screening than women in good health.

The primary factors examined are grouped under predisposing variables. Predisposing factors are social structural ones including race/ethnicity, immigration status, age and marital status. The focus is on race/ethnicity/immigration status. The remaining predisposing factors serve as descriptive variables. Immigration status plays a dual role; it is used both as an independent variable and a descriptor. Self-reported health status is used as a need variable inducing having or not having a Pap smear.

Enabling factors of personal and family resources such as health insurance coverage (JPS Connections, any private or public insurance) or the lack of it, employment status for self and having a usual source of healthcare are used as control variables. Medicare recipients were left out because the sample was aged less than sixty-five years to qualify for it ordinarily. Those who had Medicare were permanently disabled. Thus, presumably, they were very different from the rest of the sample and including them could skew the relationships being studied.

Additional enabling factors that are used as control variables are having had a check-up for current pregnancy, problems with handling paperwork for healthcare and competing needs for food, clothing, housing and transportation. These are expected to intervene in the possible relationships between the independent and dependent variables. They may partially explain such relationships. Finally, health behavior measures the use of health services: Pap smear screening.

In addition to the model proposed upfront, multiple control variables were introduced at once. For example, different categories of health status—good (excellent, very good, good) and poor (fair, poor) were introduced for their effect on the dependent variables.
Objectives of the Study

The study has three objectives. Using the Behavioral Model for Vulnerable Populations, it attempts to: (a) explain the utilization of Pap smear test among the group of low-income women interviewed by Eve et al. (2000), in Fort Worth, Texas, by ascertaining the determinants of using these services; (b) highlight policy relevant variables that may lead to changes in utilization of preventive Pap smear screening services for the population of low-income women using the safety-net healthcare network; and (c) add to the literature and theoretical synthesis on utilization of Pap smear screening.

Study Variables and Empirical Model

This section concentrates on the variables for the study and its empirical model. The main predictor variable is race/ethnicity/immigration status, with the few major groups being Anglos, African Americans, Hispanic Americans, and Hispanic immigrants. Other racial and ethnic categories were left out, as they were too few. One dependent variable is examined. This is health behavior determined by having a Pap smear test within the four categories of a) screening ever, b) screening within the last three years, c) screening within the past year and d) none/never. Health behavior is measured by self-reported use of these services. Table 1 below gives a summary of the variables being studied.
Table 1: Variables Being Examined in the Study

<table>
<thead>
<tr>
<th>Demographic Variables</th>
<th>Independent Variable</th>
<th>Intervening/Control Variables</th>
<th>Dependent Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>Race/Ethnicity/ Immigration Status: Anglo African American Hispanic American Hispanic Immigrant</td>
<td>Personal/Family Resources: Health Insurance Coverage Any public or private insurance JPS Connections No insurance</td>
<td>Pap Smear Screening: Ever Within last 3 yrs. Within past year None/never</td>
</tr>
<tr>
<td>Marital Status</td>
<td></td>
<td>Employment status</td>
<td></td>
</tr>
<tr>
<td>Immigration Status</td>
<td></td>
<td>Usual source of care</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Check-up for current pregnancy</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Problems with paperwork for healthcare</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Competing Needs: Transportation Food Clothing Housing</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Health Status: Excellent Very Good Good Fair Poor</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The empirical model used, derived from the Behavioral Model for Vulnerable Populations (Gelberg et al., 2000), is presented in Figure 2. This model pertains to the sample of women used as the unit of analysis and is used to examine the predictors of having Pap smear tests among the women. Race/ethnicity/immigration status was expected to affect Pap smear
screening. The personal/family resources, having had a check-up for current pregnancy, problems with paperwork for healthcare, competing needs, and health status variables serve as intervening explanatory variables. The specific hypotheses are presented below.
Figure 2: Empirical Model of the Effect of Race/Ethnicity/Immigration Status on Pap Smear Screening Among Low-income Women

Race/Ethnicity/Immigration Status
- Anglo
- African American
- Hispanic American
- Hispanic Immigrant

Pap Smear Screening
- Ever
- Within last 3 years
- Within past year
- None/Never

Personal/Family Resources

Health Insurance Coverage
- Any public or private ins.
- JPS Connections
- No insurance

Employment Status

Usual Source of Care

Prenatal Care
- Check-up for current pregnancy

Health System Experience
- Problem with paperwork

Competing Needs
- Transportation
- Food
- Clothing
- Housing

Health Status
- Excellent
- Very Good
- Good
- Fair
- Poor
Significance of the Study

This section discusses the anticipated contribution of this study to the general public. It will contribute to the evolving Behavioral Model for Vulnerable Populations (Gelberg et al., 2000) as well as the literature in several ways. First, it adds to the literature on utilization of preventive Pap smear screening services. Second, it introduces a vulnerable domain of immigration status to the predisposing characteristics, the main domain in the model. Pregnancy check-up, problem with paperwork for healthcare and competing needs are additional vulnerable domains introduced into the model.

My review of the literature on the latter has not seen any specification of immigration status to it. Neither have I come across any addition of prenatal care, problem with paperwork nor competing needs to the vulnerable domain for the enabling variables. These will strengthen the vulnerable domain, which is a unique characteristic of the model.

Third, by focusing on the effect of race/ethnicity/immigration status, the study elaborated on and expanded some of the structural variables outlined in the original model. A focus on race/ethnicity/immigration status is also unique to the model. The emphasis on a multi-racial low-income group of women, some of whom are immigrants, is unique in this respect.

Furthermore, the study adds to the literature on the predictors of utilization of Pap smear screening for low-income women. Moreover, it highlights some policy issues to the attention of the safety-net healthcare network used for the study, with respect to Pap smear screening for its clientele of low-income women. Finally, it makes some recommendations to health services researchers, as well as to the general scientific community.
Hypotheses

Ten hypotheses are specified for this study. They are as follows:

1. Race/ethnicity/immigration status will be related to having a Pap smear. Anglo women will be most likely to have had a Pap smear, followed by Hispanic American women, African American women, and finally Hispanic immigrant women.

2. Controlling for age will partially explain the relationship between race/ethnicity/immigration status and Pap smear screening. Younger women (aged 18-44 years) will be more likely to have had a Pap smear than older women (aged 45-60 years).

3. Controlling for marital status will partially explain the relationship between race/ethnicity/immigration status and Pap smear screening. Women who are married will be more likely to have had a Pap smear test than women who are not married.

4. Controlling for having a usual source of care will partially explain the relationship between race/ethnicity/immigration status and Pap smear screening. Women who do have a usual source of care will be more likely to have had a Pap smear than women who do not have a usual source of care.

5. Controlling for employment status will partially explain the relationship between race/ethnicity/immigration status and Pap smear screening. Women who are employed will be more likely to have had a Pap smear than women who are not employed.

6. Controlling for any private or public insurance, JPS Connections and no insurance coverage will partially explain the relationship between race/ethnicity/immigration status and Pap smear screening. There will be a difference between women who have access to any private or public insurance, and/or are not insured relative to women with JPS Connections.

7. Controlling for having a check-up for current pregnancy will partially explain the relationship between race/ethnicity/immigration status and Pap smear screening. Pregnant women who have had a check-up for current pregnancy will be more likely to have had a Pap smear than all other women.

8. Controlling for problems with handling paperwork for healthcare will partially explain the relationship between race/ethnicity/immigration status
and Pap smear screening. Women who do have problems with processing paperwork for healthcare will be less likely to have had a Pap smear than women who do not have problems with paperwork for healthcare.

9. Controlling for competing needs will partially explain the relationship between race/ethnicity/immigration status and Pap smear screening.

9a. Women who have competing need for transportation will be less likely to have had a Pap smear than women who do not have competing need for transportation.

9b. Women who have competing needs for food, clothing and housing will be less likely to have had a Pap smear than women who do not have these competing needs.

10. Controlling for health status will partially explain the relationship between race/ethnicity/immigration status and Pap smear screening. Women who are in good (excellent, very good, good) health will be more likely to have had a Pap smear than women who are in relatively poorer (poor, fair) health.
CHAPTER 3

METHODOLOGY

Introduction

In this chapter, I discuss in detail the statistical methodology I used in arriving at results for the data analyses. The chapter covers (1) research design, (2) plan for statistical analyses, (3) population and sample, and (4) the operational measures and frequencies of the variables I use in the research.

Research Design

This study is a secondary analysis of survey data which used telephone interviewing. The original study for which the sample was collected had three objectives. These were “to assess (1) access to healthcare, (2) economic cost of care and lack of care, and (3) health status of prime working-age (18-60), low-income (up to 200% of Federal Poverty Income Level), adult residents of Tarrant County” within two categories of race/ethnicity/immigration status and insurance status (Eve, Koelln, Baumer, Trevino and Urrutia-Rojas, Project Proposal, 1999: 2).

The original study was conducted to answer the following questions arising from healthcare reforms mandated by the Texas state legislature in 1995, (1) what is the effect of those healthcare reforms on the ability of the low income workforce in Texas to access and use the healthcare system when they are sick, and (2) what is the effect of this on the cost of their healthcare and health status? (Eve et al., 1999).

A closed-ended, multiple-choice questionnaire, which had been pretested, was used in collecting the primary data. The questionnaire, which had eight main sections were on “access to
care”, including “getting healthcare from a specialist,” “no usual source of care for sick care,” “insurance,” “unmet needs,” “your healthcare in the last 12 months,” “about you,” which included socio-demographic variables, and “immigration.” The final section had a set of four items focusing on women’s health, including current pregnancy status and use of health services for prenatal care, if pregnant, as well as Pap smear screening, and time since Pap smear screening, if applicable. The final section was administered to female respondents only.

The questionnaire was administered by the Survey Research Center of the University of North Texas (UNT), using the Computer Assisted Telephone Interviewing (CATI) methodology. The CATI is a random digital dialing system, which randomly selects and dials telephone numbers programmed into a central computer (Babbie, 1998).

Reliability and Validity of the Questionnaire

Reliability denotes consistency of results while validity means accuracy of measures (Babbie, 1998; Patten, 2000). The questionnaire was based on standardized questions in the National Health Interview Survey (NHIS). Revisions were made to reflect the local concerns of the Fort Worth, Texas, area, where the data was collected. Face validity was done on the questionnaire before using it for this study.

A benefit of using the interview survey methodology of the original study is that of a standardized, pretested questionnaire. Standardization and pretesting of questionnaires improve their reliability and validity. The standardized, pretested questionnaire also provides the advantage of asking the same questions of all respondents and imputing the same intent to similar answers from all respondents. This strength of measurement in survey interviews improves the reliability of the study (Babbie, 1998). Furthermore, adapting the questions to reflect local concerns in the north-central Texas region means that the questions captured the
local situation of the region, thus, improving the content validity and general validity of the questionnaires (Babbie, 1998).

The CATI survey interview has its advantages and disadvantages. According to Babbie (1998) the advantages of the CATI include the following: first, the random digit dialing leaves out unlisted telephone numbers, thereby reducing the non-response rate and increasing the completion rate, compared to other data collection techniques such as self-administered questionnaires. Second, the interviewer types the interviewee’s responses, either verbatim or by selecting a code category for a closed-ended questionnaire, into the central terminal. This facilitates the validity of the study. Third, both through the CATI and as an interview survey, this design provides the additional benefit of producing lesser incomplete questionnaires, particularly with the trained interviewers used by the UNT Survey Research Center.

Fourth, the interviewers can probe further, with the potential of increasing both the reliability and validity of the study. Fifth, since there is no face-to-face contact between the interviewees and the interviewers, a telephone interview may lessen the possibility that the interviewer’s presence may influence the interviewees into giving socially desirable answers (Babbie, 1998).

Conversely, like all research undertakings, the study has some weaknesses and limitations, which are discussed in-depth later on. These limitations reduce the external validity of the study and its generalizability to the larger population of patients who use the safety-net healthcare network. It can only be generalized to the population of female patients who used healthcare at safety-net healthcare system within July and August 2000 based on whom the sampling frame was compiled. That population may not generally represent the regular
population who use safety-net healthcare providers routinely. Neither do they represent the general population outside the safety-net network.

In addition, the closed-ended standardized questionnaire is inflexible and may reduce the content validity of the individual responses. As Babbie (1998: 273) puts it aptly, “By designing questions that will be at least minimally appropriate to all respondents, you may miss what is most appropriate to many respondents. In this sense, surveys often appear superficial…Similarly, survey research can seldom deal with the context of social life.” This robs the data of some pertinent background information of the respondent and his or her environment, which may add some depth to the information, gathered, thus, affecting its validity.

Other Discussion of Strengths and Weaknesses of the Data Collection Design

The data collection design has both strengths and weaknesses, which impact on the empirical considerations of this dissertation. I first discuss the strengths, then the weaknesses. Being secondary analysis, the design for this study has its strengths. Fashioned along the NHIS and revised to reflect local concerns, the design of this study acquired some of the technical strengths with which national experts handle the yearly NHIS surveys, including the content material and wording of the questionnaires (Babbie, 1998).

The use of secondary data has obvious advantages, and imparts these to the study. First, it is cheaper and readily available, compared to collecting original data. Second, this study is benefiting uniquely from the work of top-flight professionals, the researchers whose areas of expertise converged in collecting the primary data. Another key strength of the study is related to the race/ethnic/immigration status effect, which is the main focus of this study.

Furthermore, the interview survey from which this study was conducted has its advantages. First, they lead to fewer incomplete and misunderstood questions, as the interviewer
is able to probe. CATI surveys are especially helpful with this, as the computer offers a further check on this. Second, interview surveys typically results in higher completion rates, compared to self-administered surveys. Third, the standardization and pretesting of the questionnaire before the final data collection, as discussed already, are special strengths of survey research and improve upon both its reliability and validity. Finally, the primary study was designed to forestall the possible problem of self-selection due to language barrier (Babbie, 1998). About half of the original sample were immigrants and may not be fluent in the English language, causing them to possibly refuse to be interviewed. This was addressed by having trained interviewers talk to the Hispanic respondents in their native language.

Alternatively, the design of the study has some weaknesses. They include the retrospective research methodology; there may be recall bias (Martin et al., 1996). Moreover, the cross-sectional design of the study has its limitations. Primarily, there is a lack of time sequence and related historical framework for the questions asked. In this study, the single time frame nature of the design denies it of some complexities. These complexities may include policy recommendations for Pap smear screening over time, changes in insurance coverage and access to healthcare over time, particularly with the advent of Health Maintenance Organizations and their policies related to use of healthcare. Furthermore, the one-point-in-time nature of the study will not reflect any possible changes in the safety-net healthcare system’s policy concerning either eligibility regulations for the medically indigent or policies regarding Pap smear screening (Cready and Saenz, 1997).

In relation to this study, which aims at explaining preventive Pap smear screening among the sample of low-income women, the problem of cross-sectional data is stated more forcefully by Babbie (1998: 101) “Explanatory cross-sectional studies have an inherent problem. Though
they typically aim at understanding causal processes that occur over time, their conclusions are based on observations made at only one time.”

Additionally, the self-reporting associated with the personal interviews during the data collection may have potential recall bias (Martin et al., 1996) and/or socially desirable responses. Research has shown, however, that self-reported information about utilization of Pap smear tests (and mammography) among low-income populations could be reliable. McGovern, Lurie, Margolis and Slater (1998) studied the accuracy of self-reports of (mammography and) Pap smear tests in a low-income population. They verified the self-reports by checking medical records at sites where the tests were performed and found results for Pap smear screening recalls to be broadly similar to the medical records.

Another limitation would be the use of telephone to conduct the survey in the original study. This may be an issue when interviewing low-income, especially migrant populations. Immigrant populations, especially recent immigrants, for example, those who have been in the U.S. under five years, may be less likely to have telephone in their households. This is due to socioeconomic reasons, such as low income and high mobility (U.S. Census Bureau, 2002).

Also, random sampling, although free from bias, has the possibility of having random errors, which may influence the results. However, in this study, the probability of taking a wrong decision based on the alpha level has been minimized by using a low probability of \( \leq .05 \), which minimizes the probability of incurring a Type I error, as explained later on in the study (Patten, 2000). Furthermore, the problem with sampling error is handled partially by the research design of this study, as larger samples such as the one used in this study, reduce sampling error (Babbie, 1998).
Moreover, using secondary data for this study has inherent shortcomings. A researcher who uses secondary data is simply limited to what exists (Babbie, 1998). In this study for instance, I would have wished to study utilization of mammography tests for breast cancer screening in addition to cervical cancer screening. However, the questionnaire did not include questions on mammography and breast cancer. Furthermore, the telephone interview methodology used may serve as a barrier because some households may have more than one telephone. This gives such homes a higher probability of selection than homes with only one telephone (Babbie, 1998).

Overall, aspects of the conceptual definitions used for the primary study, such as race/ethnicity, and definition of poverty, as well as the limitations of the sample and study, compromise its reliability and validity. The definition of the primary social structural variable of race/ethnicity/immigration status being used for this study may pose a limitation. Specifically, the conceptualization of race and ethnicity may be problematic, and lack clarity for the respondents. This may skew the primary basis of categorizing the respondents.

Race and ethnicity have confused meaning for both researchers and respondents alike. In fact, the U.S. Census Bureau (2001) states that ethnicity could refer to people of any race. As a secondary analysis of previously existing data, it is not clear what understanding the respondents had before they chose a specific ethnic classification. In the understanding of the principal investigator of the primary study, “Hispanic” is ethnicity while “white” denotes race, and includes people of Latin America/Mexican descent (Eve, 2001). It is, however, not clear if the respondents understood the concepts that way.

Given the cautions concerning race and ethnicity particularly, there is the need to be weary of establishing causality. Conclusions that will be drawn with regard to the social
structural variables, particularly race/ethnicity should not be interpreted to mean that race and ethnicity are causal variables (Hahn, 1992; Hahn et al., 1992; Osborne and Feit, 1992; Tapper, 1999). The lack of causality is common to this study and all cross-sectional surveys.

Consequently, one limitation of the study is that it cannot establish causality between the predisposing, enabling, and need factors, and the use of the preventive healthcare services being studied (Healey, 1996). Also, as noted in chapter 2, poor health could cause people to utilize health services more. Conversely, people who take control of their health could use preventive health services more and are likely to be healthier. Thus, any association that may be established between health status and having a Pap smear may be only theoretical, not practical.

Studying the low-income working-age population, defined primarily as living within 200% Federal Poverty Income Level (FPIL), shaped the conceptual definition of the primary study. Most of them were receiving indigent healthcare, and thus, had little choice on where they received care (Eve et al., 1999). The safety-net healthcare system determines eligibility and co-payments at time of enrollment and is revised periodically, based on policies approved by the Tarrant County Hospital District Board of Managers, guided by family size, income and federal poverty guidelines (John Peter Smith Healthcare Network, 2002).

As I explain below, adopting this conceptual definition of poverty status for my study, based partly on federal poverty guidelines, is suspect, and can compromise the reliability and validity of the study. Of late, several poverty experts have criticized the definition and estimation of the official poverty measure being used by the U.S. Census Bureau, which was adopted by the researchers of the primary data I used for this study.

The criticism has culminated in an ongoing debate, with several of the experts involved developing a number of alternative measures of poverty. They have also recommended that the
Census Bureau modifies its traditional definition of poverty to reflect geographical residence and non-cash welfare incentives, among others (Betson, 1997; 1998; 2000; 2001; Short, 2001; Short and Iceland, 2000). Of special importance to this study is the aspect of the debate about the impact of medical out-of-pocket expenditures (MOOP) on poverty, or alternatively, real incomes available for people to use after they have borne their out-of-pocket medical expenses (Bavier, 2000/2001; Doyle, 1997). These shortcomings of the data collection design may serve as confounders to the study.

Population and Sample

The study used the female sub-sample of a previously existing data on working-age adults of 18 to 60 years in the Tarrant county of Texas, collected in fall 2000. The sample of low-income adults who had been patients in the safety-net healthcare hospital and its community clinics in July and August 2000, were randomly selected to participate in interviews. The safety-net healthcare provider assists with healthcare for the indigent and is a tax supported institution (Eve et al., 1999).

The sampling frame comprised of a total population of 10,000 patients from the list of patients seen within July and August 2000 in the safety-net healthcare system. It was collected from the payment office of the healthcare network. A final sample of 2,034 was drawn randomly, using Computer Assisted Telephone Interviewing (CATI) technique, from the list of patients provided by the healthcare network. The list reflected the multi-race and multi-ethnic population of Anglo, African American, Hispanic-American, Hispanic immigrants, Asian Pacific Islanders and American Indians.
Also, the list reflected the varied health insurance status groups including privately insured, uninsured, public-Medicaid, Medicare, John Peter Smith (JPS) Connections, CHAMPUS or TRI-CARE, military healthcare or VA, and ‘other’ sources. The JPS Connections is a subsidized healthcare payment plan for families within 200% of federal poverty level who use the safety-net healthcare providers. A respondent was called five times after which if he or she was not available to be interviewed within those times, his or her name was abandoned and another person was called till a minimum of 2,000 respondents had been interviewed (Eve, 2001). The female sub-sample of 1,382 (67.9%) was the unit of observation for this study.

By using a low-income sample, social class was controlled as the sample falls within 200% federal income poverty level. In the course of reorganizing the sample for the final statistical analyses, part of the original sample of 1,382 was lost to the analysis. This happened for three reasons. First, and mainly, because the study concentrated on the four main racial and ethnic groups interviewed. These are Anglos, African Americans, Hispanic Americans and Hispanic immigrants.

The decision to concentrate on these groups was based on two factors, their numerical strength among the sample and also because they are the main racial and ethnic groups in the U.S. Other racial and ethnic groups were ignored because their numbers were inadequate for any meaningful analysis involving the multivariate statistical methodology used, logistic regression. In logistic regression, there should not be groups of less than 15 for various analyses of the independent variable, to ensure reliable analysis (DeMaris, 1992: 78). Second, cases with missing values were dropped and not included in the analyses.

Third, thirty-two women who had Medicare health insurance were deleted. The main reason for which they were deleted was that they were permanently disabled. This disability
status possibly makes them different from the rest of the sample when considering some of the variables being studied, such as health status and employment status. After exercising these restrictions, the sample for the final data analyses was reduced to 1,170. This forms the unit of analysis for this study. Frequencies and percentage distributions are given below for selected variables for the final sample used as the unit of analysis.

Strengths and Limitations of the Sample Design

There are strengths and limitations of the sample design. The advantages include the probability sampling methodology, the mixed characteristics of the sample, and their residence within the Tarrant County. Random sampling ensures a greater degree of representativeness, thereby reducing sampling error (Babbie, 19998; Friis and Sellers, 1999; Pyrczak, 1995). Again, the large sample size provided by the original data improves the reliability of the study (Babbie, 1998).

Furthermore, both investigators for the primary study and for this study are very familiar with the Tarrant County and, thus, have more familiarity with a sample from the county than they would have with a sample collected from a remote and unfamiliar place. Both investigators have lived and worked in the North Central Texas region for several years, and focus their research on the area. This familiarity has the advantage of giving the researchers peculiar insights about the sample, which may enhance the overall validity and reliability of the study.

Alternatively, a number of limitations can be identified for the sample design. These include a possible selection bias stemming from self-selection and non-response for some of the population, and the lack of generalizability outside patients who use the publicly funded safety-net healthcare providers. Generally, the people who use county and/or publicly funded health facilities such as the one used for this study are those who are unable to access other private
health resources, such as private physicians, due to economic and other barriers. As the researchers of the primary study acknowledged, there are some restrictions on the amount of healthcare the sample could receive because healthcare within the safety-net healthcare system is rationed.

Second, the data collection method used, telephone interviewing, may limit the sample. The availability of household telephone as a condition for being reached for interviewing and subsequent selection into the study sample may be a limitation. Some poor households, particularly those within the lower economic brackets such as the sample I am using, may not have telephones (Babbie, 1998).

Third, based on the criteria that a prospective sample was called five times and abandoned if the interviewing was not completed by the fifth time, bias was systematically introduced during the process of sampling, especially for low-income populations. This is because such people may work longer hours to make ends meet, making them unavailable at home most of the time to be interviewed (Jaeger, 1990). Particularly for most of the sample who were minority and/or immigrants, for whom it may be more difficult to get regular jobs and may thus work irregular hours, this is a problem.

Statistical Analyses

The next session on statistical analysis, discusses in detail the levels of measurements for the variables used as the basis of analysis, the statistical design used, and the strengths and weakness of the statistical design used.
Levels of Measurement

Measurements in the study are done at nominal and ordinal levels mainly. The dependent variable, Pap smear screening, is measured at the nominal level. Similarly, race/ethnicity/immigration status is measured at the nominal level. The control variables of personal and family resources of health insurance coverage, employment status and usual source of care are measured at the nominal level as well. Additional intervening/control variables are problems with handling paperwork for healthcare, measured at the nominal level, and competing needs for transportation, food, housing and clothing, also measured at the nominal level. The rest are getting check-up for current pregnancy, which was also measured at the nominal level; and finally, health status was measured at the ordinal level.

Furthermore, there are demographic variables, age and marital status. Although age was originally measured as a ratio variable, it was recoded as an ordinal variable, which compared older (45-60 years old) and younger (18-44 years old) women. Marital status was measured at the nominal level.

Dependent Variable and Legitimation of Statistical Choice

The dependent variable, Pap smear screening, was measured at the nominal level as a dichotomous dummy variable. Hence, it legitimated that the data be analyzed by calculating frequencies, percentages, binary logistic regression and significance levels based on chi-squared. These are statistical procedures which legitimate using nominal-ordinal data. Logistic regression is applicable to this study basically because the dependent variable, Pap smear screening, is a dichotomous variable (Cready and Saenz, 1997; Pampel, 2000; Pyrczak, 1995): screening ever versus never, within the last three years versus everything else and within the past year versus everything else.
A chi-squared test was also done and reported at alpha level \( p \leq .05 \). I also introduced multiple control variables at once to observe their effect on the dependent variable, as stated in chapter 2. The sets of the intervening variables were introduced systematically to provide a control for within-group diversity in race/ethnicity/immigration status (Cready and Saenz, 1997). Race/ethnicity/immigration status, the intervening/control variables and demographic variables were dichotomized as dummy variables as well.

Description of Logistic Regression Analysis

Logistic regression is a linear probability model, defined by Bohrnstedt and Knoke, (1994: 332) as “a linear regression model in which the dependent variable is confined between two choices.” In this case, the dichotomous dependent variable is a linear function of the independent variables (Bohrnstedt and Knoke, 1994: 341). Basically, logistic regression is a regression on a dependent variable that transforms nonlinear relationships into linear ones. Binary discrete variables were coded into dummy variables (one fewer dummy than the number of categories), usually employing values of ‘1’ and ‘0’ (with the lowest group as the reference category). A change in one unit of a dummy variable compares the indicator group to the reference or omitted group (Pampel, 2000). Among others, logistic regression tests whether ‘certain predictors are associated with a dependent variable’ (DeMaris, 1992: 56).

In multivariate logistic regression techniques with dichotomous dependent variables, weighting is used to estimate the effects of the independent variables (Aldrich and Nelson, 1984; Bohrnstedt and Knoke, 1994; Cready and Saenz, 1997; Hanushek and Jackson, 1977; Maddala, 1983; Pampel, 2000). When the dependent variable is dichotomous, using logistic regression is advantageous in that it circumvents the problems that will arise when ordinary regression is used,
such as nonlinearity, non-normality and heteroskedasticity, which would lead to inefficient estimation (DeMaris, 1992).

Logistic regression coefficients, that is, “the effects of the independent variables in logistic regression” (Pampel 2000: 18) can be interpreted in three ways: as logged odds, probabilities, or odds ratios. For odds ratios, which are used in this study, the coefficients are stated as exponentiated coefficients ($\text{Exp}(B)$). For odds ratios, the exponentiated coefficient for the dummy variable equals the ratio of odds for the dummy variable group to the odds for the reference group.

Exponentiated coefficients are interpreted as follows: a coefficient of one (1) leaves the odds unchanged, a coefficient greater than one increases the odds for the group in the model, relative to the reference group, and a coefficient smaller than one decreases the odds. Thus, the distance of an exponentiated coefficient from one indicates the size of the effect. The deviation of a coefficient from one illustrates the increase or decrease in the odds for a unit change in the independent variable (DeMaris, 1992; Pampel, 2000).

The following is the formula for calculating the exponentiated coefficient: “the exponentiated coefficient minus 1 and times 100 gives the percentage increase or decrease resulting from a one-unit change in the independent variable” (Pampel 200: 23).

Statistically stated, “$\% \text{ change} = (e^b - 1) \times 100,$” where $e^b$ is the exponentiated coefficient (Pampel, 2000: 23). Interpretation of the exponentiated coefficients refers to multiplicative changes in the odds, not probabilities (DeMaris, 1995, quoted in Pampel 2000: 23).

Logistic regression relies on maximum likelihood procedures to obtain the coefficient estimates. Maximum likelihood estimation aims at finding coefficients that have the greatest
likelihood of producing the observed data. The log likelihood value shows the likelihood that the data would be observed given the parameter estimates, the likelihood of observing the pattern of occurrences ($Y = 1$) and nonoccurrences ($Y = 0$) of an event or characteristic in a given sample as a function of unknown model parameters (Bohrnstedt and Knoke, 1994; DeMaris, 1992; Pampel, 2000).

The test of significance for each variable in the model was calculated using the chi-squared statistic. Comparing the log likelihood ratios for models with and without the variable aids in testing for statistical significance, for confirmation or otherwise of the null hypothesis (Pampel, 2000). The null hypothesis was that all parameters (betas) of the effect are 0 and the alternative hypothesis was that at least one parameter (beta) is not zero. In all models, the difference in $-2\log$-likelihoods between the final/full model and a reduced model has a $X^2$ distribution. The reduced model is formed by omitting an effect from the final model. Stated statistically,

$$X^2 = (-2 \log \text{ likelihood for restricted model}) - (-2 \log \text{ likelihood for full model}),$$

with $df =$ number of independent variables in full model not included in restricted model,


This method of assessing the goodness-of-fit allows the researcher to judge whether the model fits the data. The decision rule is as follows:

- if obtained $X^2 > \text{table } X^2$, then reject $H_0$
- if obtained $X^2 < \text{table } X^2$, then fail to reject $H_0$

A higher test statistic reflects a better fit of the model to the data. Furthermore, the magnitudes of the model chi-squared are affected by the sample size. A conservative interpretation of this
test/goodness-of-fit statistic suggests comparing within-group models only (Burr and Mutchler, 1992: 108). A statistically significant model chi-squared denotes a good fit of the model while a non-significant model chi-squared denotes otherwise. For those variables which show significant effects, the percentage difference in odds for one variable, compared to the reference group, is then calculated for each statistically significant variable in the model, using the formula:

\[
\text{\% difference in odds} = 100 \times (e^b - 1),
\]

where \( e^b \) is the odds ratio of the variable in question (Burr and Mutchler, 1992; DeMaris, 1992; Pampel, 2000).

Strengths and Weaknesses of the Statistical Design

The statistical design, which employed descriptive statistics such as frequencies, and percentages, inferential statistics, such as chi-squared test, and binary logistic regression, has its strengths and weaknesses. I discuss the strengths first, followed by the weaknesses. Percentages are advantageous when comparing two or more groups of different sizes (Pyrczak, 1995). They make comparisons of groups of unequal sizes possible due to the fact that percentages convert frequencies to a common scale with a base of 100 (Patten, 2000).

In this study for instance, different race/ethnicity/immigration status groups with different frequencies are compared. Using percentages in doing this provides a common denominator for comparing these groups. Furthermore, when reporting percentages, it is helpful to report frequencies, as reporting percentages alone can sometimes be misleading. Reporting underlying frequencies in addition to percentages allows for more informed decisions (Pyrczak, 1995).

Additionally, the chi-squared test, which examines association between two nominal variables, has the strength of confirming or disconfirming the null hypothesis of no difference between two populations. This rules out the probability that the pattern of differences is a result of sampling errors, confirming the results with a high degree of confidence (Pyrczak, 1995). With specific reference to logistic regression, “…large samples using maximum likelihood
estimation (MLE) [as is used in this study] are unbiased, efficient and normally distributed, and thus allows for significance tests using…” chi squared and other statistics (Bohrnstedt and Knoke, 1994:342). Bohrnstedt and Knoke (1994:342) define MLE as “a method of estimating parameter values that chooses the set with the highest probability of generating the sample observations.”

DeMaris (1992: 48) spells out another crucial advantage of interpreting logistic regression in terms of odds, as done in this study, rather than probabilities. “Interpreting logistic regression results in terms of odds rather than probabilities confers certain advantages. Most important among these is that exp(\( B \)) is a single summary statistic for the partial effect of a given predictor on the odds, controlling for other predictors in the model. There is no comparable statistic for the probability. That is, it is not possible to summarize the impact on the conditional probability of a unit increase in a given predictor, net of the others. The reason for this is that the model is nonlinear, and therefore nonadditive, in the probabilities.”

The bivariate analysis used in this study also has its strength. Compared to a univariate analysis, the bivariate analysis yields more information because “each subject is classified in terms of two variables in order to examine the relationship between them” (Patten, 2000: 102). Logistic regression also has its strength. Despite the problem with interpretation, as stated below, logistic regression provides a simple summary of the statistical inference. “A logistic regression coefficient provides a simple linear and additive summary of the influence of a variable on the logged odds of having a characteristic or experiencing an event… (Pampel, 2000: 39).

On the other hand, the statistical design has some weaknesses. One of these is associated with the use of chi-squared test. With a chi-squared test, there is the possibility of incurring either a Type I or Type II error. The former denotes rejecting the null hypothesis when it actually
is correct, while the latter implies failing to reject the null hypothesis when it is incorrect in reality.

Second, tests of significance using large samples, as done in this study, can be problematic due to the fact that statistical significance depends strongly on sample size. Hence, $p$ values provide little information on strength, importance, or intuitive meaning of the relationship. In particular, large samples could produce significant $p$ values for otherwise small and unimportant effects (Pampel 2000: 30-1). Third, tests of significance make sampling assumptions that are difficult to fulfill in practice by sampling designs. One of these assumptions is the absence of nonsampling error, which is difficult to meet in most empirical measurements (Babbie, 1998).

Furthermore, logistic regression has a problem of interpretation. “Despite the simplicity of their interpretation, the logistic regression…lacks a meaningful metric. Statements about the effects of variables on changes in logged odds reveal little about the relationships and do little to help explain the substantive results. Researchers need means to interpret the substantive meaning or importance of the coefficients other than merely reporting the expected changes in logged odds” (Pampel 2000: 20-1). This problem can be solved by using the exponentiated coefficient ($e^b$) for the interpretation. “Raising $e$ to the coefficient $b$ allows interpretation of the resulting coefficient in terms of multiplicative odds or percentage change in the odds” (Pampel, 2000: 39).

Operational Measures of Variables

Operational measures for the variables in this study are given in the following order in which they appear in the write-up: first, for the dependent variable, Pap smear screening; second, for race/ethnicity/immigration status; third, for the intervening/control variables; and finally, for the demographic variables, age and marital status. For each category of variables discussed
below, the original measurement is discussed first, then the recoding, followed by frequencies, and finally, by strengths and weakness of the variable(s).

For purposes of reorganizing the data for statistical analyses, the responses to the original questions in the questionnaire for the primary study were re-categorized and recoded. Binary logistic regression requires that the dependent variable be dichotomized. Thus, for the dependent, as well as the other variables, a section on recoding is discussed after the original measures are given. The Statistical Package for Social Sciences (SPSS) version 10.0 (SPSS Inc., Chicago, IL) was used to generate frequencies of the variables being measured.

Original Coding of the Dependent Variable

The dependent variable, Pap smear screening, was originally measured as having a Pap smear, and duration since last screening. Pap smear screening was measured as follows: “have you ever had a test for cancer of the cervix or uterus, like a Pap smear? (yes, no, NR/DK).” Duration since last Pap smear test was measured with the statement “about how long has it been since you had a Pap smear? Was it within the past year, between 1 and 3 years ago, or over three years ago? (within past year, 1 to 3 years ago, over three years ago, NR/DK).”

Recoding and Frequencies of the Dependent Variable Used as Basis of Analysis

The dependent variable, Pap smear screening, was reclassified into three different versions, with each version recoded as a dummy variable for the multivariate analysis. According to Pampel, 2000: 69), a nominal dependent variable that has three or more categories might lend itself to a set of separate logistic regressions. Three versions might involve three logistic regressions with three dummy dependent variables: the first version versus all others, the second version versus all others, and the third version versus all others.”
The classifications were: (1) ever had a Pap smear versus never had a Pap smear, created into a dummy variable as: (a) ever had a Pap smear = 1, which is equal to have had a Pap smear within the past year, 1-3 years ago, 3+ years ago; and (b) never = 0, which implies none/never had a Pap smear, which is the reference category; (2) has had a Pap smear within the last 3 years: (a) has had a Pap smear within the last 3 years = 1, implying Pap smear screening within past year and 1-3 years ago, and (b) everything else = 0, covering has had a Pap smear 3+ years ago and none/never as the reference category; and (3) has had a Pap smear within the past year was operationalized into a dummy variable as: (a) within past year = 1; which implies has had a Pap smear within the past year, and (b) everything else = 0; which denotes has had a Pap smear 1-3 years ago, 3+ years ago and none/never, being the reference category. The binary logistic regression analyses in chapter 4 used these three re-categorized dependent variables separately.

Frequencies of the dependent variable. Table 2 below is on the frequencies of the dependent variable versions, Pap smear screening ever, within the last three years and within the past three year. The table indicates that nearly 90% of the women had ever had a Pap smear test and that only about 10% had never had one. Also, less than one-fifth (18.7%) had not had a Pap smear screening within the last three years, while over four-fifths (81.3%) had had it within the last three years. Furthermore, more than a third (36.7%) of them had not had a Pap smear test within the past year, while 63.3% had received Pap smear screening within the past year.
Table 2: Frequencies of the Recoded Dependent Variable

<table>
<thead>
<tr>
<th>Pap Smear Screening Category</th>
<th>%</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Screening ever</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>10.3</td>
<td>120</td>
</tr>
<tr>
<td>Yes</td>
<td>89.7</td>
<td>1050</td>
</tr>
<tr>
<td>Screening within the last 3 years</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>18.7</td>
<td>219</td>
</tr>
<tr>
<td>Yes</td>
<td>81.3</td>
<td>951</td>
</tr>
<tr>
<td>Screening within the past year</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>36.7</td>
<td>429</td>
</tr>
<tr>
<td>Yes</td>
<td>63.3</td>
<td>741</td>
</tr>
</tbody>
</table>

Strengths and Limitations of the Dependent Variable

Sub-categorizing the dependent variable, Pap smear screening, and dichotomizing each version has advantages and limitations. The advantage is that breaking it into the three versions allows for comparison of use over time. This is particularly important since the guidelines for Pap smear screening has time specifications, as discussed in other chapters. The outcome of the comparison for use over time will guide safety-net healthcare providers as well as other preventive healthcare agencies in decision making for their preventive education in cervical cancer screening.

However, dividing the dependent variable into different time-limited versions has its weaknesses. Recall of the specific times when the women had used the Pap smear screening could be a problem, as is common with all retrospective designs such as the one for this study. A second problem, related to recall, is that there could be women who have had the Pap smear screening without being aware of it. For instance, although samples for Pap smear screening are routinely collected from women who attend prenatal care during the initial contact, they are not told specifically that a Pap smear test would be done. Hence a woman may not be aware that she
has had a Pap smear screening, let alone specify the timing of it, which is another limitation of a retrospective study design.

Operational Measures of Race/ethnicity/immigration Status Variable

The next session discusses how race/ethnicity/immigration status was measured originally, and modified to generate the variable used as the basis of the analysis as well as frequencies based on it.

Original Coding and Frequencies of Race/ethnicity/immigration status Used as Basis of Analysis

Race/ethnicity/immigration status was measured separately with four questions at first: (a) “are you of Mexican origin or descent? (yes, no, NR/DK)”, (b) “Are you of Mexican American origin or descent? (yes, no, NR/DK)”, and (c) “which of the following racial groups do you belong to? (white/Caucasian, African American/Asian, Native Hawaiian/other Pacific Islander, American Indian/Alaska Native, other, NR/DK).” Finally, (d) a question on immigration status was asked only of the respondents who had indicated earlier that they were not born in the U.S. It was measured using a six-item question as follows: “which of these statements is most true of you? I am a U.S. citizen; I am applying for U.S. citizenship; I do not qualify yet to apply for U.S. citizenship; I need to become a permanent resident first; I prefer to remain a citizen of my home country; and NR/DK.”

A screening variable, country of birth, was used to filter the respondents who answered the question on immigration status and length of stay in the U.S. It was measured as “were you born in the United States? (yes, I was born in the United States, no, I was not born in the United States, NR/DK).” These were then combined to create a new race/ethnicity/immigration status variable with the following categories—Anglos, African American, Hispanic American and
Hispanic immigrant. I argue that Hispanic Americans will be different from Hispanic immigrants.

The study focused on the social structural variables of race/ethnicity and immigration status, and use of health services, measured by Pap smear screening. By focusing on race/ethnicity and immigration status particularly, the study tried to identify the strengths of race/ethnicity and immigration status that affect utilization of health services.

Recoding and Frequencies of Race/ethnicity/immigration Status

For the logistic regression analyses, race/ethnicity/immigration status was created into a dummy variable with (1) 1 = African American, 0 = all else, comprising white, Hispanic American and Hispanic immigrant; (2) 1 = Hispanic American, 0 = all else; and (3) 1 = Hispanic immigrant, 0 = all else. White was the reference category.

Frequencies of race/ethnicity/immigration status. Table 3 below is on frequencies of race/ethnicity/immigration status. It shows that nearly 40% (39.7%) of the sample were Anglos. The next major group was African Americans, who formed 24.4% of the sample. Fourteen percent were Mexican Americans, and the remaining 21.9% were Hispanic immigrants.

Table 3: Frequencies of Race/ethnicity/immigration status

<table>
<thead>
<tr>
<th>Race/ethnicity/immigration status</th>
<th>%</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anglo</td>
<td>39.7</td>
<td>465</td>
</tr>
<tr>
<td>African American</td>
<td>24.4</td>
<td>285</td>
</tr>
<tr>
<td>Hispanic American</td>
<td>14.0</td>
<td>164</td>
</tr>
<tr>
<td>Hispanic immigrant</td>
<td>21.9</td>
<td>256</td>
</tr>
<tr>
<td>Total</td>
<td>100.0</td>
<td>1,170</td>
</tr>
</tbody>
</table>
Strengths and Limitations of the Race/ethnicity/immigration Status Variable

The following section is on the strengths and weakness of race/ethnicity/immigration status. One of its strength is the between group comparison of different racial and ethnic groups it offers. As discussed already in chapter 2, there are great variations in social capital, culture and related health and illness and healthcare use orientation, health status and belief systems among these racial and ethnic groups. All of these would lead to differences in access to and utilization of healthcare and preventive care use particularly.

In addition, the literature emphasizes that based on the factors I have just enumerated, among others, health service delivery personnel may treat different racial/ethnic groups differently, also resulting in differentials in access to and utilization of health services for these groups. Doing between group analysis for them, thus, caters for these differences which might have posed confounding problems for the study. This is especially important for the between group differentiation of the two Hispanic groups in the study, Hispanic Americans and Hispanic immigrants. As advised in the literature (Chavez et al., 1997; Mandelblatt et al., 2000; Oropesa et al., 2000; Ramirez et al., 2000; Zambrana et al., 1999) and also, demonstrated by the results of this study, discussed in subsequent chapters, it was very important to have separated these two Hispanic groups for the analysis.

On the other hand, the race/ethnicity/immigration status variable has its limitations. First, deleting the other racial and ethnic groups besides the four main ones used for the study robbed it of rich information which could have been generated from the other groups, most of whom are studied lesser than the mainstream groups which my study concentrated on. Second, classifying race/ethnicity in a society as diverse as the U.S. is not very practicable and is associated with a lot of flaws, as discussed in detail below.
Difficulties with Assessing Empirical Support for a “Race/Ethnicity” Effect

Race, ethnicity and socioeconomic status (SES), along with age and sex are strongly related to public health outcomes (Mandelson and Thompson, 1998) and have frequent association with health status. They have thus been commonly used to categorize populations in health research and planning. This is done with the assumption that race and ethnicity are valid concepts and can be correctly identified. The validity of this assumption has, however, been questioned in recent times (Hahn, 1992).

In fact, Hahn (1992) concluded that several assumptions underlying federal health statistics on race and ethnic groups are poorly supported. Moreover, conceptual, rather than operational definitions of race and ethnicity are lacking and there is no consideration for scientific grounds for defining these concepts. Even if conceptual validity is attained, it may not readily translate into the ability to assess race by survey procedures. Biological notions of race may be confused with cultural and behavioral notions of ethnicity.

Consequently, race and ethnicity are ascertained differently among and within data collection agencies. Interviewees may also understand and respond to questions about race and ethnic identity differently at different times. This is not to mention that race and ethnic identification for the same person may change at different points in time. More frequently than not, miscounting and misclassification of race and ethnicity may vary by an order of magnitude between whites and other races, leading to inaccurate counts, rates, and rate ratios (Hahn, 1992; Hahn, Mulinare and Teutsch, 1992). For Hispanics particularly, and for races other than whites and African Americans, there are inconsistencies in statistical information, which may hinder health research and program development. For example, intercensal estimates by the U.S. Census
Bureau indicate that among persons in 27 states who specified a race, 33.4% classified themselves erroneously as being Mexican-American.

Other questionnaire terms regarding race and ethnicity are also misinterpreted, and or misunderstood, particularly by recent immigrants and minority respondents (Hahn, 1992). Consistency of the definition and procedure for measuring race and ethnicity is lacking (Hahn, 1992). Hahn (1992: 268) noted that “long-standing conceptual difficulties in the definition of race and ethnicity pose a challenge to the surveillance of health in US racial and ethnic groups.”

Popular notions and terminology of race and ethnicity among the general population differ substantially from those of information-collection agencies. Responses to questions about perceived identity largely depends on the circumstances and terminology used (Hahn, 1992). In some instances, the definition of race and ethnicity are not mutually exclusive (Hahn, 1992; Osborne and Feit; 1992) and there may be substantial differences between interviewer/observer and respondent ascertainment of race and ethnicity (Hahn, 1992).

Inconsistencies in race and ethnicity may also be due to shifting identity, unclear group boundaries, and ambiguity about the criteria for group membership (Hahn et al., 1992; Siegel and Passel, 1979). These inconsistencies and racial misclassification appear to have been persistent for over a quarter of a century now (Hahn, 1992), Thus, Hahn (1992) recommends that the scientific validity of the categorizations race and ethnicity, as well as perceptions of social identity in the U.S. population should be reconsidered.

Osborne and Feit (1992) and Tapper (1999) explore the practical problems and examine the consequences of using race as a category in medical research, affirming that a track record of racism already exist in the medical literature, and that reports of several racially motivated medical studies in which objectivity is fraudulent, spurious, or selective abound. Tapper (1999)
specifies that the social construction of race and disease is often suspect and incriminating. Scientists are unlikely to decide to conduct comparative racial studies totally devoid of prejudice, and even in the best of circumstances, research methods cannot always compensate for racial bias (Osborne and Feit, 1992).

Rather, there is a tendency to assume that the results are a manifestation of the biology or racial differences since race as a variable implies that a genetic reason may explain differences in incidence, severity, or outcome of medical conditions. Without pinpointing it, researchers lead readers to assume that certain racial groups have a special predisposition, risk, or susceptibility to illnesses studied. Medical research with the objective of looking for genetic reasons to explain certain types of diseases are laden with both ethical problems and scientific pitfalls since racial status and ethnicity are highly correlated with social, economic, and political factors (Osborne and Feit, 1992; Tapper, 1999).

Race as a variable in medical research is also suspect because the concept of race is, at best, elusive. There is no accepted scientific definition for it. Racial definitions and connotations depend on location, social class, and nationality. Moreover, race is not a dichotomous variable, neither is it mutually exclusive. For these reasons, race as a research category seriously compromises the objectivity of scientific enquiry and increases the likelihood that the scientific merits of an investigation will suffer. Studies using race also have the risk of projecting pejorative feelings, perceptions or attitudes and present data that are demeaning to certain groups (Osborne and Feit, 1992; Tapper, 1999).

Consequences of the negative use of race in medical research goes beyond the academia to influence medical perceptions that reinforce negative attitudes and unequal treatment in the medical and healthcare environment for certain categories of people, particularly racial and
ethnic minorities. It can have a direct effect on the quality of medical care as physicians are known to diagnose, manage, and make recommendations based on perceptions they acquire from the literature (Osborne and Feit, 1992).

Possible steps toward eliminating racial/ethnicity bias in medical research include the need for: 1) editors of medical journals to have higher standards than those of other scientific journals and assume the responsibility of protecting minority populations from abusive research, 2) researchers to notify their research subjects when race is a research category, 3) the definition and classification of race and ethnicity in public health to be reconsidered, and 4) readers to be given the opportunity to know the null hypotheses of authors and to judge the validity of the methods used to test the hypotheses (Hahn, 1992; Hahn et al., 1992; Osborne and Feit, 1992).

Operational Measures of the Control Variables

The enabling variables will be used as explanatory intervening/control variables. They include the personal and family resources, prenatal care, competing needs and problems with handling paperwork for healthcare. These factors may intervene and explain the relationship between race/ethnicity and having preventive Pap smear screening. The review of the literature indicates that these resources may partly explain the use of health services (Perez-Stable, Otero-Sabogal, Sabogal, McPhee, and Hiatt, 1994; Strong, 2000).

Original Coding and Frequencies of the Control Variables

The control variables were measured as follows, in the order in which I use them. 1) Usual source of care was measured using “Is there a person or place, like a health clinic or doctor’s office, that you usually go to when you are sick or need advice about health? (yes, no, NR/DK).” 2) Employment status for self was measured with “Do you currently have at least one job where you work for pay? (yes, no, no answer, refused).”
3) Health insurance coverage was measured with two questions; first, “Do you currently receive your healthcare for yourself through JPS Connections? (yes, no, NR/DK).” Second, “Do you currently have health insurance for yourself from any of the following sources? Remember this is coverage only for your healthcare needs, not those of your family? Are you currently covered by: (a) private insurance through your work, (b) private insurance through your husband or wife’s work? (c) Medicare? (d) Medicaid? (e) CHAMPUS or TRI-CARE? (f) military healthcare or VA, (g) do you have health insurance through some other source? (If yes: please tell me the name of this insurance? RECORD VERBATIM).”

4) Pregnancy status and prenatal care for the current pregnancy were measured with two questions: (a) “are you pregnant right now? (yes, no, NR/Dk) and (b) “IF YES: Have you been to a doctor or other health provider for a pregnancy care check-up for this pregnancy? (yes, no, NR/Dk).” 5) Having experiences with handling paperwork for healthcare was identified as one of the problems that could dissuade respondents from seeking preventive healthcare, and possibly, Pap smear screening. It was measured using a combination of two questions as follows: first, “Paperwork means things like getting your ID card, having your records changed, processing forms, or other paperwork related to getting care. In the last 12 months, did you have any experiences with paperwork for your healthcare? (yes, no, no answer, refused),” and second, “In the last 12 months, how much of a problem, if any, did you have with paperwork for getting healthcare? (a big problem, a small problem, not a problem, no answer/refused).”

6) Competing needs was measured with two questions: (a) “During the past 12 months, did you experience any problems with getting transportation to get healthcare? (yes, no, no answer, refused),” and (b) “During the past 12 months, did you NOT receive doctor’s care or prescription medicines because you needed the money to buy food, clothing or pay for housing?
Health status was measured using a six-item scale, which asked “in general, how would you rate your overall health now? (excellent, very good, good, fair, poor, NR/DK).”

Recoding and Frequencies of the Control Variables Used as Basis of Analysis

Some of the intervening/control variables were re-categorized to make them dichotomous, for purposes of the binary logistic regression method being employed for this study. These control variables were turned into dummy variables, as follows: (1) usual source of care was created into a dummy variable with 1 = has usual source of care, 0 = do not have a usual source of care, which is the reference category; (2) employment status was created into a dummy variable with 1 = employed, 0 = unemployed as the reference category.

(3) For health insurance coverage, (a) the insurance category provided by the safety-net healthcare providers called JPS Connections, was made the reference category, 0, with the rest of the dummy variable being (b) any private or public insurance, including private insurance from the women’s source of employment or from her spouse, Medicaid, but not Medicare, and ‘other’ sources of public or private insurance, such as VA, CHAMPUS or TRI-CARE = 1; and (c) ‘no insurance’ was classified as no insurance whatsoever, first coded as a residual category if it was neither JPS Connections nor any of the private, public, or ‘other’ insurance category, and was later recoded as 1.

(4) Check-up for (this) current pregnancy was recoded into a dummy variable as (a) pregnant and has had a check-up for this pregnancy = 1, (b) with the reference category being all other women = 0; which constitute those who are pregnant but are yet to have a check-up for that pregnancy, and all others who are not pregnant. (5) Experiences/problem with handling paperwork for healthcare was dummied as 1 = has experiences/small or big problem with
paperwork for healthcare, 0 = does not have an experience/problem with paperwork for healthcare/no answer/refused, is the reference group; and (6) competing needs for transportation was coded into a dummy variable as 1 = experienced any problems with getting transportation to get healthcare, 0 = did not experience any problems with getting transportation to get healthcare is the reference group.

(7) Competing needs for food, clothing and housing was created into a dummy variable with 1 = yes, has competing needs for food, clothing and housing, 0 = has no competing needs for food, clothing and housing, which is the reference category. (8) Finally, health status was recoded into a dummy variable as “good health” = 1 = excellent, very good, good; and “bad health” = 0 = fair, poor health, which is the reference category.

Frequencies of the control variables. Table 4 below has information on frequencies of the recoded control variables which were used as the basis of analysis. Most of the women, 86.9%, had a usual source of care, with only a few of them, 13.1% not having a usual source of care. Also, a little over half of them, 53% were employed, while 47% were unemployed. Nearly a fifth (19.5%) of the women had any private or public insurance, whilst majority, 80.5%, were without a private or public insurance. Out of the latter, 60.5% had JPS Connections and 20% had no insurance.

Only 5.1% of the respondents said they were pregnant by the time of the interview. Of these, 3.6% had had a check-up for that pregnancy and 1.5%, constituting 30% of those who were pregnant, had not had check-up for that pregnancy. About 95% were not pregnant. Fewer of them had competing needs/problem with paperwork for healthcare that could interrupt their access to and use of healthcare for Pap smear screening. Only one out of every eight women (12.5%) had a problem with handling paperwork for healthcare; and 13.2% had competing need
for transportation. About a third of them (33.2%) had competing needs for food, clothing and housing. Finally, a little over a third of them (36.8%) perceived their health status as bad (fair/poor) while majority of them, (63.2%) thought they had good (excellent, very good, good) health status.

Table 4: Frequencies of the Control Variables

<table>
<thead>
<tr>
<th>Control Variables</th>
<th>%</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Personal/family resources</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Usual source of care</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>13.1</td>
<td>153</td>
</tr>
<tr>
<td>Yes</td>
<td>86.9</td>
<td>1,017</td>
</tr>
<tr>
<td><strong>Employment Status</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>47.0</td>
<td>550</td>
</tr>
<tr>
<td>Yes</td>
<td>53.0</td>
<td>520</td>
</tr>
<tr>
<td><strong>Health insurance coverage</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any private or public insurance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>80.5</td>
<td>942</td>
</tr>
<tr>
<td>Yes</td>
<td>19.5</td>
<td>228</td>
</tr>
<tr>
<td><strong>No insurance</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>80.0</td>
<td>936</td>
</tr>
<tr>
<td>Yes</td>
<td>20.0</td>
<td>234</td>
</tr>
<tr>
<td><strong>JPS Connections</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>39.5</td>
<td>462</td>
</tr>
<tr>
<td>Yes</td>
<td>60.5</td>
<td>708</td>
</tr>
<tr>
<td><strong>Are you pregnant now?</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>94.9</td>
<td>1,110</td>
</tr>
<tr>
<td>Yes</td>
<td>5.1</td>
<td>60</td>
</tr>
</tbody>
</table>

*(table continues)*
Table 4. (continued)

<table>
<thead>
<tr>
<th>Control Variables</th>
<th>%</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check-up for this pregnancy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>96.4</td>
<td>1,128</td>
</tr>
<tr>
<td>Yes</td>
<td>3.6</td>
<td>42</td>
</tr>
<tr>
<td>Competing needs/problem</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Problem with paperwork</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>87.5</td>
<td>1,024</td>
</tr>
<tr>
<td>Yes</td>
<td>12.5</td>
<td>146</td>
</tr>
<tr>
<td>Competing need for transportation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>86.8</td>
<td>1,016</td>
</tr>
<tr>
<td>Yes</td>
<td>13.2</td>
<td>154</td>
</tr>
<tr>
<td>Competing needs for food, clothing and housing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>66.8</td>
<td>781</td>
</tr>
<tr>
<td>Yes</td>
<td>33.2</td>
<td>389</td>
</tr>
<tr>
<td>Perceived health status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Good health</td>
<td>36.8</td>
<td>430</td>
</tr>
<tr>
<td></td>
<td>63.2</td>
<td>740</td>
</tr>
</tbody>
</table>

Strengths and Limitations of the Control Variables

Some of the control variables bring strengths and limitations to the study. For instance, the state of pregnancy may give those women who were pregnant an advantage in terms of having a higher exposure to Pap smear testing. This is because routine prenatal care includes Pap smear testing. Thus, being currently or ever been pregnant has the probability of exposing these women to higher Pap smear testing than for the rest of the group. This may be a confounder and serves as a weakness of the study. Also, as mentioned already, health status may promote or discourage use of healthcare services (Burack et al., 1998; Gelberg, 1996; Gelberg et al., 2000; Mandelblatt et al., 1992).
Demographic Variables

Besides race/ethnicity and immigration status, age and marital status were used as demographic descriptors for the study. The subsequent section discusses the original coding, recoding, frequencies, strengths and limitations of the demographic variables used as the basis of analysis.

Original Coding of the Demographic Variables

The demographic variables were measured as follows: 1) age was measured by asking the respondents to state the year in which they were born. This was recorded verbatim. Their age and age categories were then computed by subtracting the year of birth from the year of the survey, fall 2000. 2) Marital status was measured with the question “are you currently married and living with a spouse? (yes, no, NR/DK).”

Recoding and Frequencies of the Demographic Variables Used as Basis of Analysis

For the demographic variables, age was dummied as younger (ages 18-44), with older (ages 45-60) women being the reference category. A dummy variable was created for marital status as 1 = married, with the reference group being 0 = not married. Frequencies from the data indicate that about three-quarters of the women were aged 18-44 years while nearly one-fourth of them were older, aged 45-60 years. In addition, 54% of them were not married, while 46% were married.

Strengths and Limitations of the Demographic Variables

Categorizing age into a dichotomous variable is a strength of the study. It helps to compare the effect of an older and younger age on utilization of Pap smear screening. However, while an older age confers the advantage of having a longer time span to have used Pap smear screening, a longer age does not necessarily ensure regular Pap smear screening over time.
Similarly, marital status confers an advantage of doing a comparison between groups of women who are married and not married. However, I argue that marital status per se may not necessarily make a difference to Pap smear screening. Factors such as length of time married (a considerably longer time frame rather than a couple of weeks before the interview), quality of marital life and socio-economic status conferred by the marriage may be additional indicators to differentiate the married from the unmarried in use of preventive Pap smear screening.

Uniqueness of the Study

The study adds to the literature on women’s health for several reasons. First, its population is different from others in the literature. It is from a county safety-net healthcare system. People who use county health facilities are normally those who are vulnerable. They have to cope with several distracting aspects of such public healthcare systems such as rationing of care, and long waiting times, as discussed already. Studies show that healthcare system orientation and other related healthcare system factors limit the use of preventive healthcare (Cohen et al., 1991; Franks and Clancy, 1993; Lurie et al., 1993; Mandelson and Thompson, 1998; Wee et al., 2001). This makes the sample very different from all other samples described in the literature on this topic. Most studies use samples from private healthcare networks.

Second, the low-income population used in this study is often neglected in other studies. Third, the study focuses on race, ethnicity and immigration status effect. In the U.S., race, ethnicity and immigration statuses are very important variables predicting social stratification and inequality. In particular, race and ethnicity effect, as well as immigration status are known to largely determine access to resources such as health insurance, regular source of healthcare, and even referral for follow-up healthcare. Without question, race, ethnicity and immigration status in the U.S. partly determine who gets sick and who is healthy, and life expectancy (Aday, 1993;
2001; American Public Health Association, 1982; Evans, et al., 1994; Ropes, 1991; Starr, 1982; Syme and Berkman, 1994).

Fourth, the mix of the sample is very unique. The sample used is a mix of U.S. citizens and immigrants, both recent and those who have lived in the U.S. longer. Furthermore, it is a mixture of four racial and ethnic groups, with 60% of them being racial and ethnic minorities. Studies have shown that immigration status, length of stay in the U.S., and ethnicity influence utilization of preventive health services. The literature indicates, for instance, that minority populations in the U.S., particularly Hispanics, utilize Pap smear test the worst. Also, cultural norms associated with differences in ethnicity affect definitions of need for healthcare, and perceptions about physical examinations (Chavez et al., 1997; Gotay and Wilson, 1998; Hubbell et al., 1996; Jennings, 1997; Kosloski et al., 1999; Ramirez et al., 2000).

Racial and ethnic minorities may not trust the healthcare system like Anglos do. This affects their use of preventive care services (Brown, Fouad, Basen-Engquist and Tortolero-Luna, 2000). Healthcare workers may also be influenced by stereotypes from the medical literature and, thus, give differential treatment to minorities who go to them for healthcare (Ob/Gyn News, 1989; Osborne and Feit, 1992; Tapper, 1999).

Similarly, new immigrants in the U.S. may not use preventive health services till they have been in the country longer, after about five years (Zambrana et al., 1999). They may have medical beliefs and health systems different from mainstream U.S. ones which may limit their use of mainstream orthodox healthcare (Chavez et al., 1997; Gotay and Wilson, 1998; Hubbell et al., 1996; Jennings, 1997; Kosloski et al., 1999; Ramirez et al., 2000). Furthermore, by virtue of having low human and social capital with respect to social network and support, health insurance, education and the use of the English language, immigrants and minorities may have
barriers which may hinder their access to the healthcare system (Gotay and Wilson, 1998; Harlan et al., 1991; Mandelblatt et al., 2000; Oropesa et al., 2000; Suarez, 1994).

Another unique thing about the study is that of interviewing the Hispanic samples in their native language.
CHAPTER 4

RESULTS AND DATA ANALYSES

There were three objectives for this research. These were (1) to explain the utilization of Pap smear tests among the group of low-income women interviewed by Eve, Koelln, Baumer, Trevino and Urrutia-Rojas (2000), who were patients in a safety-net healthcare network in Fort Worth, Texas, by ascertaining the determinants of using these services; (2) to highlight policy relevant variables that may lead to changes in utilization of health services for populations of low-income women using safety-net healthcare providers; and (3) to add to the literature on utilization of Pap smear screening.

The first section of this chapter presents the analyses of the data. First, results of bivariate cross-tabulations of race/ethnicity/immigration status on the three versions of the dependent variable are shown and discussed, followed by results of logistic regression analyses using the Statistical Package for the Social Sciences (SPSS) version 10.0 (SPSS Inc., Chicago, IL). Next, results of multivariate models showing odds ratios of binary logistic regression analyses are provided. The latter are evaluated within the theoretical framework of the Behavioral Model for Vulnerable Populations (Gelberg, Andersen and Leake, 2000).

Organizing the data this way for the multivariate analyses helped to determine the impact of the various intervening/control variables on the relationship between race/ethnicity/immigration status and the odds of Pap smear screening (Burr and Mutchler, 1992). Resultant –2 log likelihoods, model chi-squares (goodness-of-fit statistics) (Burr and Mutchler, 1992) and model degrees of freedom of the three versions of the dependent variable Pap smear screening ever, within the last three years and within the past year on race/ethnicity/immigration status, are used to evaluate the hypotheses. The second section
discusses the results of the logistic regression analyses relative to the hypotheses of the study. An overall summary of the chapter follows after this.

Results from Bivariate Cross-tabulations

I first explore the relationship between the independent variables and three versions of the dependent variable using bivariate tables (cross-tabulation) analyses, including their test of statistical significance, using Pearson’s chi-squared.

Percentage Having a Pap Smear Ever by Selected Characteristics

This section discusses results of bivariate analyses on Pap smear screening ever on selected characteristics. Table 5 below gives information from results of cross-tabulations of the Pap smear screening ever variable by race/ethnicity/immigration status. It demonstrates that only two predisposing variables, race/ethnicity/immigration status ($\chi^2 = 42.546, 3 \text{ df, } p = .000$) and age ($\chi^2 = 9.172, p = .002$), and one enabling variable, usual source of care ($\chi^2 = 5.638, p = .018$) have statistically significant effects on ever having a Pap smear test. Results from race/ethnicity/immigration status show that Anglos were most likely to have ever had a Pap smear, followed by African Americans, then by Hispanic immigrants, and lastly, by Hispanic Americans. More than 95% (95.5%) of Anglos have ever had a Pap smear compared to 91.2% of African Americans, 81.1% Hispanic Americans and 83.2% Hispanic immigrants.

Additionally, the data show that the older women, aged 45-60 years, are more likely to have ever had a Pap smear than the younger women, aged 18-44 years. Less than 90% (88.2%) of women aged 18-44 years had ever had a Pap smear compared to 94.4% of women aged 45-60 years. The results also reveal, as would be expected, that women with a usual source of care are more likely to have ever had a Pap smear than women without a usual source of care; 90.6% of
women who had a usual source of care have ever had Pap smear screening, compared to only 84.3% of their peers who did not have a usual source of care.

However, the effects of marital status, employment status and health insurance coverage were minimal and do not show statistically significant results. Additionally, having check-up for the current pregnancy, problems with handling paperwork for healthcare, competing needs for transportation, food, clothing and housing, and perceived health status do not have statistically significant effects on Pap smear screening ever.

Table 5: Bivariate Analyses of Percentage Having a Pap Smear Ever by Selected Characteristics

<table>
<thead>
<tr>
<th>Variables</th>
<th>% Having a Pap Smear Ever</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Predisposing Variables</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Race/ethnicity/immigration status***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anglo</td>
<td>95.5</td>
<td>465</td>
</tr>
<tr>
<td>African American</td>
<td>91.2</td>
<td>285</td>
</tr>
<tr>
<td>Hispanic American</td>
<td>81.1</td>
<td>164</td>
</tr>
<tr>
<td>Hispanic Immigrant</td>
<td>83.2</td>
<td>256</td>
</tr>
<tr>
<td>Demographic Variables</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18-44 years</td>
<td>88.2</td>
<td>882</td>
</tr>
<tr>
<td>45-60 years</td>
<td>94.4</td>
<td>288</td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not married</td>
<td>89.6</td>
<td>632</td>
</tr>
<tr>
<td>Married</td>
<td>90.0</td>
<td>538</td>
</tr>
<tr>
<td><strong>Enabling Variables</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Usual source of care**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>84.3</td>
<td>153</td>
</tr>
<tr>
<td>Yes</td>
<td>90.6</td>
<td>1017</td>
</tr>
<tr>
<td>Employment status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unemployed</td>
<td>89.1</td>
<td>550</td>
</tr>
<tr>
<td>Employed</td>
<td>90.3</td>
<td>620</td>
</tr>
</tbody>
</table>

*(table continues)*
<table>
<thead>
<tr>
<th>Variables</th>
<th>% Having a Pap Smear Ever</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Enabling Variables</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employment status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unemployed</td>
<td>89.1</td>
<td>550</td>
</tr>
<tr>
<td>Employed</td>
<td>90.3</td>
<td>620</td>
</tr>
<tr>
<td>Health insurance coverage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any private or public insurance</td>
<td>89.9</td>
<td>228</td>
</tr>
<tr>
<td>No insurance</td>
<td>86.8</td>
<td>234</td>
</tr>
<tr>
<td>JPS Connections</td>
<td>90.7</td>
<td>708</td>
</tr>
<tr>
<td>Check-up for this pregnancy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>89.5</td>
<td>1128</td>
</tr>
<tr>
<td>Yes</td>
<td>97.6</td>
<td>42</td>
</tr>
<tr>
<td><strong>Competing Needs/Problem</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Problem with paperwork</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>89.4</td>
<td>1024</td>
</tr>
<tr>
<td>Yes</td>
<td>92.5</td>
<td>146</td>
</tr>
<tr>
<td>Competing Need for Transportation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>89.9</td>
<td>1016</td>
</tr>
<tr>
<td>Yes</td>
<td>89.0</td>
<td>154</td>
</tr>
<tr>
<td>Competing Needs for Food, clothing and housing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>89.2</td>
<td>781</td>
</tr>
<tr>
<td>Yes</td>
<td>90.7</td>
<td>389</td>
</tr>
<tr>
<td><strong>Perceived Health Status</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poor</td>
<td>88.8</td>
<td>430</td>
</tr>
<tr>
<td>Good</td>
<td>90.3</td>
<td>740</td>
</tr>
</tbody>
</table>

Note: $X^2$ tests (2-tailed) * $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$
Percentage Having a Pap Smear Within the Last Three Years by Selected Characteristics

This section discusses results of analyses of bivariate relationships between having a Pap smear within the last three years and selected independent variables, as depicted in Table 6 below. Results differ somewhat from earlier ones. Interestingly, race/ethnicity/immigration status does not have a statistically significant effect on this version of the Pap smear screening variable. Regardless of the lack of initial statistically significant effect for race/ethnicity/immigration status, Table 6 shows that usual source of care ($\chi^2 = 6.380, p = .012$), health insurance coverage ($\chi^2 = 6.873, p = .032$) and having check-up for the current pregnancy ($\chi^2 = 7.642, p = .006$) were statistically significant.

Furthermore, having competing needs for food, clothing and housing ($\chi^2 = 5.838, p = .016$) and perceived health status ($\chi^2 = 5.090, p = .024$) were significant for Pap smear screening within the last three years. These results imply that the variables that show statistically significant effects, although race/ethnicity/immigration status does not show a statistically significant effect, may have substantive importance for Pap smear screening within the last three years. These variables have significant additive effects for Pap smear screening within the last three years.

Consistent with previous results, women with a usual source of care are more likely to have a Pap smear within the last three years, compared to women without a usual source of care. About 82% of women who have a usual source of care, and 73.9% of those who do not have a usual source of care, have had a Pap smear, respectively, within the last three years. As would be expected, women who have any private or public insurance are most likely to have had a Pap smear within the last three years, followed by women with JPS Connections, and finally, by women with no insurance coverage. Close to 90% (86.4%) of those who have any private or
public insurance have had a Pap smear within the last three years, compared to 81.1% of women with JPS Connections and 76.9% of women with no health insurance.

Consistent with the results on check-up for current pregnancy throughout the bivariate analyses, pregnant women who have had a check-up for that pregnancy were much more likely to have had a Pap smear within the last three years, compared to other women. Nearly all, 97.6%, of pregnant women who have had a check-up for that pregnancy have had a Pap smear within the last three years, compared to only 80.7% of other women.

Conversely, women with competing needs for food, clothing and housing are less likely to have had a Pap smear within the last three years, compared to women without these competing needs. About 83% (83.2%) of women without these competing needs have had a Pap smear within the last three years while 77.4% of women who have these competing needs have had a Pap smear within the last three years. Finally, women who perceived their health status as being good (excellent/very good/good) were more likely to have had a Pap smear within the last three years than do women who thought they had poor health (fair/poor); 83.2% of women with “good” health have had a Pap smear within the last three years, compared to 77.9% of their peers with “poor” health.

Age, marital status and employment status do not show statistically significant effects for having a Pap smear test within the last three years. Other variables which do not have statistically significant effects for this version of the dependent variable are problems with handling paperwork for healthcare and competing need for transportation.
Table 6: Bivariate Analyses of Percentage Having a Pap Smear Within the Last Three Years by Selected Characteristics

<table>
<thead>
<tr>
<th>Variables</th>
<th>% Having a Pap Smear within the Last 3 years.</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Predisposing Variables</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Race/ethnicity/immigration status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anglo</td>
<td>83.2</td>
<td>465</td>
</tr>
<tr>
<td>African American</td>
<td>82.5</td>
<td>285</td>
</tr>
<tr>
<td>Hispanic American</td>
<td>74.4</td>
<td>164</td>
</tr>
<tr>
<td>Hispanic Immigrant</td>
<td>80.9</td>
<td>256</td>
</tr>
<tr>
<td>Demographic Variables</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18-44</td>
<td>81.9</td>
<td>882</td>
</tr>
<tr>
<td>45-60</td>
<td>79.5</td>
<td>288</td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not married</td>
<td>79.9</td>
<td>632</td>
</tr>
<tr>
<td>Married</td>
<td>82.9</td>
<td>538</td>
</tr>
<tr>
<td>Enabling Variables</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Usual source of care*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>73.9</td>
<td>153</td>
</tr>
<tr>
<td>Yes</td>
<td>82.4</td>
<td>1017</td>
</tr>
<tr>
<td>Employment status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unemployed</td>
<td>81.8</td>
<td>550</td>
</tr>
<tr>
<td>Employed</td>
<td>80.8</td>
<td>620</td>
</tr>
<tr>
<td>Health insurance coverage*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any private or public insurance</td>
<td>86.4</td>
<td>228</td>
</tr>
<tr>
<td>No insurance</td>
<td>76.9</td>
<td>234</td>
</tr>
<tr>
<td>JPS Connections</td>
<td>81.1</td>
<td>708</td>
</tr>
<tr>
<td>Check-up for this Pregnancy**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>80.7</td>
<td>1128</td>
</tr>
<tr>
<td>Yes</td>
<td>97.6</td>
<td>42</td>
</tr>
</tbody>
</table>

*(tables continues)*
Table 6. (continued)

<table>
<thead>
<tr>
<th>Variables</th>
<th>% Having a Pap Smear within the Last 3 years.</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Competing Needs/Problem</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Problem with paperwork</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>81.0</td>
<td>1024</td>
</tr>
<tr>
<td>Yes</td>
<td>83.6</td>
<td>146</td>
</tr>
<tr>
<td>Competing Need for Transportation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>81.9</td>
<td>1016</td>
</tr>
<tr>
<td>Yes</td>
<td>77.3</td>
<td>154</td>
</tr>
<tr>
<td>Competing Needs for Food, clothing and housing*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>83.2</td>
<td>781</td>
</tr>
<tr>
<td>Yes</td>
<td>77.4</td>
<td>389</td>
</tr>
<tr>
<td><strong>Perceived Health Status</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poor</td>
<td>77.9</td>
<td>430</td>
</tr>
<tr>
<td>Good</td>
<td>83.2</td>
<td>740</td>
</tr>
</tbody>
</table>

Note: \( X^2 \) tests (2-tailed) * \( p \leq .05 \), ** \( p \leq .01 \), *** \( p \leq .001 \)

Percentage Having a Pap Smear Within the Past Year by Selected Characteristics

The section below discusses results from data on bivariate relationships between selected characteristics and Pap smear screening within the past year. Again, race/ethnicity/immigration status shows no statistically significant effect, meaning there is no initial relationship between it and Pap smear screening within the past year. Regardless of this, age \( (X^2 = 12.796, p = 0.000) \), usual source of care \( (X^2 = 9.248, p = 0.002) \), health insurance coverage \( (X^2 = 8.571, p = 0.014) \) and check-up for current pregnancy \( (X^2 = 11.502, p = 0.001) \) show statistically significant effects. Other variables that show statistically significant effects are, competing need for transportation \( (X^2 = 6.801, p = 0.009) \), competing needs for food, clothing and housing \( (X^2 = 11.529, p = 0.001) \), and perceived health status \( (X^2 = 8.621, p = 0.003) \).
Thus, these variables show statistically significant additive effects, regardless of the lack of a statistically significant effect for race/ethnicity/immigration status. These results imply that the statistically significant variables may have substantive significance for the bivariate relationship for the likelihood of having a Pap smear within the past year.

Like the results with Pap smear screening ever, women with a usual source of care are more likely to have a Pap smear within the past year than women without a usual source of care. Sixty-five percent of women who had a usual source of care, compared to 52.3% of women who did not have a usual source of care, have had a Pap smear within the past year. Unlike the results with Pap smear screening ever, younger women aged 18-44 years were more likely to have had a Pap smear within the past year than older women aged 45-60 years. As results from Table 7 demonstrate, over 50% (54.5%) of women aged 45-60 years have had a Pap smear within the past year, compared to 66.2% of women aged 18-44 years.

As is expected, results from the data on health insurance coverage reveal that women who had no health insurance coverage were the least likely to have had a Pap smear within the past year, compared to women who had any private or public insurance and those with JPS Connections. Fifty-six percent of women with no health insurance coverage have had a Pap smear within the past year. This compares with 64% for women with JPS Connections and 68.9% for women with any private or public insurance.

Check-up for the current pregnancy also has a bivariate relationship with having a Pap smear within the past year. Women who had check-up for their current pregnancy were more likely to have had a Pap smear within the past year, compared to all other women. Nearly 90% (88.1%) of women who are currently pregnant and had check-up for that pregnancy have had a Pap smear test within the past year, compared to 62.4% of all other women. Also, women with
competing need for transportation were less likely to have had a Pap smear within the past year, compared to those without competing need for transportation; 53.9% of women who had competing need for transportation and 64.8% of those who did not have competing need for transportation have had a Pap smear within the past year, respectively.

Similarly, women with competing needs for food, clothing and housing were less likely to have had a Pap smear within the past year, compared to those without competing needs for food, clothing and housing. More than half (56.6%) of women who had these competing needs have had a Pap smear within the past year, compared to 66.7% of women who did not have these competing needs. Finally, women with good health (excellent, very good, good) were more likely to have had a Pap smear within the past year than women who did not have good health (fair, poor). Of women who perceived their health status as being good, 66.5% have had a Pap smear within the past year whilst 57.9% of those who considered their health status to be poor have had a Pap smear within the past year.

Marital status, employment status and problem with handling paperwork for healthcare had no statistically significant effects on Pap smear screening within the past year.
Table 7: Bivariate Analyses of Percentage Having a Pap Smear Within the Past Year by Selected Characteristics

<table>
<thead>
<tr>
<th>Variables</th>
<th>% Having a Pap Smear</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Predisposing Variables</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Race/ethnicity/immigration status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anglo</td>
<td>61.9</td>
<td>465</td>
</tr>
<tr>
<td>African American</td>
<td>64.6</td>
<td>285</td>
</tr>
<tr>
<td>Hispanic American</td>
<td>60.4</td>
<td>164</td>
</tr>
<tr>
<td>Hispanic Immigrant</td>
<td>66.4</td>
<td>256</td>
</tr>
<tr>
<td><strong>Demographic Variables</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age (18-44 years)**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18-44</td>
<td>66.2</td>
<td>882</td>
</tr>
<tr>
<td>45-60</td>
<td>54.5</td>
<td>288</td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not married</td>
<td>61.2</td>
<td>632</td>
</tr>
<tr>
<td>Married</td>
<td>65.8</td>
<td>538</td>
</tr>
<tr>
<td><strong>Enabling Variables</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Usual source of care**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>52.3</td>
<td>153</td>
</tr>
<tr>
<td>Yes</td>
<td>65.0</td>
<td>1017</td>
</tr>
<tr>
<td>Employment status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unemployed</td>
<td>63.3</td>
<td>550</td>
</tr>
<tr>
<td>Employed</td>
<td>63.4</td>
<td>620</td>
</tr>
<tr>
<td>Health insurance coverage*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any private or public insurance</td>
<td>68.9</td>
<td>228</td>
</tr>
<tr>
<td>No insurance</td>
<td>56.0</td>
<td>234</td>
</tr>
<tr>
<td>JPS Connections</td>
<td>64.0</td>
<td>708</td>
</tr>
<tr>
<td>Check-up for this pregnancy***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>62.4</td>
<td>1128</td>
</tr>
<tr>
<td>Yes</td>
<td>88.1</td>
<td>42</td>
</tr>
<tr>
<td><strong>Competing Needs/Problem</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Problem with paperwork</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>63.8</td>
<td>1024</td>
</tr>
<tr>
<td>Yes</td>
<td>60.3</td>
<td>146</td>
</tr>
</tbody>
</table>

*(table continues)*
**Table 7. (continued)**

<table>
<thead>
<tr>
<th>Variables</th>
<th>% Having a Pap Smear Within the Past Year</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Competing Needs/Problem</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Problem with paperwork</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>63.8</td>
<td>1024</td>
</tr>
<tr>
<td>Yes</td>
<td>60.3</td>
<td>146</td>
</tr>
<tr>
<td>Competing Need for Transportation**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>64.8</td>
<td>1016</td>
</tr>
<tr>
<td>Yes</td>
<td>53.9</td>
<td>154</td>
</tr>
<tr>
<td>Competing Needs for Food, clothing and housing***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>66.7</td>
<td>781</td>
</tr>
<tr>
<td>Yes</td>
<td>56.6</td>
<td>389</td>
</tr>
<tr>
<td>Perceived Health Status**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poor</td>
<td>57.9</td>
<td>430</td>
</tr>
<tr>
<td>Good</td>
<td>66.5</td>
<td>740</td>
</tr>
</tbody>
</table>

Note: $\chi^2$ tests (2-tailed) * $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$

Summary of Findings from Bivariate Analyses

This section sums up results from the data on bivariate analyses on the three dependent variable versions and race/ethnicity/immigration status. As shown above, results from the bivariate cross-tabulation in Table 5 reveal that only race/ethnicity/immigration status, age and usual source of care have statistically significant effects on having a Pap smear test ever. Older women (45-60 years) are more likely to have ever had a Pap smear than younger women (18-44). Also, women with a usual source of care are more likely to have had a Pap smear than women without a usual source of care.

This finding suggests that only one predisposing variable--age and one enabling variable--having a usual source of care potentially explain the bivariate relationship between race/ethnicity/immigration status and the dependent variable version ever had a Pap smear.
Interestingly, race/ethnicity/immigration status has a statistically significant effect on only one version of the dependent variable, Pap smear screening ever. Race/ethnicity/immigration status has no statistically significant effect on the other two versions of the dependent variable—having a Pap smear test within the last three years and within the past year.

Although no statistically significant bivariate effects exist between race/ethnicity/immigration status and having a Pap smear test within the last three years and within the past year, other variables which have statistically significant additive effects on these versions of Pap smear test have statistically significant effects for these dependent variable versions. These variables may have substantive significance for having a Pap smear test. For the bivariate relationship with having a Pap smear test within the last three years, the enabling variables usual source of care, health insurance coverage and check-up for current pregnancy; as well as competing needs for food, clothing and housing have statistically significant effects. Perceived health status also has a statistically significant effect on Pap smear test within the last three year, as shown in Table 6 above.

Variables which have statistically significant effects for the bivariate relationships for having a Pap smear test within the past year, as shown in Table 7 above, are the predisposing variable age, and the three enabling variables of usual source of care, health insurance coverage and having a check-up for the current pregnancy. The rest are competing needs for transportation, food, clothing and housing, and the perceived health status variable.

Interestingly, the effects of the different categories of health insurance coverage for having Pap smears within the last three years and within the past year are consistent. For both of these Pap smear screening variables, women with no health insurance are least likely to have had
Pap smear tests, followed by women with JPS Connections, and finally women with any private or public insurance.

Logistic Regression Analyses

In this section, results of the binary logistic regression analyses, which are presented in six tables, Tables 8 to 13 below, are discussed. The first part of this section discusses the tables, which show odds ratios from binary logistic regressions of Pap smear screening on selected factors, focusing on the general trend depicted in the data. Chi-squared test is used as a measure of statistical significance. Only statistically significant variables are discussed in detail. For all the significant values, the chi-squared statistic and alpha levels are given in parentheses when they are first reported. Significant variables are determined at alpha level $p \leq 0.05$; $N = 1,170$. Degrees of freedom ($df$) are stated for the chi-squared values if they are more than one (1), or else, they are not stated.

Tables 8, 10 and 12 show results for the main effects tables of the various versions of Pap smear screening, and Tables 9, 11 and 13 show results for domain-specific effects of Pap smear tests ever, within the last year, and within the past three years, respectively. Each successive set of tables (8 and 9, 10 and 11, and 12 and 13) present the results for a different version of the dependent variable. Table 8 shows odds ratios from binary logistic regressions of Pap smear screening ever versus never on race/ethnicity/immigration status and Table 9 shows results for the domain-specific effects. Table 10 gives results of Pap smear screening within the past year compared with everything else, and Table 11 shows its domain-specific effects. Finally, Tables 12 and 13 show results of the main effects and domain-specific effects of having a Pap smear within the last three years compared with everything else, respectively.
In each of the three main effects tables, five models are estimated. In keeping with the theoretical framework guiding the analysis, the Behavioral Model for Vulnerable Populations, each successive model introduces a new set of variables, representing a new domain. Also, each model serves as a restricted model for a subsequent model. The first model estimates the effect of race/ethnicity/immigration status on the likelihood of having a Pap smear. The second model introduces other predisposing variables. The third model introduces enabling variables. The fourth model introduces competing needs/problem variables. The fifth model introduces perceived health. Hence, each successive model shows the effects of the variables in one domain change as variables from a subsequent domain are introduced.

In each of the three domain-specific tables, six models are estimated for each version of the dependent variable. The first, second and last models are the same for the main effects tables, respectively. The third model introduces the enabling variables without controlling for the effects of the predisposing, competing needs/problems and perceived health variables. The fourth model introduces the competing needs/problem variables alone, without the effects of other variables. The fifth model introduces the perceived health variable without controlling for the effects of the other variables. Thus, in the domain-specific tables, one model ignores the effect of a subsequent model. Similarly, each model shows the effects without controlling for the previous set(s) of variables. In essence, these are reduced models.

Summary of Results from Models in Table 8

Table 8 below shows the main model of odds ratios from binary logistic regressions of Pap smear screening ever and various independent variables. All model chi-squareds for the regressions of Pap smear screening are highly significant, indicating that at least one or more
independent variables included in each model has a statistically significant effect on ever had a Pap smear test. Independent variables with statistically significant effects include race/ethnicity/immigration status, age and check-up for current pregnancy, and are discussed below. Marital status, usual source of care, employment status and health insurance coverage do not show statistically significant effects. Problem with handling paperwork for healthcare, competing needs for transportation, food, clothing and housing, and perceived health status also do not show statistically significant effects.

Model 1, Table 8 below, demonstrates the effect of race/ethnicity/immigration status without controlling for the effects of any other variables and other domains. This is the baseline model. For this and all models in the multivariate analyses of this study, race/ethnicity/immigration status is dummed as African American, Hispanic American and Hispanic immigrant, with whites being the reference group. Race/ethnicity/immigration status is highly significant ($\chi^2 = 42.466, 3 \, df, \, p = .000$). Results for race/ethnicity/immigration status reveal that, all else equal, the odds of ever having a Pap smear test for African Americans are 50.8% \( [(50.8\% = 100 \times \[.492 – 1\])]; \) see Long (1997)) lower than the odds for whites. The odds for Hispanics are even lower. The odds of ever having a Pap smear test for Hispanic Americans and Hispanic immigrants are, respectively, 79.7% and 76.6% lower than the odds for whites.

Model 2, Table 8, shows the effects of the other predisposing variables in the theory, controlling for the effect of race/ethnicity/immigration status. Of course, model 2 also shows the effect of race/ethnicity/immigration status, controlling for the effects of age and marital status. For this and all other models in the multivariate analyses, age is dummed, showing the younger age group of 18-44 years, with the older age group 45-60 years being the reference group; and shows the effect of the two age groups (18-44 versus 45-60) on the relative odds of ever having a
Pap smear test. Also, marital status is dummied, showing respondents who are married and living with a spouse, with those who are not married being the reference category.

Age is statistically significant ($X^2 = 5.232, p \leq .05$) in model 2, Table 8. All else equal, the odds of ever having a Pap smear test for respondents aged 18-44 years are 45.9% lower than the odds for those aged 45-60 years. Table 8, model 2, also shows a significant race/ethnicity/immigration status effect ($X^2 = 40.653, 3 \ df, p \leq .05$). The variable’s effect does not change much when the other predisposing variables are introduced into the model.

However, it is interesting to note that the differences between African Americans and whites diminish slightly. All else equal, the odds that African Americans have ever had a Pap smear are 46.7% lower than the odds for whites (compared to 50.8% in model 1). This decrease suggests that age differences between African Americans and whites explain some of the “race” effect. On the other hand, the difference between the two Hispanic groups and Anglos is consistent across the two models. All else equal, the odds that Hispanic Americans have ever had a Pap smear are 79.6% lower than the odds for whites. All else equal, the odds that Hispanic immigrants have ever had a Pap smear are 77.5% lower the odds for whites.

Table 8, model 3, gives the effects of the enabling variables in the theory, controlling for the predisposing variables. As mentioned earlier, all of the enabling variables in the multivariate analyses are represented by dummy variables. Omitted categories are: for women with a usual source of care, those who do not have a usual source of care are the reference group; the various health insurance categories of any private or public insurance, and no insurance have JPS Connections as their reference group; and women who have problems with handling paperwork for healthcare, have those without such problems as the reference category. Finally, women who
were pregnant during the time of the interview and who had had a check-up for that pregnancy is shown, with the reference group being all other women in the sample.

Only one enabling variable, check-up for current pregnancy ($X^2 = 4.93, p \leq .05$), has a statistically significant effect on the likelihood of having a Pap smear ever. Results suggest that getting such a “check-up” increases women’s chances of Pap smear screening ever. Controlling for the predisposing variables, the odds of having a Pap smear ever for pregnant women who have had check up for the current pregnancy are 463.5% greater than the odds for all other women in the sample.

The effects of age ($X^2 = 4.248, p \leq .05$) and race/ethnicity/immigration status ($X^2 = 40.681, 3 \text{ df}, p \leq .05$) on the likelihood of Pap smear screening ever change little. For example, all else equal, the odds that women who are aged 18-44 years have ever had a Pap smear are 43.4% lower than the odds for women age 45-60 years. Also, all else equal, the odds that African Americans have ever had a Pap smear are 47.3% lower than the odds for whites. All else equal, the odds that Hispanic Americans have ever had a Pap smear are 79.9% lower than the odds for whites. All else equal, the odds that Hispanic immigrants have ever had a Pap smear are 78.4% lower than the odds for whites.

Model 4, Table 8, depicts the effects of the competing needs/problem variables, controlling for the predisposing and enabling variables. For the competing needs/problem variables for all logistic regression tables in this study, competing need for transportation, and competing needs for food, clothing and housing are dummied, showing respondents with these needs, in contrast to those without such competing needs/problem.

Results show that, all else equal, none of the competing needs variables significantly affect the likelihood of ever having a Pap smear. Results also indicate that the effects of age ($X^2$
= 4.178, \( p \leq .05 \), race/ethnicity/immigration status \( (X^2 = 38.454, \ 3 \ df, \ p \leq .05) \) and check-up for current pregnancy \( (X^2 = 4.881, \ p \leq .05) \) change little with the introduction of the competing needs variables, all else equal. African Americans and Hispanics are still less likely to ever have a Pap smear than Anglos. Younger women are still less likely than older women to have had a Pap smear. And finally, the likelihood to ever have such a test is still much greater for pregnant women who have had a check-up for the current pregnancy than for other women.

Model 5, Table 8, shows the perceived health variable, controlling for the predisposing, enabling and competing needs variables. It evaluates the full model with the effects of all factors combined in one single equation (Burr and Mutchler, 1992). For this table and all multivariate tables in these analyses, the perceived health variable is dummied, showing good health, with the reference category being bad health. Good health is conceptualized as a combination of excellent, very good and good health while bad health is operationalized as a combination of having fair and poor health.

Like models 3 and 4 in Table 8, model 5 indicates that only age, race/ethnicity/immigration status and check-up for current pregnancy show statistically significant effects \( (X^2 = 4.878, \ p \leq .05, \ X^2 = 37.41, \ 3 \ df, \ p \leq .05, \ \text{and} \ X^2 = 4.634, \ p \leq .05 \) respectively). Again, there is little change with the introduction of the perceived health variable.

In review, Table 8 shows that marital status, usual source of care, employment status, health insurance coverage, perceived health status and the competing needs/problem variables have no statistically significant effects on ever having a Pap smear test by the women. Alternatively, race/ethnicity/immigration status, age, and having had check-up for the current pregnancy are statistically important for ever had a Pap smear. Overall, the effect of age on the odds of having a Pap smear test ever is about the same across all models in the table, all else
equal. The odds of having had such a test for women aged 18-44 years are about 45% lower than the odds for older women across all models in Table 8. Table 8 also shows a significant race/ethnicity/immigration status effect across all models.

Compared to whites, African Americans are about half as less likely to have ever had a Pap smear. Across all five models in Table 8, the odds for African Americans are between 43.1% and 50.8% lower than the odds for whites. Interestingly, the difference between African Americans and whites decreased slightly with the introduction of other variables into the model, suggesting that differences between African Americans and whites on these other variables help explain the Pap smear screening difference. Results for both Hispanic Americans and Hispanic immigrants show the same pattern. The odds that both Hispanic groups have ever had a Pap smear range from about 75% to 80% lower than the odds for whites. Furthermore, these racial/ethnic/immigration status differences do not differ appreciably with the introduction of other variables into the model.

As was expected, having had a check-up for the current pregnancy is very important for the odds of having a Pap smear screening ever. Across all models in Table 8, the odds for women who have had check-up for the current pregnancy are over 400% (442.8%-463.5%) greater than the odds for other women in the sample.
Table 8: Odds Ratios from Binary Logistic Regressions of Pap Smear Screening Ever on Selected Factors

<table>
<thead>
<tr>
<th>Variables</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
<th>Model 5</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Predisposing Variables</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Race/ethnicity/immigration status</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>.492***</td>
<td>.533*</td>
<td>.527*</td>
<td>.537*</td>
<td>.539*</td>
</tr>
<tr>
<td>Hispanic American</td>
<td>.203***</td>
<td>.204*</td>
<td>.201*</td>
<td>.205*</td>
<td>.204*</td>
</tr>
<tr>
<td>Hispanic immigrant</td>
<td>.234***</td>
<td>.225*</td>
<td>.216*</td>
<td>.219*</td>
<td>.227*</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td>.541*</td>
<td>.566*</td>
<td>.569*</td>
<td>.538*</td>
</tr>
<tr>
<td>Marital status</td>
<td>1.502</td>
<td>1.449</td>
<td>1.458</td>
<td>1.443</td>
<td></td>
</tr>
<tr>
<td><strong>Enabling Variables</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Usual source of care</td>
<td></td>
<td>1.623</td>
<td>1.632</td>
<td>1.632</td>
<td></td>
</tr>
<tr>
<td>Employment status</td>
<td>1.027</td>
<td>1.023</td>
<td>1.002</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Health insurance coverage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any private or public insurance</td>
<td>.834</td>
<td>.838</td>
<td>.827</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No insurance</td>
<td>.854</td>
<td>.853</td>
<td>.847</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Check-up for this pregnancy</td>
<td></td>
<td>5.635*</td>
<td>5.610*</td>
<td>5.428*</td>
<td></td>
</tr>
<tr>
<td><strong>Competing Needs/Problem</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Problem with paperwork</td>
<td></td>
<td></td>
<td></td>
<td>1.168</td>
<td>1.186</td>
</tr>
<tr>
<td>Competing need for transportation</td>
<td></td>
<td></td>
<td></td>
<td>1.011</td>
<td>1.036</td>
</tr>
<tr>
<td>Competing needs for food, clothing and housing</td>
<td></td>
<td></td>
<td></td>
<td>1.057</td>
<td>1.093</td>
</tr>
<tr>
<td><strong>Perceived Health Status</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.258</td>
</tr>
<tr>
<td>Good health</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-2 log likelihood</td>
<td>731.327</td>
<td>722.615</td>
<td>712.549</td>
<td>712.216</td>
<td>711.092</td>
</tr>
<tr>
<td>Model chi-sq</td>
<td>42.466***</td>
<td>51.178***</td>
<td>61.244***</td>
<td>61.577***</td>
<td>62.701***</td>
</tr>
<tr>
<td>Model degrees of freedom (df)</td>
<td>3</td>
<td>5</td>
<td>10</td>
<td>13</td>
<td>14</td>
</tr>
</tbody>
</table>

*significant at p ≤ .05  **significant at p ≤ .01  ***significant at p ≤ .001

Summary of Results from Models in Table 9

Table 9 below shows odds ratios from domain-specific binary logistic regressions analyses of Pap smear screening ever on selected independent variables. Model chi-squareds for models 3, 4 and 5 in Table 9 are not significant, meaning that none of these models are a good fit.

Models 1 and 2 in Table 9 are the same as models 1 and 2, respectively, in Table 8, and have the same results. Model 3 illustrates the effects of the enabling variables in the theory. Model 4 shows the effects of competing needs/problems variables. Model 5 shows the effects of
the perceived health status variable. As stated previously, all of models 3-5 ignore the effects of all other variables being studied. In effect, they are reduced models. Model 6 shows the full model for Table 9. It is the same as Model 5 in Table 8 and has the same results.

Model 3 demonstrates that the effect of only one enabling variable, check-up for current pregnancy ($\chi^2 = 3.866, p \leq .05$), is statistically significant for ever had a Pap smear. Compared to the odds for other women in the sample, the odds that women who are pregnant and have had check-up have ever had a Pap smear test for that pregnancy are 373.4% higher. Models 4 and 5 do not show any statistically significant effects for ever had a Pap smear screening, implying that the competing needs/problem and perceived health status variables do not have any effects on the odds of Pap smear screening ever for the domain-specific analysis of Pap smear screening ever.

In summary, both Tables 8 and 9 suggest that controlling for the effects of other sets of variables in Table 8 is not beneficial. This is because similar effects resulted across all models for the variables that show statistically significant effects in Table 8 and Table 9. The only exception is for check-up for current pregnancy, which reduced slightly across models in Table 9 (373.4% to 442.8%) from its effect across models in Table 8 (442.8% to 463.5%). Overall, Tables 8 and 9 indicate that the effect of having a check-up for the current pregnancy is substantively important for the odds of ever having a Pap smear, all else equal.
Table 9: Odds Ratios from Domain-specific Binary Logistic Regressions of Pap Smear Screening Ever on Selected Factors

<table>
<thead>
<tr>
<th>Variables</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
<th>Model 5</th>
<th>Model 6</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Predisposing Variables</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Race/ethnicity/immigration status</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>.492***</td>
<td>.533*</td>
<td>.539*</td>
<td></td>
<td>.204*</td>
<td></td>
</tr>
<tr>
<td>Hispanic American</td>
<td>.203***</td>
<td>.204*</td>
<td></td>
<td>.204*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic immigrant</td>
<td>.234***</td>
<td>.225*</td>
<td></td>
<td>.227*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>.541*</td>
<td></td>
<td></td>
<td>.538*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marital status</td>
<td>1.502</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.443</td>
</tr>
<tr>
<td><strong>Enabling Variables</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Usual source of care</td>
<td></td>
<td>1.627</td>
<td></td>
<td>1.632</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employment status</td>
<td></td>
<td>1.186</td>
<td></td>
<td>1.002</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Health insurance coverage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any private or public insurance</td>
<td></td>
<td>.877</td>
<td></td>
<td>.827</td>
<td>.847</td>
<td></td>
</tr>
<tr>
<td>No insurance</td>
<td></td>
<td>.779</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Check-up for this pregnancy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4.734*</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5.428*</td>
</tr>
<tr>
<td><strong>Competing Needs/Problem</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Problem with paperwork</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.453</td>
</tr>
<tr>
<td>Competing need for transportation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.036</td>
</tr>
<tr>
<td>Competing needs for food, clothing and housing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.093</td>
</tr>
<tr>
<td><strong>Perceived Health Status</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Good health</td>
<td></td>
<td></td>
<td></td>
<td>1.166</td>
<td></td>
<td>1.258</td>
</tr>
<tr>
<td>-2 log likelihood</td>
<td>731.327</td>
<td>722.615</td>
<td>763.180</td>
<td>771.472</td>
<td>773.192</td>
<td>711.092</td>
</tr>
<tr>
<td>Model chi-sq</td>
<td>42.466***</td>
<td>51.178***</td>
<td>10.613</td>
<td>2.321</td>
<td>0.601</td>
<td>62.701***</td>
</tr>
<tr>
<td>Model degrees of freedom (df)</td>
<td>3</td>
<td>5</td>
<td>5</td>
<td>3</td>
<td>1</td>
<td>14</td>
</tr>
</tbody>
</table>

*significant at \( p \leq .05 \)  **significant at \( p \leq .01 \)  ***significant at \( p \leq .001 \)

Summary of Models in Table 10

In this section, odds ratios of binary logistic regressions of Pap smear screening within the last three years on selected factors are discussed. Similar to Tables 8 and 12, all models in Table 10 show the effects of previous and subsequent set(s) of variables controlled for, based on the theory being used in the study. Similarly, each previous model is a restricted model for a subsequent one. Results of the model chi-squareds for the regressions of Pap smear test within the last three years show also that models 1 and 2 are a bad fit since they are not statistically significant while models 3, 4 and 5 are excellent fit because they are highly significant (\( p \leq .001 \)).
Thus, at least one or more independent variable(s) in models 3, 4 and 5 have statistically significant effect(s) on Pap smear screening within the last three years.

In this main effects table, Table 10, race/ethnicity/immigration status does not have a statistically significant effect when analyzed without controlling for other predisposing variables, but it is significant when analyzed as part of the set of predisposing variables. Check-up for current pregnancy also shows a statistically significant effect. Both usual source of care and competing needs for food, clothing and housing have statistically significant effects in some models but not in others. Usual source of care shows a statistically significant effect in models 3 and 5, but not in model 4, and competing needs for food, clothing and housing shows a statistically significant effect in model 4, but not in model 5. The results are discussed for only these variables which have statistically significant effects.

Model 1, Table 10, is the baseline model. It shows the effect of race/ethnicity/immigration status without the effects of the rest of the predisposing variables. Results from model 1 indicate that when assessed separately without combining it with or controlling for the effects of other predisposing variables, race/ethnicity/immigration status is close to being, but has no statistically significant effects ($\chi^2 = 6.194, p = .103$).

Model 2 illustrates the effects of other predisposing socio-demographic variables, controlling for the effect of race/ethnicity/immigration status, as well as the effect of race/ethnicity/immigration status, controlling for the effects of age and marital status. Model 2 also shows the effects of the predisposing characteristics without the effects of the enabling variables. In model 2, age and marital status serve as suppressor variables. The effect of race/ethnicity/marital status, which has no statistical significance in model 1, becomes statistically significant in model 2 after age and marital status have been introduced and
controlled for. This result implies that it is important to take age and marital status into consideration in model 2 when considering the effect of race/ethnicity/immigration status on the likelihood of having a Pap smear within the last three years.

In model 2, only race/ethnicity/immigration status demonstrates a statistically significant effect ($X^2 = 8.169$, 3 df, $p \leq .05$). The effect of race/ethnicity/immigration status on the likelihood of having a Pap smear within the last three year is very little for African Americans, compared to whites. All else equal, the odds that African Americans have had a Pap smear in the last three years are 2.5% lower than the odds for whites. On the other hand, the effect of race/ethnicity/immigration status on the likelihood of having a Pap smear within the last three years is much higher for the two Hispanic groups, particularly, for Hispanic Americans. All else equal, the odds that Hispanic Americans have had a Pap smear within the last three years are 45% lower than the odds for whites. All else equal, the odds that Hispanic immigrants have had a Pap smear within the last three years are 25% lower than the odds for whites.

In model 3, Table 10, the effects of the enabling variables in the theory are shown, controlling for the effects of the predisposing variables. Only two enabling variables, usual source of care ($X^2 = 4.107$, $p \leq .05$) and check-up for current pregnancy ($X^2 = 9.132$, $p \leq .05$) have statistically significant effects for having a Pap smear within the last three years. All else equal, the odds that respondents with a usual source of care have had a Pap smear within the last three years are 56.7% higher than the odds for those who do not have a usual source of care. All else equal, the odds that pregnant women who have had a check-up for the current pregnancy have had a Pap smear within the last three years are 732.5% higher than the odds for all other women in the study.
Furthermore, introducing the enabling variables show little change in the effects of the predisposing variables. Race/ethnicity/immigration status shows a statistically significant effect ($\chi^2 = 7.961, 3 \ df, p \leq .05$). Whites are still more likely to have had this version of Pap smear than the other racial/ethnicity/immigration status groups being studied. The difference between whites and African Americans is still very small; 4.5% lower than the odds for whites. Also, the two Hispanic groups lag behind, compared to whites, with the margin between Hispanic Americans and Hispanic immigrants still persisting. All else equal, the odds that Hispanic Americans have had a Pap smear within the last three years are 45.6% lower than the odds for whites. The odds that Hispanic immigrants have had a Pap smear within the last three years are 24.6% lower than the odds for whites, all else equal.

Model 4, Table 10, shows the effects of the competing needs and problem variables, controlling for the predisposing and enabling variables. Only one competing needs/problem variable, competing need for food, clothing and housing ($\chi^2 = 4.813, p \leq .05$), shows a statistically significant effect on the likelihood of having this version of Pap smear. Once again, introducing the competing needs/problem variables left the effects of all other variables the same, as described above for model 3. There is little change in the effects of race/ethnicity/immigration status and check-up for current pregnancy, both of which show statistically significant effects for the likelihood of having a Pap smear within the last three years.

The only exception is with the usual source of care variable. Although usual source of care shows a statistically significant effect in model 3, indicating that it increases women’s chances of having Pap smears within the last three years, results in model 4 suggest that introducing the competing needs/problem variables leads to a statistically insignificant effect for
the usual source of care variable. This suggests that controlling for the predisposing and enabling variables, having competing needs for food, clothing and housing explains away the effect of having a usual source of care.

Finally, model 5, Table 10, is the full model for the main effects table. It demonstrates that the effects of all factors in the main model are combined in one single equation (Burr and Mutchler, 1992). As stated previously for similar models, model 5 shows the effects of the perceived health variable, controlling for the predisposing, enabling and competing needs variables.

The perceived health status variable shows no statistically significant effect on the likelihood of having this version of Pap smear test. Also, the results suggest that the effect of the race/ethnicity/immigration status variable \( (X^2 = 9.089, 3 \, df, \, p \leq .05) \) change very little. For example, all else equal, the odds that African Americans have had a Pap smear within the last three years are 5.5% lower than the odds for whites. Also, all else equal, the odds that Hispanic Americans have had a Pap smear within the last three years are 49.2% lower than the odds for whites. The odds that Hispanic immigrants have had a Pap smear within the last three years are 20.2% lower than the odds for whites, all else equal.

However, with the introduction of the perceived health variable, the effects change for usual source of care, check-up for current pregnancy and competing needs for food, clothing and housing. Although usual source of care shows no statistically significant effect in model 4, it does show a significant effect in model 5, Table 10. The results show that usual source of care increases the likelihood of having a Pap smear within the last three years. All else equal, the odds that respondents with a usual source of care \( (X^2 = 3.853, \, p \leq .05) \) have had a Pap smear within
the last three years are 54.9% higher than the odds for those who do not have a usual source of care.

Furthermore, the effect of check-up for the current pregnancy diminishes slightly in model 5 from its effect in model 4. All else equal, the odds that pregnant women who have had a check-up for that pregnancy ($X^2 = 8.297, p \leq .05$) have had a Pap smear within the last three years are 675.8% higher than the odds for everyone else (compared to 714.3% in model 4). This decrease suggests that although not statistically significant, perceived health status may have substantive significance, which may have implications for the effect of pregnancy check-up.

Additionally, although competing needs for food, clothing and housing has a statistically significant effect in model 4, it does not have a statistically significant effect in model 5. In model 5, competing needs for food, clothing and housing is very nearly, but not statistically significant ($X^2 = 3.839, p \leq .05$; should be $\geq 3.8414$ for $p \leq .05$, to be statistically significant). This result demonstrates another substantive effect potential for the perceived health status variable. This implies further that perceived health status is a suppressor variable; it is important to take perceived health status into consideration for the effects of usual source of care and competing needs for food, clothing and housing on the likelihood of having Pap smear screening within the last three years.

Age, marital status, employment status and health insurance coverage do not show statistically significant effects. Problem with handling paperwork for healthcare and competing need for transportation do not show any statistically significant effects as well.

To give highlights from Table 10, race/ethnicity/immigration status and check-up for current pregnancy are important, statistically, for the odds that women have had a Pap smear within the last three years, all else equal. In fact, the marked differences in the effect of
race/ethnicity/immigration status on the likelihood of having a Pap smear within the last three years indicate that this variable has a strong effect in explaining having a Pap smear within the last three years. Usual source of care and competing needs for food, clothing and housing are only partially important for having a Pap smear within the last three years in the main effects table, as these variables are significant across some but not all models in the table. Their effects are explained by controlling for competing needs/problem variables and perceived health status, respectively.

The effect of race/ethnicity/immigration status on the odds that the women have had a Pap smear in the past three years is about the same across all models in the table. Also, the effect of usual source of care does not change much across models 3 and 5 where they have a statistically significant effect. The only difference is with the effect of check-up for current pregnancy, which decreases slightly from model 3 to model 4 (732.5% to 714.3%, respectively) and considerably (to 675.8%) in model 5.

This suggests that the perceived health variable, although not statistically significant, may have a substantive significance. It decreases the effect of having a check-up for the current pregnancy, and more importantly, totally eliminates the significant effect of the competing needs for food, clothing and housing variable, making the effect not statistically significant in model 5. Thus, the women’s perception of their health status could minimize the impact of having a check-up for the current pregnancy as well as override the effect of having competing needs for food, clothing and housing, all else equal.

Overall, all else equal, African Americans show the least difference, compared to whites, for the odds of having a Pap smear within the last three years. The highest odds that African Americans have had a Pap smear within the last three years, is 6.2% lower than the odds for
whites, and the lowest odds that African Americans have had a Pap smear within the last three years is 2.5% lower than the odds for whites. All else equal, Hispanic immigrants have the next lower likelihood of having a Pap smear within the last three years than there are for whites. Across all models in Table 10, the odds that Hispanic immigrants have had a Pap smear within the last three years is between 20.2% and 25% lower than the odds for whites, all else equal.

Finally, Hispanic Americans have the greatest difference in the likelihood of having a Pap smear within the last three years, compared to whites. All else equal, the odds that Hispanic Americans have had a Pap smear within the last three years are up to nearly 50% lower than the odds for whites. The odds that Hispanic Americans have had a Pap smear within the last three years range between 45% and 49.2% lower than the odds for whites, all else equal.
Table 10: Odds Ratios from Binary Logistic Regressions of Pap Smear Screening Within the Last Three Years on Selected Factors

<table>
<thead>
<tr>
<th>Variables</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
<th>Model 5</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Predisposing Variables</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Race/ethnicity/immigration status</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>.947</td>
<td>.975*</td>
<td>.955*</td>
<td>.938*</td>
<td>.945*</td>
</tr>
<tr>
<td>Hispanic American</td>
<td>.586</td>
<td>.550*</td>
<td>.544*</td>
<td>.509*</td>
<td>.508*</td>
</tr>
<tr>
<td>Hispanic immigrant</td>
<td>.852</td>
<td>.750*</td>
<td>.754*</td>
<td>.767*</td>
<td>.798*</td>
</tr>
<tr>
<td>Age</td>
<td>1.215</td>
<td>1.194</td>
<td>1.203</td>
<td>1.134</td>
<td></td>
</tr>
<tr>
<td>Marital status</td>
<td>1.319</td>
<td>1.218</td>
<td>1.192</td>
<td>1.176</td>
<td></td>
</tr>
<tr>
<td><strong>Enabling Variables</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Usual source of care</td>
<td>1.567*</td>
<td>1.533</td>
<td>1.549*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employment status</td>
<td>.928</td>
<td>.915</td>
<td>.889</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Health insurance coverage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any private or public insurance</td>
<td>1.383</td>
<td>1.346</td>
<td>1.320</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No insurance</td>
<td>.899</td>
<td>.926</td>
<td>.913</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Check-up for this pregnancy</td>
<td>8.325*</td>
<td>8.143*</td>
<td>7.758*</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Competing Needs/Problem</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Problem with paperwork</td>
<td>1.315</td>
<td>1.350</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Competing need for transportation</td>
<td>.863</td>
<td>.896</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Competing needs for food, clothing</td>
<td>.691*</td>
<td>.716</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>and housing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Perceived Health Status</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Good health</td>
<td></td>
<td></td>
<td></td>
<td>1.306</td>
<td></td>
</tr>
</tbody>
</table>

-2 log likelihood                  | 1121.937| 1117.628| 1098.088| 1091.246| 1088.668|
Model chi-sq                        | 6.194   | 10.503  | 30.043***| 36.885***| 39.463***|
Model degrees of freedom (df)       | 3       | 5       | 10      | 13      | 14      |

*significant at p ≤ .05     ***significant at p ≤ .001

Interpretation of Models in Table 11

Table 11 below is a domain-specific model for having a Pap smear within the past three years. It is the restricted model for Table 10. It shows the odds ratios of binary logistic regressions of Pap smear screening in the last three years and various independent variables. As in Tables 9 and 13, the effects in Table 11 are shown without controlling for other variables and other domains. Thus, all models ignore the effect(s) of a previous or subsequent set(s) of variables. Hence, they are reduced models. Model 6 is the full model for Table 11, and it evaluates the effects of all factors combined in one single equation (Burr and Mutchler, 1992).
Models 1 and 2 in Table 11 are the same as models 1 and 2 in Table 10, respectively. They show similar effects and outcomes and highlight age and marital status as suppressor variables, as mentioned earlier. As in Table 10, race/ethnicity/immigration status does not show a statistically significant effect in model 1 when analyzed without controlling for other predisposing variables in the theory. However, race/ethnicity/immigration status shows a statistically significant effect when other predisposing variables are introduced and controlled for in model 2.

Model 3 shows the effects of the enabling variables in the theory. Two enabling variables, usual source of care ($X^2 = 4.115, p \leq .05$) and check-up for current pregnancy ($X^2 = 9.161, p \leq .05$) show statistically significant effects. The results indicate that having a usual source of care and check-up for the current pregnancy increase the likelihood of having Pap smear within the last three years. All else equal, the odds that respondents with a usual source of care have had a Pap smear within the last three years are 55.6% higher than the odds for those without a usual source of care. The odds that pregnant women who have had a check-up for the current pregnancy have had a Pap smear within the last three years are 722.7% higher than the odds for other women, all else equal.

Model 4, Table 11, shows the effects of the competing needs/problem variables. Only one variable, competing needs for food clothing and housing ($X^2 = 5.061, p \leq .05$) shows a statistically significant effect. All else equal, the odds that respondents who have competing needs for food, clothing and housing have had a Pap smear within the last three years are 30.6% lower than the odds for those without competing needs for food, clothing and housing.

Model 5, Table 11, shows the effect of the perceived health variable, controlling for the effects of all other variables. It is the full model for Table 11. It is the same as model 5 in Table
10 and has the same results. As stated earlier, the results show no statistically significant effect for the perceived health variable. Thus, the perceived health variable does not explain the likelihood of having a Pap smear within the last three years. It also shows that perceived health status may have a substantive effect, acting as a suppressor variable for the effects of having a usual source of care, and competing needs for food, clothing and housing.

Results from Table 11 show that the effect of race/ethnicity/immigration status on the likelihood of having a Pap smear within the last three years increases only slightly from the baseline model to the full model. It increases by three percent for African Americans, 4.2% for Hispanic Americans and 4.8% for Hispanic immigrants. On the contrary, the effect of check-up for current pregnancy decreases from 722.7% in model 3, when the effects of the enabling variables are studied, to 675.8% in model 6, when the effects of all factors are combined in one single equation (Burr and Mutchler, 1992). However, the effect of usual source of care is about the same in model 3, when the effects of the enabling variables are assessed, as they are in model 6, the full model. Also, the effect of having competing needs for food, clothing and housing is completely lost when the perceived health variable is introduced in the full model.
Table 11: Odds Ratios from Domain-specific Binary Logistic Regressions of Pap Smear Screening Within the Last Three Years on Selected Factors

<table>
<thead>
<tr>
<th>Variables</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
<th>Model 5</th>
<th>Model 6</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Predisposing Variables</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Race/ethnicity/immigration status</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>.947</td>
<td>.975*</td>
<td>.945*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic American</td>
<td>.586</td>
<td>.550*</td>
<td>.508*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic immigrant</td>
<td>.852</td>
<td>.750*</td>
<td>.798*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>1.215</td>
<td></td>
<td>1.134</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marital status</td>
<td>1.319</td>
<td></td>
<td>1.176</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Enabling Variables</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Usual source of care</td>
<td></td>
<td>1.556*</td>
<td>1.549*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employment status</td>
<td>.930</td>
<td></td>
<td>.889</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Health insurance coverage</td>
<td></td>
<td>1.465</td>
<td>1.320</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any private or public insurance</td>
<td></td>
<td>.899</td>
<td>.913</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Check-up for this pregnancy</td>
<td></td>
<td>8.227*</td>
<td>7.758*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Competing Needs/Problem</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Problem with paperwork</td>
<td></td>
<td>1.340</td>
<td>1.350</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Competing need for transportation</td>
<td>.824</td>
<td></td>
<td>.896</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Competing needs for food, clothing and housing</td>
<td>.694*</td>
<td></td>
<td>.716</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Perceived Health Status</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Good health</td>
<td></td>
<td>1.409</td>
<td>1.306</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

-2 log likelihood                      | 1121.937 | 1117.628 | 1107.144 | 1120.333 | 1123.123 | 1088.668 |
Model chi-sq                            | 6.194    | 10.503   | 20.987**  | 7.798*   | 5.008*   | 39.463*** |
Model degrees of freedom (df)           | 3        | 5        | 5         | 3        | 1        | 14        |

*significant at \( p \leq .05 \)   **significant at \( p \leq .01 \)   ***significant at \( p \leq .001 \)

Overall, for Tables 10 and 11, as for Pap smear screening ever in Tables 8 and 9, having check-up for current pregnancy has an overwhelmingly strong effect for having a Pap smear within the last three years.

Summary of Results from Models in Table 12

Results of multivariate analyses from Table 12 are discussed below. It shows the main model of odds ratios from binary logistic regressions of Pap smear screening within the past year and various independent variables. As in Tables 8 and 10, for all models in this main table, the effects of the previous sets of variables are controlled for, guided by the theory being used for
this study. Model 5 is the full model for Table 12. All model chi-squareds for the regressions of Pap smear screening, except for model 1, are significant, indicating that in all models in this table, save model 1, at least one or more independent variable(s) included in each model has a statistically significant effect on Pap smear screening within the past year. This also implies that the model fit is good for all models in this analysis, except for model 1.

In the analyses for Pap smear screening within the past year summarized in Table 12 below, race/ethnicity/immigration status does not have a statistically significant effect. Thus, race/ethnicity/immigration status is not related to the dependent variable version having a Pap smear within the past year. Nevertheless, age, having a usual source of care, check-up for current pregnancy and competing needs for food, clothing and housing show statistically significant effects, regardless of the lack of a relationship between race/ethnicity/immigration status and having a Pap smear within the past year. These results imply that these variables show significant additive effects for Pap smear screening within the past year. These significant variables are discussed further for purposes of future research.

Model 1 in Table 12 below is the baseline model and demonstrates the effect of race/ethnicity/immigration status without controlling for the effects of other variables. Race/ethnicity/immigration status has no statistically significant effect, indicating that race/ethnicity/immigration status is not important for having a Pap smear within the past year.

Model 2, Table 12, shows the effects of other predisposing variables in the theory, controlling for the effect of race/ethnicity/immigration status. These comprise the socio-demographic variables of age and marital status. Conversely, model 2 shows the effect of race/ethnicity/immigration status, controlling for the effects of age and marital status variables.
Age shows a statistically significant effect ($\chi^2 = 11.601, p \leq .05$). All else equal, the odds of having a Pap smear within the past year for women who are aged 18-44 years is 61.7% higher than the odds for women who are aged 45-60 years. The variable’s effect does not change much when the other predisposing variables are introduced. In fact, race/ethnicity/immigration status remains without having a significant effect. The effect of age on Pap smear screening is the only one that is important, as stated above. This suggests that age is the sole factor in this model which explains having a Pap smear within the past year.

Model 3, Table 12, demonstrates the effects of the enabling variables in the theory, controlling for the predisposing variables. The results show that two enabling variables, a usual source of care ($\chi^2 = 6.746, p \leq .05$) and having a check-up for current pregnancy ($\chi^2 = 9.108, p \leq .05$) have statistically significant effects on the likelihood having a Pap smear within the past year, although race/ethnicity/immigration status does not show a statistically significant effect. All else equal, the odds that respondents who have a usual source of care have had a Pap smear within the past year are 62.9% greater than the odds for those who do not have a usual source of care. All else equal, the odds that pregnant women who have had check-up for the current pregnancy had a Pap smear within the past year are 257.4% greater than the odds for other women in the sample.

The introduction of the enabling variables, controlling for the predisposing variables, showed little change in the effect of age ($\chi^2 = 11.34, p \leq .05$) on the likelihood of having a Pap smear within the past year. All else equal, the odds that women who are aged 18-44 years have had a Pap smear within the past year are 63.3% greater than the odds for women aged 45-60 years. Thus, age, having a usual source of care and check-up for current pregnancy have
statistically significant additive effects on increasing the women’s chances of having a Pap smear within the past year, although race/ethnicity/immigration status is not statistically significant.

Model 4, Table 12, demonstrates the effects of the competing needs variables, controlling for the predisposing and enabling variables. Only competing needs for food, clothing and housing ($\chi^2 = 5.817, p \leq .05$) shows a statistically significant effect for the likelihood of Pap smear screening within the past year. It shows that these competing needs have the likelihood of decreasing Pap smear screening within the past year. All else equal, the odds that those who have competing needs for food, clothing and housing have had a Pap smear within the past year are 28.4% lower than the odds for those who do not have these competing needs.

Results from the model also shows that the effects of age ($\chi^2 = 11.297, p \leq .05$), usual source of care ($\chi^2 = 6.049, p \leq .05$) and check-up for current pregnancy ($\chi^2 = 9.169, p \leq .05$) remain about the same with the introduction of the competing needs/problem variables. Younger women are still more likely to have had a Pap smear within the past than older women. Respondents who have a usual source of care are also still more likely to have had a Pap smear within the past year than those without a usual source of care. And pregnant women who have had check-up for the current pregnancy are still more likely to have had a Pap smear within the past year than other women in the sample.

For example, the odds that younger women (aged 18-44 years) have had a Pap smear within the past year are 63.8% greater than the odds for older women (aged 45-60 years), all else equal. All else equal, the odds that women who have a usual source of care have had a Pap smear within the past year are 59.2% greater than the odds for women without a usual source of care. All else equal, the odds that pregnant women who have had check-up for their current pregnancy have had a Pap smear are 261.4% greater than the odds for other women. Finally, the odds for
women with competing needs for food, clothing and housing are 28.4% lower than the odds for women without these competing needs.

Model 5, Table 12, shows the effect of the perceived health variable, controlling for the predisposing, enabling and competing needs variables. It evaluates the full model with the effects of all factors combined in one single equation (Burr and Mutchler, 1992). Again, there is little change with the introduction of the perceived health variable. The effects of age, usual source of care, check-up for current pregnancy are similar and still show significant additive effects in the positive direction while the effect of having competing needs for food, clothing and housing still shows a significant additive effect in the negative direction.

Marital status, employment status and insurance coverage do not have statistically significant effects on the likelihood of having a Pap smear within the past year. Similarly, problem with handling paperwork for healthcare, competing need for transportation and perceived health status do not have statistically significant effects for the likelihood of having a Pap smear within the past year.

In short, Table 12 indicates that race/ethnicity/immigration status has no effect on Pap smear screening within the past year. Nevertheless, age, having a usual source of care, check-up for current pregnancy, and having competing needs for food, clothing and housing are important factors, statistically, for having a Pap smear within the past year, although there is a strong significant additive effect. These variables may have substantive effects on Pap smear screening within the past year, beyond having statistically significant effects. Overall, the effect of age on the odds of having a Pap smear within the past year is about the same across all models, except in model 5 where it reduces slightly after the effects of perceived health is introduced with all other variables controlled for.
Table 12: Odds Ratios from Binary Logistic Regressions of Pap Smear Screening Within the Past Year on Selected Factors

<table>
<thead>
<tr>
<th>Variables</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
<th>Model 5</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Predisposing Variables</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Race/ethnicity/immigration status</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>1.120</td>
<td>1.123</td>
<td>1.104</td>
<td>1.063</td>
<td>1.070</td>
</tr>
<tr>
<td>Hispanic American</td>
<td>.936</td>
<td>.859</td>
<td>.860</td>
<td>.809</td>
<td>.808</td>
</tr>
<tr>
<td>Hispanic immigrant</td>
<td>1.125</td>
<td>1.042</td>
<td>1.055</td>
<td>1.074</td>
<td>1.106</td>
</tr>
<tr>
<td>Age</td>
<td>1.617*</td>
<td>1.633*</td>
<td>1.638*</td>
<td>1.567*</td>
<td>1.567*</td>
</tr>
<tr>
<td>Marital status</td>
<td>1.206</td>
<td>1.156</td>
<td>1.117</td>
<td>1.117</td>
<td>1.106</td>
</tr>
<tr>
<td><strong>Enabling Variables</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Usual source of care</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employment status</td>
<td>1.041</td>
<td>1.024</td>
<td>1.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Health insurance coverage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any private or public insurance</td>
<td>1.112</td>
<td>1.068</td>
<td>1.051</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No insurance</td>
<td>.782</td>
<td>.794</td>
<td>.785</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Check-up for this pregnancy</td>
<td>3.574*</td>
<td>3.614*</td>
<td>3.490*</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Competing Needs/Problem</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Problem with paperwork</td>
<td></td>
<td>.996</td>
<td>1.017</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Competing need for transportation</td>
<td></td>
<td>.717</td>
<td>.738</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Competing needs for food, clothing</td>
<td></td>
<td>.716*</td>
<td>.737*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>and housing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Perceived Health Status</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Good health</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.234</td>
</tr>
</tbody>
</table>

-2 log likelihood: 1535.504, 1521.541, 1496.869, 1484.699, 1482.324
Model chi-sq: 2.245, 16.208**, 40.880***, 53.050***, 55.425***
Model degrees of freedom (df): 3, 5, 10, 13, 14

*significant at p ≤ .05, **significant at p ≤ .01, ***significant at p ≤ .001

Interpretation of Results from Models in Table 13

Table 13 below is a domain-specific model for Table 12, the main model for having a Pap smear within the past year. Table 13 gives results of odds ratios from binary logistic regressions of Pap smear screening within the past year on selected independent variables. In this table, as in Tables 9 and 11, the effects are shown without controlling for other variables and other domains. One model ignores the effect of a subsequent model. Similarly, each model shows the effects without controlling for the previous set(s) of variables. In essence, Table 13 is a restricted model and the individual models are reduced models.
Model chi-squareds for all models in this restricted model table, except for model 1, are statistically significant. This implies that all models in Table 13 are a good fit, with the exception of model 1. Similar to Table 12, Table 13 shows statistically significant effects of having a Pap smear within the past year for age, usual source of care, check-up for current pregnancy, and competing needs for food, clothing and housing, regardless of the initial lack of a statistically significant effect for race/ethnicity/immigration status. Again, the results imply that these variables have significant additive effects for Pap smear screening within the past year. They are still important for the likelihood of Pap smear screening within the past year.

As in Table 12 above, there are no statistically significant effects between race/ethnicity/immigration status and having a Pap smear within the past year in Table 13. Regardless of the lack of statistically significant effects between race/ethnicity/immigration status and having a Pap smear within the past year, the other variables that showed statistically significant effects are discussed for purposes of future research.

Models 1 and 2 in Table 13 are the same as models 1 and 2, respectively, in Table 12 and have the same results. Model 3, Table 13, shows the effects of the enabling variables without controlling for the effects of the predisposing variables. In this model, usual source of care ($\chi^2 = 5.732, p \leq .05$) and check-up for current pregnancy ($\chi^2 = 11.343, p \leq .05$) are significant. All else equal, the odds that respondents who have a usual source of care have had a Pap smear within the past year is 55.6% higher than the odds for respondents who do not have a usual source of care. Also, the odds that women who have had check-up for their current pregnancy have had a Pap smear within the past year are 301.8% higher than the odds for everyone else in the sample.

Model 4, Table 13, shows the competing needs/problem variables. In this model, neither the predisposing socio-demographic nor enabling variables are controlled for. Only competing
needs for food, clothing and housing is significant ($X^2 = 7.718, p \leq .05$) in the model. All else equal, the odds that respondents who have competing needs for food, clothing and housing have had a Pap smear within the past year are 30.9% lower than the odds for those who do not have such competing needs.

In model 5, Table 13, the perceived health status variable is tested without controlling for all other preceding variables. The result does not have a statistically significant effect, implying that perceived health does not affect the likelihood of having a Pap smear within the past year. As stated previously, model 6 in Table 13 evaluates the full model with the effects of all factors combined in one single equation (Burr and Mutchler, 1992). It is the same as Model 5 in Table 12 and has the same results, as discussed earlier.

In summary, Table 13 on odds ratios of domain-specific binary logistic regressions of Pap smear screening within the past year on selected factors indicates that race/ethnicity/immigration status does not affect the likelihood of having a Pap smear within the past year. Irrespective of this, Table 13 shows that age, having a usual source of care, having check-up for the current pregnancy and having competing needs for food, clothing and housing have statistically significant effects for the domain-specific analyses of Pap smear screening within the past year, even if the effects of all other variables being studied are ignored. These variables have statistically significant additive effects. Similar to the results in Table 12, the main table for having a Pap smear within the past year, the effects of age, usual source of care and competing needs for food, clothing and housing on the odds of Pap smear screening within the past year remain about the same across all models in the table.

Conversely, the effect of check-up for current pregnancy decreases from 301.8% with the introduction of the enabling variables in model 3 to 249% in model 6 where the full model with
the effects of all factors in one single equation (Burr and Mutchler, 1992) are combined. In effect, Table 13 suggests that leaving the effects of other variables uncontrolled for in this table is helpful for isolating the moderating effects of pregnancy check-up on the likelihood of having a Pap smear within the past year.

Overall, even without controlling for the effects of other variables and other domains, the effects of the various variables for the odds of having a Pap smear within the past year either increase or decrease in the full model, compared to their effects in the previous models.

As in Table 12, the effects of race/ethnicity/immigration status, marital status, employment status and health insurance coverage are not statistically significant in Table 13. The same applies to the effects of problem with handling paperwork for healthcare, competing need for transportation and perceived health status.
Table 13: Odds Ratios from Domain-specific Binary Logistic Regressions of Pap Smear Screening Within the Past Year on Selected Factors

<table>
<thead>
<tr>
<th>Variables</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
<th>Model 5</th>
<th>Model 6</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Predisposing Variables</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Race/ethnicity/immigration status</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>1.120</td>
<td>1.123</td>
<td></td>
<td>1.070</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic American</td>
<td>.936</td>
<td>.859</td>
<td></td>
<td>.808</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic immigrant</td>
<td>1.125</td>
<td>1.042</td>
<td></td>
<td>1.106</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>1.617*</td>
<td></td>
<td></td>
<td>1.567*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marital status</td>
<td>1.206</td>
<td></td>
<td></td>
<td>1.106</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Enabling Variables</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Usual source of care</td>
<td>1.556*</td>
<td></td>
<td></td>
<td>1.606*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employment status</td>
<td>1.014</td>
<td></td>
<td></td>
<td>1.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Health insurance coverage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any private or public insurance</td>
<td>1.213</td>
<td></td>
<td></td>
<td>1.051</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No insurance</td>
<td>.818</td>
<td></td>
<td></td>
<td>.785</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Check-up for this pregnancy</td>
<td>4.018*</td>
<td></td>
<td></td>
<td>3.490*</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Competing Needs/Problem</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Problem with paperwork</td>
<td>.982</td>
<td></td>
<td></td>
<td>1.017</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Competing need for transportation</td>
<td>.726</td>
<td></td>
<td></td>
<td>.738</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Competing needs for food, clothing and housing</td>
<td>.691*</td>
<td></td>
<td></td>
<td>.737*</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Perceived Health Status</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Good health</td>
<td>1.442</td>
<td></td>
<td></td>
<td>1.234</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

-2 log likelihood             | 1535.504| 1521.541| 1511.845| 1523.192| 1529.186| 1482.324|
Model chi-sq                   | 2.245   | 16.208**| 25.904***| 14.557**| 8.563**  | 55.425***|
Model degrees of freedom (df)  | 3       | 5       | 5       | 3       | 1        | 14       |

*significant at \( p \leq .05 \)  significant at \( p \leq .01 \) significant at \( p \leq .001 \)

To sum up results from the data on the multivariate relationship between race/ethnicity/immigration status and Pap smear screening within the past year as demonstrated in Tables 12 and 13, there is no relationship between the race/ethnicity/immigration status and having a Pap smear within the past year. Regardless of this, other variables, which may have substantive importance for having a Pap smear within the past year, showed statistically significant results. These are age, usual source of care, check-up for current pregnancy and competing needs for food, clothing and housing. The following sections discuss and summarize the findings from the binary logistic regression analyses.
Discussion and Summary of Results from Binary Logistic Regressions Analyses

I discuss and sum up results of the data for the three different versions of Pap smear screening. First, I discuss results for Pap smear screening ever; second, Pap smear screening within the last three years; and third, Pap smear screening in the past year; and highlight unique results from these. Also, I compare the findings across different versions of Pap smear screening.

_Pap smear screening ever._ Information on ever having a Pap smear is given in Tables 8 and 9. As noted earlier, only race/ethnicity/immigration status, age and check-up for current pregnancy explain the odds of ever having a Pap smear. All other variables do not show statistically significant effects. Thus, the effect of race/ethnicity/immigration status can be explained using only the effects of age and check-up for current pregnancy.

Therefore, it can be concluded that in the analyses involving the dependent variable version having a Pap smear ever, the set of predisposing variables are substantively important for predicting the odds of having a Pap smear among the sample, all else equal. On individual basis, check-up for current pregnancy has a very strong effect for the odds that the women have ever had a Pap smear. The effects of other variables not considered in this study may help explain the odds of ever having a Pap smear by the sample.

The combined results from Tables 8 and 9 also indicate that for the most part, controlling for various sets of variables is not beneficial to the odds of having ever had a Pap smear by the sample, as the effects of age and race/ethnicity/immigration status are about the same across all models in both tables, except for the effect of having a check-up for the current pregnancy which decreased in model 5, Table 8, and increased in model 6, Table 9, the full models.
Pap smear screening within the last three years. Data on the results of Pap smear screening within the last three years on selected independent variables are shown in Tables 10 and 11. They indicate that race/ethnicity/immigration status does not have a statistically important effect when the effects of other predisposing variables are not considered. On the other hand, race/ethnicity/immigration status shows a statistically significant effect, when age and marital status are introduced and controlled for. Thus, age and marital status act as suppressor variables for the likelihood that the different racial/ethnic/immigration status groups have had a Pap smear within the last three years. Although it is not statistically significant, perceived health status may have substantive importance for the effects of usual source of care, pregnancy check-up and competing needs for food, clothing and housing on the likelihood of having a Pap smear within the last three years.

The percentage difference in odds shows little difference between African Americans and whites for the odds of having a Pap smear within the last three years. Overall, the odds that African Americans have had a Pap smear within the last three years range from 2.5% to 6.2% lower than the odds for whites. Next to African Americans, results show that Hispanic immigrants have a lower likelihood of having a Pap smear within the last three years. All else equal, the odds that Hispanic immigrants have had a Pap smear within the last three years are about 20% to 25% lower than the odds for whites. This means that Hispanic immigrants are about one-fifth to one-quarter less likely to have had a Pap smear within the last three years than whites.

Finally, Hispanic Americans are the least likely to have had a Pap smear within the last three years, compared to whites. Across all models in Table 10, Hispanic Americans are nearly half as less likely as whites to have had a Pap smear within the last three years. Their odds
ranged from 45% to 49.2% lower than the odds for whites. This finding is contrary to
expectation. Based on the prevailing literature (for example, Benar, Lee, Piper and Richardson,
2001; Brown et al., 2002; Gotay and Wilson, 1998; Ropes, 1991), it has been anticipated that
Hispanic Americans, followed by African Americans and then followed by Hispanic immigrants
would be more likely to have had a Pap smear next to whites.

Overall, the set of enabling variables appear to have very strong effects on predicting
having a Pap smear within the last three years. Both usual source of care and having a check-up
for current pregnancy show statistically significant effects among the set of enabling variables.
Both of these are significant in the positive direction, meaning that they increase the likelihood
of having a Pap smear within the last three years. As shown in models 3 and 5 in Table 10, the
odds that women with a usual source of care have had a Pap smear range from 54.9% to 56.7%
greater than the odds for women without a usual source of care, all else equal. Thus, the odds
that women with a usual source of care have had a Pap smear within the last three years are over
50% greater than the odd for women without a usual source of care.

When evaluated as individual variables, again, check-up for current pregnancy had a
substantively important effect on having a Pap smear within the last three years. In Table 10, the
odds that pregnant women who have had check-up for the current pregnancy have had a Pap
smear within the last three years are between 675.8% and 732.5% greater than the odds for all
other women in the study. Results from Table 11, which is the domain-specific table showing
effects of Pap smear screening within the last three years, show that the odds that pregnant
women who have had check-up for the current pregnancy have had a Pap smear within the last
three years are between 675.8% and 722.7% greater than the odds for other women in the study.
Pap smear screening within the past year. Table 12 shows odds ratios from binary logistic regression analyses of preventive Pap smear screening within the past year on selected independent variables. The table shows no statistically significant effects between race/ethnicity/immigration status and Pap smear screening within the past year. Nevertheless, age, usual source of care, check-up for current pregnancy, and competing needs for food, clothing and housing are statistically important factors for the likelihood of Pap smear screening within the past year, all else equal. Beyond statistical significance, these variables may have substantive significance. They show significant additive effects for having a Pap smear within the past year.

In contrast, marital status, race/ethnicity/immigration status, employment status and health insurance coverage do not have statistically significant effects for having this version of Pap smear test. Problem with paperwork for healthcare and perceived health status do not have statistically significant effects for having a Pap smear within the past year as well.

For purposes of future research, I discuss the variables that are statistically significant below. Results from calculating the percent difference in odds from odds ratios generated from binary logistic regression analyses of Pap smear screening within the past year indicate that check-up for current pregnancy had a substantively important significant positive effect on having a Pap smear within the past year. Results from Table 12 shows that all else equal, the odds that pregnant women who have had a check-up for the current pregnancy have had a Pap smear within the past year are between 249% and 261.4% greater than the odds for other women in the study.

Even without controlling for the effects of all other variables and other domains in Table 13, check-up for current pregnancy still remains a very important variable with a statistically
significant positive effect on the odds of having a Pap smear within the past year. Table 13 shows that without controlling for all other variables, the odds that women who have had a check-up for the current pregnancy have had a Pap smear within the past year range from 249% to 301.8% higher than the odds for other women.

When considered as sets of variables, the enabling ones have substantively important effects for the odds of having a Pap smear within the past year, although there is no initial statistically significant effect for race/ethnicity/immigration status. Two enabling variables, check-up for current pregnancy and usual source of care have statistically significant effects. In Table 12, the odds that women with a usual source of care have had a Pap smear within the past year are about 60% greater than the odds for women without a usual source of care. In Table 13, which tests the effects of each of the variables without controlling for the effects of other variables and other domains, the odds that women with a usual source of care have had a Pap smear within the past year are between 55.6% and 60.6% higher than the odds for women without a usual source of care.

Results from the full models in Tables 12 and 13 also show that the introduction of the perceived health status variable slightly diminishes the effects of nearly all the statistically significant variables, such as age, check-up for current pregnancy and competing needs for food, clothing and housing. This decrease suggests that although the perceived health status variable does not have a statistically significant effect, it may have a substantive effect.

Comparing and Contrasting Results of the Three Pap Smear Screening Versions

The next three paragraphs compare and contrast results from tables on the three versions of the dependent variable. Tables 8 and 9, which show results of odds ratios from binary logistic
regressions of Pap smear screening ever on various independent variables, indicate that this version of the dependent variable is substantively important for policy purposes. This is because unlike results from the other versions of the dependent variable, race/ethnicity/immigration status shows a statistically significant effect both when used with and without controlling for the effects of the other predisposing variables. In addition, other variables such as usual source of care and check-up for the current pregnancy show statistically significant effects on the likelihood of having a Pap smear.

Another important dependent variable version for policy purposes, based on the data from the multivariate logistic regression analyses, is Pap smear screening within the last three years. Tables 10 and 11, which show data on this dependent variable version, indicate that race/ethnicity/immigration status is significant, when assessed as part of the set of predisposing variables. In addition, one enabling variable, check-up for current pregnancy has a statistically significant effect for the odds of having a Pap smear. Having competing needs for food, clothing and housing, and usual source of care also show significant effects for the likelihood of Pap smear screening within the last three years across some of the models in the tables.

The persistence of race/ethnicity/immigration status for the odds of having a Pap smear ever and within the last three years, with whites being more likely than other racial/ethnic/immigration status groups to have had a Pap smear, even when the effects of other independent/control variables are taken into account, is one of the main findings of the study. There may be reasons for this, for example, cultural differences between the different race/ethnicity/immigration status groups may explain this finding. This is explained further in chapter 5.
In contrast, the dependent variable version Pap smear screening within the past year appears to have little importance for policy purposes. This is because race/ethnicity/immigration status does not show a statistically significant effect at all, as demonstrated by results in Tables 12 and 13. Nevertheless, other variables such as usual source of care, check-up for current pregnancy and competing needs for food, clothing and housing show statistically significant effects. This implies that beyond statistical significance, these variables may have substantive significance for having a Pap smear within the past year.

Testing of Hypotheses

This second section of chapter 4 reviews the results of the binary logistic regression analyses in relation to the hypotheses of the study. Only the results of the more rigorous multivariate binary logistic regression are used to evaluate the hypotheses of the study. For all the analyses involving testing of the hypotheses, Pap smear screening is assessed within the three different versions: (1) screening ever, (2) screening within the last three years, and (3) screening within the past year. Similarly, and as indicated previously, analyses involving race/ethnicity/immigration status is assessed as three dummy variables: African Americans, Hispanic Americans and Hispanic immigrants, with whites being the reference category. All six tables, 8 to 13, which show odds ratios from binary logistic regression analyses are used to assess the hypotheses.

Hypothesis 1

Hypothesis 1 looked at the relationship between race/ethnicity/immigration status and Pap smear screening. Hypothesis 1 states that race/ethnicity/immigration status is related to
having a Pap smear. Anglo women would be most likely to have had Pap smears, followed by Hispanic American women, African American women, and finally Hispanic immigrant women.

As noted earlier, data from Tables 8 and 9 on ever having a Pap smear show that race/ethnicity/immigration status is related to Pap smear screening, in support of the first part of hypothesis 1. The findings in Tables 10 and 11 suggest that the relationship between race/ethnicity/immigration status and Pap smear screening within the last three years is partially supported. When analyzed without controlling for the effects of other predisposing variables, race/ethnicity/immigration status has no statistically significant effect on Pap smear screening within the last three years. However, when used as part of the set of predisposing variables, race/ethnicity/immigration status has a statistically significant effect. Consequently, the first part of hypothesis 1 which predicts that there will be a relationship between race/ethnicity/immigration status is only partially supported by results from Pap smear screening ever and within the last three years.

Additionally, results from the relationship between Pap smear screening within the past year and race/ethnicity/immigration status, based on Tables 12 and 13, however, do not show statistically significant effects. Thus, this part of the analysis does not support hypothesis 1 for having a Pap smear within the past year. Statistically, no relationship exists between Pap smear screening within the past year and race/ethnicity/immigration status.

Next, I examine the relationship within the different race/ethnicity/immigration status groups, as anticipated in the second part of hypothesis 1. Overall, the race/ethnicity/immigration status effect persists and whites are more likely than other race/ethnicity/immigration status groups to have had a Pap smear ever and within the last three years, even when the effects of other independent/control variables are taken into account. Data from Tables 8 and 9 show that
as is expected, Anglo women are most likely to have ever had a Pap smear. They are nearly 50% to about 80% more likely to have ever had a Pap smear, compared to all other race/ethnicity/immigration status groups.

However, the expectation that whites will be followed next in Pap smear screening ever by Hispanic Americans, African Americans and finally, Hispanic immigrants is not fulfilled. On the contrary, following whites, African Americans are more likely to have ever had a Pap smear, leading both Hispanic Americans and Hispanic immigrants by over 25% higher likelihood of having ever had a Pap smear. Also, contrary to expectation, Hispanic immigrants are about equally likely as Hispanic Americans to have ever had a Pap smear, compared to whites.

Furthermore, results from Tables 10 and 11 indicate that as speculated in the second half of hypothesis 1, all else equal, Anglo women are most likely to have had a Pap smear within the past three years. Nevertheless, the results from Tables 10 and 11 do not follow the full pattern outlined in hypothesis 1. On the contrary, they show that next to Anglo women, African American women are more likely to have had a Pap smear within the last three years, followed by Hispanic immigrants, and lastly, by Hispanic American women. In fact, African Americans are only between 2.5% and about 6% less likely to have had a Pap smear within the last three years, compared to whites.

Moreover, African Americans are over 40% more likely to have had a Pap smear within the last three years than do Hispanic Americans. Even Hispanic immigrants are at least 25% more likely to have had a Pap smear within the last three years than do Hispanic Americans. Hence, the second part of hypothesis 1, that Anglos will be most likely to have had Pap smear screening, followed by Hispanic Americans, African Americans and lastly by Hispanic
immigrants is only partially supported as well by results of analyses of Pap smear screening within the last three years.

Hypothesis 2

This hypothesis tested the effect of age on the relationship between race/ethnicity/immigration status and Pap smear screening. Hypothesis 2 postulates that controlling for age will partially explain the relationship between race/ethnicity/immigration status and having a Pap smear, and that younger women (ages 18-44 years) would be more likely to have had a Pap smear than older women (ages 45-60 years).

Tables 8, 10 and 12 show the relationships examined under hypothesis 2. Table 10 provides no support for hypothesis 2. Age has no significant effect on Pap smear screening within the last three years. Moreover, the race/ethnicity/immigration status effect on Pap smear screening does not change with the introduction of age into the model. Thus, age does not clarify the relationship between these two variables. Similarly, Table 12 above does not support hypothesis 2, since there is no initial statistically significant effect for race/ethnicity/immigration status and Pap smear screening within the past year.

On the other hand, Table 8 illustrates that age has a statistically significant effect for Pap smear screening ever. Table 8 on Pap smear screening ever indicates that younger women (aged 18-44) are less likely to have had a Pap smear. According to results from Table 8 above, all else equal, the odds that younger women (18-44 years) have ever had a Pap smear range from 43.1% to 46.2% lower than the odds for older women (45-60 years). Hence, this part of hypothesis 2 is supported in the reverse direction than is expected.

Thus, it can be concluded that hypothesis 2 is supported only partially. The first part, that controlling for age will partially explain the relationship between race/ethnicity/immigration
status and the dependant variable versions, is only supported by results from Pap smear screening ever, and not for having a Pap smear within the past year nor within the last three years. Moreover, the direction of the predicted effect is not confirmed. Instead of the prediction that younger women would be more likely to have ever had a Pap smear, they are less likely to have had it. These findings are not surprising. For Pap smear screening ever, it is normal for older women who are more advanced in years to have had more Pap smear over a longer period of time than do the younger women.

Hypothesis 3

The effect of marital status on the relationship between race/ethnicity/immigration status and Pap smear screening was examined for hypothesis 3. This hypothesis posits that controlling for marital status will partially explain the relationship between race/ethnicity/immigration status and Pap smear screening. Women who are married will be more likely to have had a Pap smear than women who are not married. Tables 8, 10 and 12 show this effect. In all three tables, this effect is not statistically significant. Therefore, hypothesis 3 is not supported. Taking into account the effects of other independent/control variables does not clarify the effect of marital status on the relationship between race/ethnicity/immigration status and having a Pap smear.

Hypothesis 4

The impact of having a usual source of care on the relationship between race/ethnicity/immigration status and Pap smear screening was examined in hypothesis 4. The hypothesis states that controlling for having a usual source of care will partially explain the relationship between race/ethnicity/immigration status and Pap smear screening. Women who do have a usual source of care will be more likely to have had a Pap smear than women who do not have a usual source of care. This relationship was tested in Tables 8, 10 and 12.
Based on results from these three tables which took into account the effects of other independent/control variables, the effect of having a usual source of care is only partially significant for having a Pap smear within the last three years, and not for either Pap smear screening ever or within the past year. From Table 10, which shows data from odds ratios on Pap smear screening within the last three years, although usual source of care is significant in models 3 and 5, it is nearly, but not fully significant in model 4.

In model 4, analyzing the effects of the competing needs/problem variables, controlling for the enabling and predisposing variables overshadow the effect of having a usual source of care on having a Pap smear within the last three years. Thus, controlling for the effect of other independent/control variables explains the effects of having a usual source of care on the relationship between race/ethnicity/immigration status and Pap smear screening within the last three years only in part. There is no statistically significant effect for Pap smear screening ever, neither is the effect of having a usual source of care supported for having a Pap smear within the past year because there is no relationship between race/ethnicity/immigration status and this dependent variable version, as depicted in Table 12 above.

The second part of hypothesis 4, which predicted that women who have a usual source of healthcare would be more likely to have had a Pap smear than women who do not have a usual source of care, was supported only in part for Pap smear screening within the last three years. But, there is no support for this part of the analysis for Pap smear screening ever, since the results do not show statistically significant effects. Also, the lack of an initial relationship between race/ethnicity/immigration status and Pap smear screening within the past year means that hypothesis 4 is not supported by this dependent variable version. According to models 3 and 5 of Table 10, the odds that women with a usual source of care have had a Pap smear within the
last three years are about 55% greater than the odds for women who do not have a usual source of care.

Additionally, Table 11 which tests the effects of each of the variables without controlling for the effects of other variables and other domains reveals that having a usual source of care still has a statistically significant positive effect on Pap smear screening within the last three years. The effect of having a usual source of care remains the same in Table 11 as it is in Table 10. Women with a usual source of care are about 55% more likely to have had Pap smear screening within the last three years than women who do not have a usual source of care, as illustrated in Table 11 above.

Hypothesis 5

This hypothesis tested the effect of employment status on the relationship between race/ethnicity/immigration status and Pap smear screening. The hypothesis states that controlling for employment status will partially explain the relationship between race/ethnicity/immigration status and Pap smear screening. Women who are employed will be more likely to have had a Pap smear than women who are not employed. Results from Tables 8, 10 and 12 provide no support for hypothesis 5 on the effect of employment status. Employment status has no statistically significant effect on Pap smear screening. Moreover, the race/ethnicity/immigration status effect on Pap smear screening does not change with the introduction of employment status into the model.

Hypothesis 6

Hypothesis 6 examined the effect of health insurance coverage on the relationship between race/ethnicity/immigration status and Pap smear screening. JPS Connections, any private or public insurance and not having any insurance were considered. JPS Connections is
the reference category. Hypothesis 6 states that controlling for any private or public insurance, JPS Connections and no insurance coverage will partially explain the relationship between race/ethnicity/immigration status and Pap smear screening. There will be a difference between women who have access to any private or public insurance, and/or are not insured relative to women with JPS Connections. Tables 8, 10 and 12 examine these relationships, taking into account the effects of other independent/control variables.

Tables 8, 10 and 12 on Pap smear screening ever, within the last three years and within the past year, respectively, demonstrate no support for hypothesis 6 on the effect of health insurance coverage. Health insurance coverage has no statistically significant effect on having a Pap smear. In addition, the race/ethnicity/immigration status effect on Pap smear screening does not change with the introduction of health insurance status into the model.

Hypothesis 7

Hypothesis 7 examined the effect of check-up for current pregnancy on the relationship between race/ethnicity/immigration status and Pap smear screening. It states that controlling for check-up for current pregnancy will partially explain the relationship between race/ethnicity/immigration status and Pap smear screening. Pregnant women who have had a check-up for the current pregnancy will be more likely to have had a Pap smear than all other women. Data from tables 8, 10 and 12 are used to analyze this hypothesis.

The results from Table 12 do not support the hypothesis, as there exists no initial relationship between race/ethnicity/immigration status and having a Pap smear within the past year. However, results from Tables 8 and 10 provide support for hypothesis 7 on the effect of check-up for current pregnancy. This variable had a statistically significant effect on having a Pap smear.
Pap smear. In addition, the race/ethnicity/immigration status effect on Pap smear screening changes with the introduction of check-up for current pregnancy into the model.

According to Table 8, all else equal, the odds that pregnant women who have ever had a Pap smear have had a check-up for their current pregnancy are over 400% greater than the odds for those who have not had check-up for their current pregnancy. Also, results from Table 10 show that all else equal, the odds that pregnant women who have had check-up for their current pregnancy have had a Pap smear within the last three years are close to 700% greater than the odds for other women.

Hence, hypothesis 7 on the effect of check-up for current pregnancy is supported only in part, but in the direction predicted: check-up for current pregnancy partially explains the relationship between race/ethnicity/immigration status and Pap smear screening ever and within the last three years. Women who have had a check-up for their current pregnancy are more likely to have had a Pap smear within the past year and within the last three years than do other women in the sample.

Even when the effects of other variables and other domains are not controlled for, the effect of check-up for current pregnancy is statistically significant across all models in Tables 9 and 11. This implies that having a check-up for the current pregnancy is substantively important for Pap smear screening ever, and screening within the last three years. In fact, having a check-up for the current pregnancy turned out to have an overwhelmingly strong effect, influencing Pap smear screening, especially for screening within the last three years.

Hypothesis 8

This hypothesis examined the effect of problem with paperwork for healthcare on the relationship between race/ethnicity/immigration status and Pap smear screening. Hypothesis 8
states that controlling for problem with paperwork for healthcare will partially explain the relationship between race/ethnicity/immigration status and having a Pap smear. Women who do have problems with processing paperwork for healthcare will be less likely to have had a Pap smear than women who do not have problems with handling paperwork for healthcare. Tables 8, 10 and 12 provide information for testing the effect of problem with paperwork for healthcare.

According to these tables, problem with paperwork for healthcare has no statistically significant effect on Pap smear screening ever, within the last three years and within the past year. Moreover, the race/ethnicity/immigration status effect on Pap smear screening does not change with the introduction of problem with paperwork for healthcare into the model. Consequently, hypothesis 8 was not supported.

Hypothesis 9

The effect of having competing needs for healthcare on the relationship between race/ethnicity/immigration status and Pap smear screening was tested in hypothesis 9. The hypothesis posits that controlling for competing needs will partially explain the relationship between race/ethnicity/immigration status and having a Pap smear. Women who have competing needs for transportation, food, clothing and housing will be less likely to have Pap smears than women who do not have these competing needs.

Two sets of competing needs were specified for hypotheses 9a and 9b. These are competing needs for transportation, and competing needs for food, clothing and housing, respectively.

Tables 8, 10 and 12 give information on results of these analyses. Based on results from these tables, hypothesis 9a on competing need for transportation was not supported. Competing need for transportation never showed a statistically significant effect on Pap smear screening.
Furthermore, the race/ethnicity/immigration status effect on Pap smear screening did not change with the introduction of competing needs for transportation into the model.

As noted earlier, hypothesis 9b examines the impact of having competing needs for food, clothing and housing on the relationship between race/ethnicity/immigration status and having a Pap smear. Results from Table 8 reveal that there was no support for hypothesis 9b. Having these competing needs has no statistically significant effect on having a Pap smear ever. Neither does the race/ethnicity/immigration status effect on Pap smear screening ever change with the introduction of having competing needs for food, clothing and housing into the model.

Table 12 does not support hypothesis 9b on Pap smear screening within the past year either, since there is lack of an initial statistically significant effect between race/ethnicity/immigration status and this dependent variable version. Furthermore, having competing needs for food, clothing and housing is only partially supported in Table 10 on having a Pap smear within the last three years, as only the effects in model 4 are statistically significant. This model focused on the impact of the competing needs/problem variables, controlling for the predisposing and enabling variables and domains.

Nevertheless, this statistically significant effect in Table 10, model 4, is supported in the expected direction as hypothesized. Having competing needs for food, clothing and housing has a negative impact on the likelihood of having a Pap smear within the last three years. Results from Table 10, model 4, show that the odds that women who have competing needs for food, clothing and housing have had a Pap smear in the past three years are about 31% lower than the odds for women who do not have these competing needs for food, clothing and housing.

Another significant effect of introducing the multiple competing needs for food, clothing and housing into model 4, is that unlike in the rest of the models in Table 10, usual source of care
is not statistically significant. This finding implies that when competing needs for food, clothing and housing are compelling, they have the likelihood of decreasing Pap smear screening within the last three years. This may happen if the effect of the competing needs for food, clothing and housing suppress the effect of having usual source of care.

Therefore, hypothesis 9b, which postulates that having these competing needs will partially explain Pap smear screening, received only partial support for screening within the last three years, but not for Pap smear screening ever or within the past year. Thus, overall, hypothesis 9b is only partially supported. When the effects of other independent/control variables are taken into account, having competing needs for food, clothing and housing only partly supports the relationship between race/ethnicity/immigration status and Pap smear screening.

Even without controlling for the effects of other variables and other domains in Table 11, the effect of having competing needs for food, clothing and housing remains the same for model 4 of Table 11, the domain-specific table on Pap smear screening within the last three years. Results from model 4 of Table 11 show that the odds that women with competing needs for food, clothing and housing have had a Pap smear within the last three years are about 31% lower than the odd for women without these competing needs. This implies, also, that taking the effects of other independent/control variables into account is not beneficial to testing the effect of having these competing needs, as similar results are reached for both Table 10, which controls for the effects of other independent/control variables, and Table 11, which does not control for the effects of other independent/control variables.
Hypothesis 10

Finally, hypothesis 10 tested the effect of perceived health status on the relationship between race/ethnicity/immigration status and having a Pap smear. The hypothesis states that controlling for health status will partially explain the relationship between race/ethnicity/immigration status and Pap smear screening. Women who are in good health (excellent, very good, good) are more likely to have had a Pap smear than women who are in relatively poorer (fair, poor) health. Tables 8, 10 and 12 illustrate the results of testing for this hypothesis.

Results from these tables provide no support for hypothesis 10 on the effect of perceived health status. Perceived health status has no statistically significant effect on having a Pap smear. Furthermore, the race/ethnicity/immigration status effect on Pap smear screening does not change with the introduction of perceived health status into the model. Nevertheless, perceived health status may have a substantive importance for Pap smear screening.

Summary of Chapter 4

This final section of chapter 4 summarizes the rest of the chapter, based mainly on results from the multivariate analyses and hypotheses testing. Results of odds ratios from binary logistic regressions discussed above indicate that there is a relationship between race/ethnicity/immigration status and Pap smear screening ever and within the last three years and that the hypothesis that Anglo women will be most likely to have had a Pap smear is supported. This race/ethnicity/immigration status effect persists even when the effects of other independent/control variables are taken into account.

Nevertheless, the prediction that Hispanic American women, followed by African Americans and finally Hispanic immigrants will be more likely to have had a Pap smear after
Anglo women in that order is not supported by both analyses. Rather, for all two versions of the dependent variable that are statistically significant, African American women are more likely to have had a Pap smear next to Anglo women.

In fact, the difference between white and African American women is minimal for Pap smear screening within the last three years. According to data in Tables 10 and 11 on these binary logistic regression analyses, the odds that African American women have had a Pap smear within the last three years are between 2.5% and 6.2% lower than the odds for whites. Results from the bivariate analysis corroborated this. Bivariate results from Table 5 on Pap smear screening ever, the only one for which a statistically significant bivariate effect is established between race/ethnicity/immigration status and Pap smear screening, indicate that African American women are about four percent less likely to have ever had a Pap smear, compared to white women.

Furthermore, results from the multivariate analyses show that the difference between African American women and the two Hispanic groups for Pap smear screening ever is over 30% higher. In addition, African American women have over 40% greater odds of having a Pap smear within the last three years than Hispanic American women and about 20% greater odds of having a Pap smear within the last three years than Hispanic immigrant women.

Next to African American women, Hispanic immigrant women are more likely to have ever had a Pap smear and also to have had it within the last three years, compared to Hispanic American women. While the margin between these two groups is about the same for Pap smear screening ever, it is substantial for Pap smear screening within the last three years (21%-29%). This implies that, contrary to expectation, Hispanic American women were least likely to have
had a Pap smear across all the analyses where race/ethnicity/immigration status showed a statistically significant effect: screening ever and within the last three years.

In fact, results from the full model in Table 10 show that the odds that Hispanic American women have had a Pap smear within the last three years are about 49% lower than the odds for whites, all else equal. The odds that Hispanic immigrant women have had a Pap smear within the last three years are about 20% lower than the odds for whites. Worse still, results from the full model in Table 8 show that the odds that Hispanic American women have ever had a Pap smear are about 80% lower than the odds for whites, all else equal. The odds that Hispanic immigrant women have ever had a Pap smear are about 77% lower than the odds for whites, all else equal.

Next, I sum up results from the other variables that were expected to partially explain the relationship between race/ethnicity/immigration status and the dependent variable versions. Based on the multivariate analyses, the findings from Tables 8, 10 and 12, which test the effect of each of the variables, controlling for the effects of other variables and domains, indicate that six out of the 10 other independent variables never supported the expectation that they would partially explain the relationship between race/ethnicity/immigration status and Pap smear screening. These variables are marital status, employment status, health insurance coverage and problem with paperwork for healthcare. The remaining two are competing need for transportation and perceived health status.

The four remaining independent variables, age, check-up for current pregnancy, usual source of care and competing needs for food, clothing and housing, showed statistically significant effects for some, but not across all of the dependent variable versions and models, as discussed above. In spite of this, having had a check-up for the current pregnancy had a very
strong effect for explaining the relationship between race/ethnicity/immigration status and Pap smear screening ever and within the last three years. The results of data from Tables 8 and 10 reveal that the effect of check-up for current pregnancy helps to positively explain the relationship between race/ethnicity/immigration status and Pap smear screening ever and within the last three years.

Odds ratios from having a check-up for the current pregnancy for Pap smear screening ever compared to screening within the last three years show clearly that the rates for the latter period of time are much higher. At least, the rates are 64% higher on average for Pap smear screening within the last three years than they are for rates for Pap smear screening ever. Since Pap smear screening within the last three years is coded to include screening within the past year, and pregnancy lasts for less than one year, this finding could be interpreted to mean that, possibly, healthcare workers within the safety-net healthcare system have stepped up Pap smear screening within the past year or so for pregnant women, compared with the previous pregnancies, if any, for the women.

It could also mean that the previous pregnancies of the women, if any, were managed at different healthcare networks where lesser Pap smear screening is done. Alternatively, it could mean that over time, greater awareness for the need for Pap smear screening for the general population has been created, and that of late, health workers undertake more routine Pap smear screening for pregnant women than they used to do in the past.

Also, the effects of having a usual source of care and having competing needs for food, clothing and housing explain the relationship between race/ethnicity/immigration status and Pap smear screening within the last three years across some, but not all of the models. Usual source, of care which is considered an enabling variable in this study, explains the relationship between
race/ethnicity/immigration status and Pap smear screening within the last three years when the effects of the enabling variables are considered, controlling for the effects of the predisposing variables and domain, and also when the effects of all other variables are combined in one single equation in the full model (Burr and Mutchler, 1992).

However, having a usual source of care does not explain the relationship between race/ethnicity/immigration status and Pap smear screening within the last three years, when the effects of the set of competing needs/problem variables are analyzed, controlling for the set of enabling and predisposing variables and domains. This result implies that introducing the competing needs variable suppressed the effect of usual source of care. Similarly, the effect of competing needs for food, clothing and housing was significant for Pap smear screening within the last three years when the effects of these competing needs/problem variables were considered, controlling for the effects of the enabling and predisposing variables, but not when the effect of the perceived health status variable was introduced, controlling for the effects of all other variables. Thus, although not statistically significant, the perceived health status variable may have substantive importance.

More importantly, data from Table 8 based on the multivariate analyses reveal that only the effects of age and check-up for current pregnancy can clarify the relationship between race/ethnicity/immigration status and Pap smear screening ever. Although the expected direction for the effect of having a check-up for the current pregnancy is confirmed, it is reversed for age. Having a check-up for the current pregnancy is substantively able to partially explain the relationship between race/ethnicity/immigration status and Pap smear screening ever. Women who have had a check-up for the current pregnancy had a higher likelihood of ever having a Pap smear, compared to all other women.
Contrary to expectation, however, the younger women are less likely to have ever had a Pap smear. This effect of age on Pap smear screening ever is corroborated by the bivariate analyses as well. As mentioned earlier, this effect of age is not surprising as the older women have had more time in their lifespan to have ever screened for Pap smears than the younger women, some of whom are as young as 18 years.

Unlike the results revealed in the analyses for Pap smear screening ever and within the last three years, results of data from Pap smear screening within the past year, shown in Tables 12 and 13, indicate that race/ethnicity/immigration status is not related to having a Pap smear within the past year, as race/ethnicity/immigration status does not have a statistically significant effect. However, data from these tables show that age, usual source of care, check-up for current pregnancy, and competing needs for food, clothing and housing may have statistically significant additive effects on the likelihood of having a Pap smear within the past year, despite the lack of a statistically significant relationship between this dependent variable version and race/ethnicity/immigration status.

Results from the bivariate analyses, shown in Table 7, also support the lack of statistically significant effects between Pap smear screening within the past year and race/ethnicity/immigration status. Furthermore, bivariate Table 6 shows that there are no statistically significant effects between Pap smear screening within the last three years and race/ethnicity/immigration status, although there are significant effects for the multivariate analyses, according to Tables 10 and 11.

Data from the bivariate cross-tabulations also indicate that marital status, employment status, and having experiences with handling paperwork for healthcare had no statistically significant effects for the relationship between Pap smear screening and
race/ethnicity/immigration status. In the multivariate analyses, these variables had no statistically significant effects on Pap smear screening as well. In fact, only Pap smear screening ever had a bivariate relationship with race/ethnicity/immigration status.

Effects of Time Frame

Another unintended, but outstanding results of the multivariate analyses particularly, and to some extent, the bivariate ones, is the effects of time frame, judged by results from the different Pap smear screening versions. As may be obvious in the discussion above, time frame seems to play a very important role in Pap smear screening. Two trends in the ‘time frame’ theses have evolved from the results of the data analyses. The first ‘time frame’ thesis is supported by results from data from both the multivariate and bivariate analyses.

This primary ‘time frame’ thesis portrayed in this study suggests that the longer the time frame for the dependent variable version being assessed, the greater the tendency to get statistically significant results between race/ethnicity/immigration status and that dependent variable version. Furthermore, the longer the time span being looked at, the greater the tendency for the statistically significant variables to be across all models in the respective tables summarizing the data. I expand on this below.

From the more rigorous multivariate analyses, results from the data make it clear that the effect of race/ethnicity/immigration status on Pap smear screening ever, which demonstrates the longest time span, is statistically significant both when analyzed separately without controlling for other variables in model 1, Table 8, and also when analyzed as part of the set of predisposing variables, controlling for the effects of age and marital status, in model 2, Table 8. Compared with the dependent variable version Pap smear screening within the last three years which shows
a shorter time frame, the effect of race/ethnicity/immigration status is not statistically significant when analyzed without controlling for other predisposing variables in model 1, Table 10, but is statistically significant when analyzed as a part of the set of predisposing variables in model 2, Table 10.

This argument is strengthened by the finding that the dependent variable version, Pap smear screening within the past year, which has the shortest time span, shows that race/ethnicity/immigration status has no statistically significant effect, neither when analyzed without controlling for the effects of other variables in the models nor when assessed as a part of the set of predisposing variables, controlling for the effects of age and marital status.

Furthermore, other variables, such as age and check-up for current pregnancy, which are significant in the analyses of Pap smear screening ever, are significant across all models in the tables (8 and 9). Compared to results from Pap smear screening within the last three years, usual source of care and competing needs for food, clothing and housing show statistically significant results across only some, and not all of the models in Table 10 where the effects of the other variables and other domains are controlled for. Even in Table 11 where the effects of the other variables and other domains are not controlled for, competing needs for food, clothing and housing does not show a statistically significant effect across all the models in the table.

Results from the less rigorous bivariate analyses also lend support to the ‘time frame’ thesis. The analysis on Pap smear ever, representing the dependent variable version for the longest time span, shows statistically significant effect for race/ethnicity/immigration status. The rest, Pap smear screening within the last three years and within the past year, which cover relatively shorter time periods, do not demonstrate statistically significant effects with race/ethnicity/immigration status. Thus, the time span being analyzed correlate with the
statistical significance of race/ethnicity/immigration status. The longer the time frame, the more statistically significant effects there are for race/ethnicity/immigration status, and vice versa.

A secondary and less evident ‘time frame’ trend which evolved from the results from the data is supported only by results from the multivariate binary regression analyses. This second ‘time frame’ trend, which is different from the primary ‘time frame’ trend discussed above, involves race/ethnicity/immigration status. Comparison of odds ratios for race/ethnicity/immigration status for Pap smear screening ever and those for screening within the last three years, indicates that for the latter time frame, which is the shorter and more recent one between the two, the percent difference in Pap smear screening between whites and all other racial/ethnic/immigration status groups in this study narrows considerably.

Results from the full models show that for African Americans, the rates reduced from about 46% lesser likelihood for having a Pap smear ever to 5.5% lesser likelihood of having a Pap smear within the last three years, compared to whites. Similarly, the rates reduced from about 77% less likely to about 20% less likely over the same time periods for Hispanic immigrants. Also, for Hispanic Americans, the rates reduced from about 80% less likely to about 49% less likely for the same time periods under consideration.

Thus, the disparities between African Americans, Hispanic Americans, and Hispanic immigrants, compared to whites, in terms of rates of Pap smear screening between screening ever and within the last three years, are narrowing for the sample used in this study. As mentioned already, this is particularly so for African Americans. Nevertheless, as stated in chapter 3, due to the limitations of the cross-sectional data used, this finding cannot be interpreted as a change in Pap smear screening rates between the different racial/ethnic/immigration status groups over time.
Conclusion

The next series of paragraphs highlight the conclusion for chapter 4. Based on the more rigorous multivariate analyses, race/ethnicity/immigration status is a predictor of Pap smear screening ever and within the last three years, while race/ethnicity/immigration status is not a predictor of Pap smear screening within the past year, all else equal. Thus, race/ethnicity/immigration status has a more important effect on Pap smear screening ever and within the last three years, than Pap smear screening within the past year. Based on the above stated discussions, it can also be concluded that in these analyses, the set of predisposing variables are substantively important for predicting the odds of having a Pap smear ever, while the set of enabling variables have strong effects on predicting Pap smear screening within the last three years among the sample, all else equal.

For individual variables that partially explain the relationship between race/ethnicity/immigration status and Pap smear screening, check-up for the current pregnancy had a strong effect. Also, age, usual source of care, and competing needs for food, clothing and housing had important effects. Marital status and perceived health status had little effect.

Clearly, employment status, health insurance coverage, competing need for transportation and problem with paperwork for healthcare had no effects on the relationship between race/ethnicity/immigration status and the three dependent variable versions. These latter set of variables showed no statistically significant effects at all in the multivariate analyses for all three categories of Pap smear screening. Nevertheless, they may have substantive significance for Pap smear screening.

From the foregoing, it can also be concluded that based on the multivariate binary logistic regression analyses which yield more complex results, Pap smear screening ever is substantively
important for policy purposes. This finding is not surprising, and supports the conclusion on the importance of time frame on Pap smear screening in this study. In addition, Pap smear screening within the last three years has an important effect for policy purposes. It supports the relationship between race/ethnicity/immigration status and the dependent variable version, when the effects of the remaining predisposing variables are taken into account. This is yet another evidence of the primary “time frame” thesis developed in this study.

In addition, one other variable, check-up for current pregnancy, is fully supported across all models in tables 10 and 11 on Pap smear screening within the last three years, while two other variables, usual source of care, and competing needs for food, clothing and housing are supported across some, but not all the models in these tables. On the other hand, Pap smear screening within the past year has little importance for policy purposes.

Furthermore, results from the data indicate that time frames for the different dependent variable versions are important for the statistically significant effects of the independent variables. Moreover, the rates of Pap smear screening between whites and other races narrowed greatly between screening ever and within the last three years.

Nevertheless, this cannot be concluded to mean increased screening over time since the cross-sectional design of this study cannot measure change over time.

There is the possibility that lately, pregnant women in this sample who go for prenatal care are getting more Pap smear screening. On the other hand, recall bias could have influenced these findings. Martin et al. (1996) documented that reporting date of screening exam is problematic. The final chapter, chapter 5, summarizes the study, draws conclusions, discusses policy implications and provides recommendations for future research.
CHAPTER 5

SUMMARY, CONCLUSION, POLICY IMPLICATIONS AND RECOMMENDATIONS

Introduction

This chapter has five sections. First, I present the objectives and hypotheses of the study. The second section presents the summary and discussion of the findings of the research. Third, the conclusions of the study are stated. The fourth section discusses the policy implications and finally, the fifth section is on recommendations based on the findings of the study.

The study set out to achieve the following objectives: (1) to explain the utilization of Pap smear tests among the group of low-income women who were patients in a safety-net healthcare system interviewed by Eve, Koelln Baumer, Trevino and Urrutia-Rojas (2000), in Fort Worth, Texas, by ascertaining the determinants of using these services; (2) to highlight policy relevant variables that may lead to changes in utilization of health services for populations of low-income women using safety-net healthcare networks; and to (3) add to the literature on utilization of Pap smear screening. The primary independent variable is race/ethnicity/immigration status, categorized into three dummy variables as African Americans, Hispanic Americans and Hispanic immigrants, with Anglos being the reference category. The dependent variable, Pap smear screening, is conceptualized three-fold: screening ever, within the last three years and within the past year.

There were ten hypotheses as follows:

1. Race/ethnicity/immigration status will be related to having a Pap smear. Anglo women will be most likely to have had Pap smears, followed by Hispanic American women, African American women, and finally Hispanic immigrant women.

2. Controlling for age will partially explain the relationship between race/ethnicity/immigration status and Pap smear screening. Younger women...
(aged 18-44 years) will be more likely to have had a Pap smear than older women (aged 45-60 years).

3. Controlling for marital status will partially explain the relationship between race/ethnicity/immigration status and Pap smear screening. Women who are married will be more likely to have had a Pap smear than women who are not married.

4. Controlling for having a usual source of care will partially explain the relationship between race/ethnicity/immigration status and Pap smear screening. Women who do have a usual source of care will be more likely to have had a Pap smear than women who do not have a usual source of care.

5. Controlling for employment status will partially explain the relationship between race/ethnicity/immigration status and Pap smear screening. Women who are employed will be more likely to have had a Pap smear than women who are not employed.

6. Controlling for any private or public insurance, JPS Connections and no insurance coverage will partially explain the relationship between race/ethnicity/immigration status and Pap smear screening. There will be a difference between women who have access to any private or public insurance, and/or are not insured relative to women with JPS Connections.

7. Controlling for having a check-up for the current pregnancy will partially explain the relationship between race/ethnicity/immigration status and Pap smear screening. Pregnant women who have had a check-up for current pregnancy will be more likely to have had a Pap smear than all other women.

8. Controlling for problems with handling paperwork for healthcare will partially explain the relationship between race/ethnicity/immigration status and Pap smear screening. Women who do have problems with processing paperwork for healthcare will be less likely to have had a Pap smear than women who do not have problems with paperwork for healthcare.

9. Controlling for competing needs will partially explain the relationship between race/ethnicity/immigration status and Pap smear screening.

9a. Women who have competing need for transportation will be less likely to have had a Pap smear than women who do not have competing need for transportation.

9b. Women who have competing needs for food, clothing and housing will be less likely to have had a Pap smear than women who do not have these
competing needs.

10. Controlling for health status will partially explain the relationship between race/ethnicity/immigration status and Pap smear screening. Women who are in good health will be more likely to have had a Pap smear than women who are in relatively poorer health.

Summary and Discussion

This section reviews and discusses the hypotheses of the study, which aimed to study the correlation between race/ethnicity/immigration status and utilization of preventive Pap smear screening. The study does not fully support any of the hypotheses, but partially supports five of them. These are discussed in detail below. A summary table of the key findings showing results of odds ratios from binary logistic regressions of the three different versions of Pap smear screening on selected factors from the full models of the three main effects tables (Tables 8, 10 and 12) is presented in Table 14 below to facilitate a review of the findings.

While it was anticipated that the predisposing, enabling and need variables would explain the relationship between race/ethnicity/immigration status and Pap smear screening, (that is, it would significantly decrease the strength of the relationship), in fact, the model is additive. In model 1 in Tables 10 and 11, race/ethnicity/immigration status is not related to Pap smear screening within the last three years until other predisposing variables are introduced. This result implies that the other predisposing variables, age and marital status, suppressed the effect of race/ethnicity/immigration status. Effect only emerged after the other predisposing variables were controlled for.
Table 14: Summary of Significant Effects from Odds Ratios from Binary Logistic Regressions of Pap Smear Screening Ever, Within the Last Three Years and Within the Past Year on Selected Factors

<table>
<thead>
<tr>
<th>Variables</th>
<th>Pap Smear Screening Ever</th>
<th>Pap Smear Screening Within the Last Three Years</th>
<th>Pap Smear Screening Within the Past Year</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Predisposing Variables</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Race/ethnicity/immigration status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>.539*</td>
<td>.945*</td>
<td></td>
</tr>
<tr>
<td>Hispanic American</td>
<td>.204*</td>
<td>.508*</td>
<td></td>
</tr>
<tr>
<td>Hispanic immigrant</td>
<td>.227*</td>
<td>.798*</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>.538*</td>
<td></td>
<td>1.567*</td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Enabling Variables</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Usual source of care</td>
<td></td>
<td>1.549*</td>
<td>1.606*</td>
</tr>
<tr>
<td>Employment status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Health insurance coverage</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any private or public insurance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No insurance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Check-up for this pregnancy</td>
<td>5.428*</td>
<td>7.758*</td>
<td>3.490*</td>
</tr>
<tr>
<td><strong>Competing Needs/Problem</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Problem with paperwork</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Competing need for transportation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Competing needs for food, clothing and housing</td>
<td></td>
<td></td>
<td>.737*</td>
</tr>
<tr>
<td><strong>Perceived Health Status</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Good health</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

-2 log likelihood 711.092  1088.668  1482.324
Model chi-sq 62.701***  39.463***  55.425***
Model degrees of freedom (df) 14  14  14

*significant at p ≤ .05  **significant at p ≤ .01  ***significant at p ≤ .001

Hypothesis 1

The first and main hypothesis examined the relationship between race/ethnicity/immigration status and Pap smear screening. It was expected that there would be a relationship between these two variables, and that, Anglo women would be most likely to have had Pap smears, followed by Hispanic American women, African American women, and finally Hispanic immigrant women. Results from the data (Tables 8, 9, 10 and 11) support the existence
of a relationship between race/ethnicity/immigration status and Pap smear screening ever and within the last three years, but not Pap smear screening within the past year (Tables 12 and 13).

Additionally, the data lend credence to the expectation that Anglos would be most likely to have had a Pap smear. This is, however, true for having Pap smear ever and within the last three years (Tables 8, 9, 10 and 11), but not for screening within the past year (Tables 12 and 13), which is not statistically significant. In fact, the race/ethnicity/immigration status effect persists, with whites being more likely than other racial/ethnicity/immigration status groups to have had Pap smear tests even when the effects of other independent/control variables are taken into account.

There will be reasons for this result. For example, cultural differences between the different groups may explain it. Cultural differences have been emphasized, among others, as one of the factors that lead to differences in Pap smear and other preventive screening and general utilization of healthcare among different racial and ethnic groups in the U.S. Previous studies have also blamed these racial and ethnic differences in health services utilization rates on communication difficulties and barriers, and discrimination within the healthcare system against minority populations in the U.S.

The reported unequal treatment is said to include a lack of referral for such low-income women and minority populations (Bakemeier et al., 1995; Hahn et al., 2001; Hubbell et al., 1996; Oropesa et al., 2000). Prevalent fatalistic beliefs among certain racial/ethnic groups, for example, among Mexican Americans, Latino immigrants and Puerto Ricans, have been blamed for these differences in utilization of health services as well (Chavez et al., 1997; Ramirez et al., 2000).

Moreover, the study does not find support for the expectation that following Anglos, Hispanic Americans, African Americans and Hispanic immigrants would be more likely to have
had a Pap smear in that order. Rather, overall, African Americans, Hispanic immigrants and lastly Hispanic Americans are more likely to have had Pap smears, in that order (Tables 8, 9, 10 and 11).

Data from Tables 8 and 9 on Pap smear screening ever indicate that African Americans are about 46% lower than whites, to have ever had a Pap smear; and the two Hispanic groups are about equally much less likely to have ever had Pap smears. The odds that Hispanic immigrants have ever had a Pap smear are about 78% lower than the odds for whites, all else equal. All else equal, the odds that Hispanic Americans have ever had a Pap smear are about 80% lower than the odds for whites.

Tables 10 and 11 on Pap smear screening within the last three years even show that a much higher margin exists between African Americans and Hispanic Americans; that Africans Americans are very close to Anglos in having Pap smears within the last three years; and that Hispanic immigrants performed much better than Hispanic Americans in Pap smear screening within the last three years, contrary to expectation. In the full model, the odds that African Americans have had a Pap smear within the last three years are 5.5% lower than the odds for whites. The odds that Hispanic Americans have had a Pap smear within the last three years are 49.2% lower than the odds for whites. This is not surprising perhaps, as it may be due to the fact that African Americans are much more likely to have health insurance of any source because they are more likely to qualify for Medicare or Medicaid or other public insurance than Hispanic Americans. This may be due to the fact that unlike the majority of African Americans who are U.S. citizens, a large proportion of Hispanics are foreign born (U.S. Census Bureau, 2002).

Although this result was not expected, it corroborated previous research by the National Cancer Institute (NCI) (1999; 2001a), that African Americans were more likely to have had
preventive Pap smear screening than Hispanic Americans. Similarly, a study conducted by Navarro et al. (1998) on preventive Pap smear tests and other preventive screening tests among low-income women in five states with the highest concentration of Hispanics found that overall, Hispanic women were significantly less likely to have had these tests, compared to other racial and ethnic groups. Thus, data from this study adds support to similar findings by researchers in health services utilization, that race/ethnicity and immigration status is a strong predictor of Pap smear screening.

In fact, Harlan et al.’s (1991) analysis on national cancer screening rates reported that through to age 69, African Americans were more likely than, or at least similarly likely as Anglos to have had Pap smear screening. Martin et al. (1996) reported a similar trend, that African American women were more likely to have had a Pap smear, compared to whites. Bolen, Rhodes, Powell-Griner, Bland and Holtzman’s (2000) study on state-specific prevalence of selected health behaviors, by race and ethnicity, also found that African Americans had the lowest rates of inadequate Pap smear screening among a large sample of women aged 20 years and above who had not had hysterectomies.

More importantly, Hispanic Americans are much worse off in having Pap smears within the last three years, contrasted with Hispanic immigrants. Contrary to expectation, data from Tables 10 and 11 indicate that Hispanic immigrants are 29% more likely to have had a Pap smear within the last three years, than do Hispanic Americans. In the full model, the odds that Hispanic immigrants have had a Pap smear within the last three years are 20.2% lower than the odds for whites. The odds that Hispanic Americans have had a Pap smear within the last three years are 49.2% lower than the odds for whites.
The correlation between race/ethnicity/immigration status and Pap smear screening established by this study is supportive of similar findings documented by several studies (Benar et al., 2001; Gotay and Wilson, 1998; Martin et al., 1996; NCI, 1999a; 2001a; OncoLink Cancer News, 2001; Perez-Stable et al., 1994; Ramirez et al., 2000; Vincent et al., 1997; Wells and Horn; 1998; Yi, 1994; Zambrana et al., 1999). Yi’s (1994) study found that immigrants who had lived in the U.S. longer were more likely to have been screened for a Pap smear. Conversely, the findings from this study contradict Zambrana et al.’s (1999) study that Hispanic women immigrants in the U.S. were least likely to be screened for Pap smear and other preventive screening procedures.

Moreover, findings from this study that Pap smear screening within the past year is not correlated with race/ethnicity/immigration status is noteworthy. Understandably, from the frequencies and descriptive statistics given in chapter 3, most (89.7%) of the women have ever had a Pap smear, and most (81.3%) of them have had it within the last three years, while fewer (63.3%) women have had it within the past year. Thus, in this study, time frame is important for establishing statistically significant effects of Pap smear screening, as stated above.

As a result, the lack of statistical significance for screening within the past year could mean that women have a lower likelihood of having a Pap smear in the short run. A 1987 National Health Institutes Survey (NHIS) data concluded that the most frequent reason given for not having a Pap smear in the last three months by all women interviewed, irrespective of race, was procrastination or the believe that the test was not necessary (Harlan et al., 1991). A longer time frame than three months to one year is probably needed for women to act beyond wishful thinking to actually undertake a Pap smear test and/or to be convinced or persuaded about its importance. It is also possible that the women remember better to have a Pap smear over a longer
period of time, than a shorter one. This “in last year” finding could also be due to the significant effect of prenatal care for a current pregnancy as a trigger for Pap smear tests as part of the prenatal care. As mentioned previously, recall bias could be playing a role here as well (Martin et al., 1996).

As was revealed in the descriptive statistics in chapter 3, the women are more likely to have had a Pap smear within the last three years than they are within the past year. This is not surprising, based on the same time frame thesis. Also, given that majority of the women (60.5%) have subsidized health insurance coverage through the John Peter Smith (JPS) Connections, there is the possibility that the tendency to have a Pap smear within the last three years more than within the past year reflects the safety-net healthcare system’s policy, if any, regarding recommended time frames for having a Pap smear.

Thus, this study and others such as Harlan et al.’s (1991) lend credence to the U.S. Preventive Services Task Force’s (1996) recommendation that women should have a Pap smear within three years, although this falls short of recommendations from other preventive health agencies in the U.S., such as NCI (2001b). The NCI’s recommendation enjoins all women, 18 years and older and/or sexually active to have a Pap smear annually until proven safe for the third consecutive time or more, and then to leave the frequency of testing at the discretion of a woman’s physician.

Hypothesis 2

Hypothesis 2 posits that there will exist a relationship between race/ethnicity/immigration status and having a Pap smear, and that this relationship will be clarified by the effect of age. It was anticipated that, younger women (aged 18-44 years) would be more likely to have Pap smear screening than older women (aged 45-60 years). The first part of hypothesis 2, that the
relationship between the dependent variable and race/ethnicity/immigration status will partially be explained by age, controlling for other independent/control variables, was supported only in part; only by Pap smear screening ever.

Results for Pap smear screening ever is in the reverse direction than expected. Contrary to expectation, results from Table 8 shows that younger women (18-44 years) have a lesser likelihood of having a Pap smear ever, compared to older women (45-60 years). In the full model, the odds that younger women have had a Pap smear are 46.2% lower than the odds for older women, all else equal. The hypothesis is not supported by Pap smear screening within the last three years.

On the other hand, although there is no initial relationship between race/ethnicity/immigration status and Pap smear screening within the past year, age has a statistically significant additive effect. Thus, age may have a substantive effect for Pap smear screening within the past year. Results for Pap smear screening within the past year is possibly a reflection of the significant effect of prenatal care for current pregnancy as a trigger for having a Pap smear, as mentioned earlier.

Several studies (Coughlin et al., 1997; Harlan et al., 1991; Mandelblatt et al., 1992; Martin et al., 1996; NCI, 1999a; 2001a) have established a relationship between age and Pap smear screening. However, these findings were mixed on the effect of age, younger versus older, on Pap smear screening. While most of these researchers have concluded that low-income women screen more for Pap smears until an advanced age of about 50 till 65 years (Coughlin et al., 1997; Mandelblatt et al., 1992; 2000; Martin et al., 1996), others did not find age as being important for Pap smear screening.
Both Mandelblatt et al. (1992) and Martin et al. (1996) concluded from national studies that low-income, 65 or older year-old women may not have regular Pap smear screening. Others, such as Vincent et al. (1997) and Yi (1994) documented the mixed effect of age on having a Pap smear. Vincent’s study concluded that age was not related to “ever use” and “recency of use” of Pap smear tests. Beyond these, however, annual Pap smear screening fell at age 55 and thereafter.

Additionally, although Yi (1994) stated generally that older age promoted Pap smear screening among her sample of low-income women, she still documented that age was not a barrier for having a Pap smear. The mean age of women in Yi’s (1994) study who had ever had a Pap smear was 37 years, compared with 30.7 for those who had never had a Pap smear. Yi’s ‘older’ women with a mean age of 37 years, however, are considered to be within the ‘younger’ age group by my study.

Hypothesis 3

The third hypothesis was on marital status. It predicted that the relationship between race/ethnicity/immigration status and Pap smear screening would be explained by marital status. It was anticipated that being married might make it more likely for women to screen for Pap smears. Although the majority of researchers (Chavez et al., 1997; Martin et al., 1996; Weinrich et al., 1995; Yi, 1994; Zambrana et al., 1999) have linked being married to a higher likelihood of having a Pap smear, this study found otherwise. No statistically significant effects exist between Pap smear screening and marital status in all six tables from the logistic regression analyses. Weinrich et al. (1995) had argued, for instance, that being married was one of the "incentives" that promoted Pap smear screening for women.
Hypothesis 4

Hypothesis 4 predicted that there would be a relationship between race/ethnicity/immigration status and Pap smear screening, and that this relationship would be partially explained by having a usual source of care, taking into account the effects of other variables. Women who do have a usual source of healthcare are expected to have Pap smears more than those who do not have a usual source of healthcare. Although the majority of previous research, which has studied the effect of having a usual source of care on Pap smear screening by low-income women, has largely found a correlation between the two, this study found only partial support for hypothesis 4. The hypothesis received support for one Pap smear screening version: screening within the last three years; but not for screening ever and within the past year (Tables 8, 10 and 12).

Table 10, which tested the effect of having a usual source of care on the relationship between Pap smear screening within the last three years and race/ethnicity/immigration status, established some support for having a usual source of care; even then, it was across only two out of three models in the table. Results from the full model of Table 10 indicate that the odds that women with a usual source of care have had a Pap smear within the last three years are 54.9% greater than the odds for women who do not have a usual source of care. In fact, as mentioned in chapter 4, usual source of care is not statistically significant in model 4, Table 10, when the effects of the set of competing needs/problem variables are analyzed, controlling for the sets of enabling and predisposing variables.

This means that focusing on the effects of competing needs/problem variables overshadows the effect of having a usual source of care on having a Pap smear within the last three years. Having competing needs for food, clothing and housing may overshadow any
beneficial effect of having a usual source of care on the likelihood of having a Pap smear within the last three years.

In spite of the mixed findings of this study with regard to the role of having a usual source of care on the likelihood of having a Pap smear, most of previous research supports the importance of the role of having a usual source of care for the likelihood of having a Pap smear. Previous studies such as Martin et al. (1996) and Zambrana et al. (1999) have largely confirmed the importance of having a usual source of care on Pap smear screening by economically disadvantaged women. For instance, Martin et al.’s (1996) study emphasized that women who do not have a usual source of medical care underutilize Pap smear screening services.

The impact of usual source of care may be greater in the general population than it is in this sample of women who are in the care of a safety-net healthcare provider. This means that by having access to a safety-net healthcare provider, they may already have a usual source of care. Therefore, the atypical role having a usual source of care has played in this study may be explained by the fact that this sample is very different from the general population based on whom most studies are conducted.

Hypothesis 5

This hypothesis reviewed the effect of employment status on the relationship between race/ethnicity/immigration status and having a Pap smear. It posited that controlling for employment status would partially explain the relationship between race/ethnicity/immigration status and Pap smear screening. Women who were employed were expected to be more likely to have had a Pap smear than women who were not employed. All six tables based on data from the logistic regression analyses (Tables 8 to 13) established no correlation between employment
status and Pap smear screening. In fact, employment status turned out to be one of the enabling variables with no effect on Pap smear screening.

This finding of lack of partial explanation for the relationship between Pap smear screening and race/ethnicity/immigration status by employment status is supportive of Yi (1994) whose study among a group of Vietnamese immigrants living in Western Massachusetts found that employment status was not statistically significant for previous Pap smear experience.

The reasoning behind the hypothesis on employment status for this study was that women who were employed would be better off in having a Pap smear, as employment would potentially equip them with some amount of social capital to better utilize Pap smear screening services. Employment could also equip them with their own health insurance, which could translate into a higher tendency to have a usual source of care. Finally, employment could also provide some amount of financial security and social support, all of which are known to better promote Pap smear screening and other preventive healthcare services in general (Bloom et al., 1987; Gotay and Wilson, 1998; Jennings 1997; KPMG Peat Marwick, 1997; Morris et al., 1994; Suarez et al., 1994; The Kaiser/Commonwealth, 1998; U.S. Census Bureau, 1999).

Hypothesis 6

The sixth hypothesis examined the effect of having health insurance coverage on the relationship between race/ethnicity/immigration status and having a Pap smear. It states that, controlling for any private or public insurance, JPS Connections and no insurance coverage will partially explain the relationship between race/ethnicity/immigration status and Pap smear screening. There will be a difference between women who have access to any private or public insurance, and/or are not insured, relative to women with JPS Connections. Data from Tables 8, 10 and 12 provide no support for hypothesis 6 on the effect of health insurance coverage. Health
insurance coverage has no statistically significant effect on Pap smear screening. In addition, the race/ethnicity/immigration status effect on having a Pap smear does not change with the introduction of health insurance coverage into the model.

Thus, according to this study, having health insurance coverage makes no impact on Pap smear screening by the various racial, ethnic and immigration status groups. In support of the findings of this study, Yi (1994) concluded that type of health insurance was not significantly related to previous Pap smear screening among her sample of vulnerable women.

On the other hand, this finding is inconsistent with those from a large number of researchers who emphasize the importance of having health insurance for utilization of health services. It may be because the women mostly have subsidized care through the safety-net healthcare providers. The Harvard/NORC/Kaiser Survey (1995) found, for instance, that the uninsured are three to four times more likely to report having problems getting healthcare.

Brook et al. (1983) also documented that increased cost sharing reduces utilization of healthcare services. Moreover, increased cost sharing has the potential of sacrificing the more cost effective preventive services in favor of the less cost effective curative care services. Increased cost sharing also affects access to healthcare for vulnerable populations, such as the sample for this study. Aday (1993; 2001) corroborated the hypothesis between medical out-of-pocket (MOOP) expenditures and use of healthcare by vulnerable populations. For these populations, a relatively inexpensive medical cost-sharing burden constitutes a disproportionately huge burden and a potential for limiting access to healthcare.

Specific to preventive Pap smear screening, a large number of researchers, including Chavez et al. (1997), Hubbell et al. (1996) and Navarro et al. (1998) have supported the near indispensable nature of having health insurance. For one part, having health insurance almost
translates into having a regular healthcare provider or a usual source of care (Navarro et al., 1998).

One reason for which health insurance coverage does not have a correlation with Pap smear screening for the sample of this study may be that they are unique and unrepresentative of other populations, as stated already. First, they are a sample of women who are already being seen by a safety-net healthcare provider—hospital and eight Community Health Centers. Hence, most likely, they are already exposed to the requirements on having a Pap smear as most of these women do because they are already in a safety-net healthcare system.

Secondly, they already have a source of healthcare, the safety-net healthcare network, from where they were sampled. By its definition as a safety-net provider, it does not select patients based on health insurance status, making it possible for its clientele to have Pap smears, regardless of their health insurance status. This is probably the key factor that makes it possible for women in this study to screen for Pap smears. Poor/vulnerable populations may just take advantage of public services for acute care. Preventive care may be a luxury when dealing with a public healthcare system.

Thirdly, being a low-income vulnerable group, the sample used in this study is unrepresentative of the average U.S. population, majority of whom must have private health insurance before they can use healthcare services. Similarly, most studies have reached their conclusions based on middle class populations and the dominant Caucasian racial/ethnic group who are U.S. citizens. These same arguments may apply for the lack of correlation between employment status, marital status and health status (to be discussed later), and having Pap smears for the sample in this study.
Another implication of the lack of statistical significance for health insurance coverage in this study is that having access to a safety-net healthcare network is important for Pap smear screening in the absence of health insurance coverage per se. This is an interesting finding pointing to the fact that publicly supported and not-for-profit healthcare programs need to be sustained and strengthened for the benefit of vulnerable populations.

Hypothesis 7

The seventh hypothesis posited that there would be a relationship between race/ethnicity/immigration status and Pap smear screening, and that the relationship will be partially explained by having a check-up for the current pregnancy. Hypothesis 7 specifies that, controlling for having a check-up for the current pregnancy will partially explain the relationship between race/ethnicity/immigration status and Pap smear screening. Pregnant women who have had a check-up for their current pregnancy will be more likely to have had a Pap smear than other women. Hypothesis 7 was tested using results from data presented in Tables 8, 10 and 12 which test for the effect of having a check-up for the current pregnancy, controlling for the effects of other variables and other domains.

As stated earlier, Table 12 does not support the hypothesis on Pap smear screening within the past year, due to a lack of an initial relationship between race/ethnicity/immigration status and Pap smear screening within the past year, although there was a strong significant additive effect for having a check-up for the current pregnancy and other variables. Having a check-up for the current pregnancy showed a statistically significant effect, nonetheless.

This means that current pregnancy itself is important even though race/ethnicity/immigration status is not. Hypothesis 7 was, however, supported by both Pap smear screening ever and within the last three years. According to Tables 8 and 10, the
expectation that women who have had a check-up for the current pregnancy will be more likely
to have had a Pap smear than other women was supported.

From Table 8, the odds that women who have had a check-up for the current pregnancy
have ever had a Pap smear are over 400% greater than the odds for other women in the study.
Results from the full model shows that the odds that women who have had a check-up for their
current pregnancy have ever had a Pap smear are 442.8% greater than the odd for other women.
In fact, results from the data in Table 10 show far greater rates of Pap smear screening within the
last three years for women who have had a check-up for the current pregnancy. In the full
model, the odds that women who have had check-up for the current pregnancy have had a Pap
smear within the last three years are 675.8% greater than the odds for other women. This
constitutes an increase of about 66% higher Pap smear screening within the last three years than
there are for Pap smear screening ever.

Unquestionably, having a check-up for the current pregnancy has a very strong effect on
explaining the relationship between race/ethnicity/immigration status and Pap smear screening
ever and within the last three years. This outcome may be a reflection of the routine check-ups
and examinations that pregnant women who attend prenatal care receive, as routine Pap smear
screening is part of the routine prenatal care nowadays. Nonetheless, hypothesis 7 was only
partially supported, as it did not receive support for Pap smear screening within the past year,
despite the strong significant additive effect.

Hypothesis 8

Hypothesis 8 examined the effect of having problems with paperwork for healthcare on
the relationship between race/ethnicity/immigration status and Pap smear screening. It stated that
controlling for experiences with handling paperwork for healthcare would partially explain the
relationship between race/ethnicity/immigration status and Pap smear screening. The hypothesis proposed further, that women who do have problems with processing paperwork for healthcare would be less likely to have had a Pap smear than those who have no problems with paperwork for healthcare.

Hypothesis 8 on the effect of having a problem with paperwork is not supported at all throughout the multivariate analyses, as results show no statistically significant effect for problem with paperwork on Pap smear screening. Furthermore, the race/ethnicity/immigration status effect on Pap smear screening does not change with the introduction of problem with paperwork into the model. Thus, having problems with paperwork may not affect Pap smear screening at all.

This finding could be related to the fact that these women can handle paperwork, i.e., they were able to get services at the safety-net healthcare system, compared to other vulnerable women not included in this sample. Passing beyond the paperwork barrier is quite an accomplishment. This group may be different from vulnerable groups that have not been able to pass beyond the paperwork barrier.

Nevertheless, having problems with paperwork for healthcare has been identified by some researchers as an example of structural obstacles, which negatively impact on healthcare delivery. Espinoza (2001) points to the fact that organizational problems with healthcare delivery may constitute structural barriers which could serve as impediments in access to and utilization of healthcare services, particularly for vulnerable populations such as the sample of this study. Furthermore, “problem with paperwork” may prevent people from getting into the healthcare system at all.
Hypothesis 9

This hypothesis reviewed the proposition that controlling for competing needs would partly clarify the relationship between race/ethnicity/immigration status and having a Pap smear. The hypothesis was divided into 9a and 9b, which, respectively, looked at the effects of having competing need for transportation and competing needs for food, clothing and housing.

Hypothesis 9a postulates that women who have competing need for transportation would be less likely to have Pap smears than those who do not have this competing need. Hypothesis 9b states that women with competing needs for food, clothing and housing would be less likely to have a Pap smear than women who do not have these competing needs.

As with most of the hypotheses for this study, there was only partial confirmation for hypothesis 9. Hypothesis 9a received no support from the multivariate analyses. There was no statistically significant effect for having competing need for transportation. As in the previous hypothesis, this result may be due to the fact that this group of women in the sample may have less transportation barriers. The fact that they have been able to access the safety-net healthcare system may be an indication that this group is somewhat above the transportation barrier.

In addition, hypothesis 9b on having competing needs for food, clothing and housing is supported only in part. Hypothesis 9b was supported only by one model, model 4 in Table 10 for Pap smear screening within the last three years. In this model, the effects of the competing needs/problem variables were tested, controlling for the enabling and predisposing variables. Results from data in this model show that the odds that women with competing needs for food, clothing and housing have had a Pap smear within the last three years are about 31% lower than the odds for women without these competing needs. Moreover, results from model 4, Table 10,
show that competing needs for food, clothing and housing acts as a suppressor variable to diminish the effect of having a usual source of care.

Evidence from data from Table 11, which does not control for the effects of other variables and other domains on having competing needs for food, clothing and housing, also show that the effect of these competing needs were about the same as they were for Table 10. The effect is significant, and the odds that women with these competing needs have had a Pap smear within the last three years are about 31% lower than the odds for women without those without these competing needs.

Moreover, having competing needs for food, clothing and housing may have substantive importance for Pap smear screening within the past year. Although the initial relationship between race/ethnicity/immigration status and having a Pap smear within the past year did not have a statistically significant effect, a significant additive effect for these competing needs was established across all models in Table 12. Results from the full model of Table 12 show that the odds that women with those competing needs have had a Pap smear within the past year were about 26% lower than the odds for women who did not have those competing needs.

Even without controlling for the effects of other variables and other domains in Table 13, the effect of having these competing needs on the likelihood of having a Pap smear within the past year remained the same. In the full model of Table 13, the odds that women with those competing needs have had a Pap smear within the past year were about 26% lower than the odds for women without those competing needs.

Hypothesis 10

The final hypothesis on the effect of health status did not receive support from data from Tables 8, 10 and 12. The hypothesis stated that, controlling for health status would partially
explain the relationship between race/ethnicity/immigration status and Pap smear screening, and that women who perceive their health status as good (excellent/very good/good) would be more likely to have a Pap smear than women who perceive their health status as relatively poorer (fair/poor).

Similarly, Tables 9, 11 and 13, which examined the effect of perceived health status, without controlling for the impact of other variables and other domains, established no statistically significant effect for confirming this hypothesis. Moreover, the race/ethnicity/immigration status effect on Pap smear screening does not change with the introduction of perceived health status into the model. Thus, based on data for this study, the relationship between race/ethnicity/immigration status and Pap smear screening is not clarified by perceived health status.

Even though results from this study did not support hypothesis 10 on the effect of perceived health status, some researchers, including Burack et al. (1998) and Mandelblatt et al. (1992) have argued that a relationship exists between health status and use of health services. Specifically, they stated that women with persistent ill-health use health services more frequently than do other women and as such, have a higher likelihood of being recommended by physicians for at least one Pap smear test.

Conclusion

This section gives the conclusions from the study, relative to its objectives. The study examined three main objectives. These were (1) to explain the utilization of Pap smear tests among the sample, (2) to highlight policy-relevant variables for use of safety-net healthcare services by low-income women, and (3) to add to the literature on Pap smear screening. The
following conclusions are based on results from data from the multivariate analyses. Based on results from these data, it is concluded for the first objective, that:

(a) race/ethnicity/immigration status is a strong predictor of Pap smear screening. Race/ethnicity/immigration status, however, predicts Pap smear screening ever and within the last three years, but not screening within the past year.

(b) Not surprisingly, having preventive Pap smear tests by this sample was more likely in the long run, such as screening ever and within the last three years, than it was in the relatively shorter run, such as screening within the past year.

(c) When conditions are suitable, such as having access to a subsidized safety-net healthcare system and being already enrolled in it, vulnerable African American women may utilize Pap smear screening services more than is normally documented by the prevailing literature. In this study, African Americans were more likely to have had a Pap smear than Hispanic Americans.

(d) Furthermore, Hispanic immigrants were more likely to have had a preventive Pap smear screening than Hispanic Americans.

Based on the second objective, which sought to highlight the policy relevant variables that may impact having a Pap smear in safety-net healthcare systems by vulnerable populations, the study concludes that:

(e) beyond race/ethnicity/immigration status, having check-up for the current pregnancy is extremely important for Pap smear screening. In fact, having had a check up for the current pregnancy has substantively important effect for clarifying the relationship between race/ethnicity/immigration status and Pap smear screening. Even when the initial relationship with race/ethnicity/immigration status does not have statistically
significant effects with Pap smear screening within the past year, a strong significant additive effect was established for having a check-up for the current pregnancy. Thus, the study has demonstrated that there is the need to encourage pregnant women to attend prenatal care, as this may immensely promote their screening for Pap smears, among other things.

(f) Age is one of the important variables which predispose the women to have Pap smears. Being younger (18-44 years) has the likelihood of decreasing Pap smear screening ever, compared to being older (45-60 years). This emphasizes the need for safety-net healthcare providers to educate all their female clientele, particularly the younger ones, on the importance of having a Pap smear at every opportunity they get to be in contact with them, such as during prenatal, post natal, nutrition, dental and well-baby clinics, among others.

Also, age had a strong significant additive effect on the likelihood of having a Pap smear within the past year, although there was lack of an initial relationship between race/ethnicity/immigration status and this version of the dependent variable. In addition, age served as a suppressor variable for Pap smear screening within the last three years, implying that it is important to take age into consideration when explaining the relationship between race/ethnicity/immigration status and the likelihood of having a Pap smear within the last three years for the sample.

(g) Although marital status had no statistically significant effect for any of the three versions of the dependent variable, marital status served as a suppressor variable, explaining the relationship between race/ethnicity/immigration status and Pap smear screening within the last three years. Race/ethnicity/immigration
status was not statistically significant until (age and) marital status were introduced and controlled for. This implies that it is important to take (age and) marital status into consideration when explaining the relationship between race/ethnicity/immigration status and the likelihood of having a Pap smear within the last three years.

(h) Having a usual source of care, to some extent, was also important to the sample, for having a Pap smear. In this study, women who have a usual source of care have a greater likelihood of having Pap smear tests within the last three years. Having a usual source of care may translate into having some kind of insurance coverage, as is the case for most of the clientele of the safety-net healthcare system studied (most of whom have subsidized insurance coverage from the safety-net healthcare network) and/or having a regular healthcare provider. Undoubtedly, these facilitate access to and use of healthcare services, including Pap smear screening.

Furthermore, despite the lack of an initial statistically significant relationship between race/ethnicity/immigration status and Pap smear screening within the past year, having a usual source of care has a strong significant additive effect on having this dependent variable version. Having a usual source of care is still important for having a Pap smear within the past year, regardless of the effects of race/ethnicity/immigration status.

(i) Also, having competing needs for food, clothing and housing was somewhat relevant for Pap smear screening for this vulnerable population studied. Results from this study show that controlling for the effects of the predisposing and enabling variables, having competing needs for food, clothing and housing is important for Pap smear screening within the last three years. In addition, competing needs for food, clothing and housing
had a statistically significant additive effect on Pap smear screening within the past year, irrespective of the lack of an initial statistically significant effect on the relationship between race/ethnicity/immigration status and having a Pap smear within the past year.

Moreover, results from model 4, Table 10 show that the effect of having a usual source of care for the likelihood of having a Pap smear within the last three years may be overridden by the effect of having competing needs for food, clothing and housing.

Other patient-use policies for safety-net healthcare providers may be to partner with relevant institutions and organizations to address multiple competing needs such as needs for food, clothing and housing for vulnerable populations which may interfere with their utilization of health services.

(j) The study demonstrates, indirectly, the need to maintain and improve publicly funded insurance such as JPS Connections, Medicaid, and other public insurance such as CHAMPUS, TRI-CARE and VA. Having these forms of insurance may serve as a safety-net for vulnerable populations such as the ones in this study.

(k) Also, the study demonstrates in no uncertain terms, that there is a crucial need to support and sustain such publicly funded programs as JPS Connections. Results from this study are largely different from those from other vulnerable populations, arguably, due to this group’s exposure to and assistance from the safety-net healthcare network.

Finally, for the third objective of adding to the literature on utilization of pap smear screening, it is concluded, in addition to the findings of this study itemized above, that:
(l) vulnerable populations, such as the low-income, minorities and immigrant women studied may utilize Pap smear screening beyond average levels, if suitable conditions such as having a usual source of healthcare and access to prenatal care are made available to them.

(m) Obstetrical and gynecological outlets may be one of the best places to promote the utilization of Pap smear screening for vulnerable women such as those in this study.

(n) Age may promote or discourage Pap smear screening for this vulnerable population studied.

(o) Other variables such as employment status, health insurance coverage, health status and competing need for transportation may not be important for Pap smear screening for this sample. Also, some structural healthcare system problems like difficulty with handling paperwork for healthcare may not be important for Pap smear screening for them. Rather, the effects of these variables may be overshadowed by the effects of having a usual source of healthcare, as already stated above, as well as by overcoming such multiple obstacles as having competing needs for food, clothing and housing.

(p) Theoretically, this study has introduced and confirmed very important vulnerable domain-specific variables to the theory of the Behavioral Model for Vulnerable Populations, propounded by Gelberg, Andersen and Leake (2000). Specifically, it has demonstrated that the vulnerable domain variables introduced by this study, particularly immigration status and having competing needs, which create obstacles for Pap smear services, are very important. Although Hispanic immigrants were more likely to have had a Pap smear than do Hispanic Americans, the Hispanic immigrants were much less likely
to have done so, compared to whites, and to a lesser extent, compared to African Americans.

(q) Again, the study concludes that Pap smear screening for the Hispanic immigrant women in this study remains a paradox, which requires further theoretical explanation. Several researchers have applied the “healthy migrant/selective migration hypothesis” to this, as discussed in chapter 2 of this study, and later on in this chapter.

(r) Moreover, although it is usual to do so, this study has demonstrated that the sample do not have Pap smears within shorter intervals as is recommended by U.S. Preventive Health service agencies.

(s) Furthermore, the study found that the rates of Pap smear screening for whites, compared to the racial and ethnic minority groups had narrowed from the rates during screening ever to screening within the last three years for the sample. This may be attributable to the lesser disparities in socio-economic status between the different racial and ethnic groups in this study, compared to the general population. The finding above could also be attributed to increased attempts to reach minority women for cancer screening in the past few years. For example, the Susan G. Komen Foundation is making increased efforts to reach Hispanic women in the Dallas-Fort Worth metropolis (Urrutia-Rojas, 2002).

The above-stated finding, however, cannot be interpreted as a change in Pap smear screening over time between whites and the minority groups in the sample. This is due to the inability of the cross-sectional design of this study to establish change over time. Nevertheless, the finding supports a previous one in the literature on race/ethnicity and Pap smear screening. Martin et al. (1996) did not find race to be a significant indicator of underutilization of female preventive services, and concluded that race and ethnic
differences in the rates of Pap smear (and mammogram) screening may be narrowing. Unlike this study, Martin and his colleagues’ study which made a conclusion on change in Pap smear screening over time was a longitudinal study.

Finally, the study corroborates the literature calling for need for caution not to lump Hispanic groups together in studies on healthcare utilization (Chavez et al., 1997; Mandelblatt et al., 2000; Oropesa et al., 2000; Ramirez et al., 2000; Zambrana et al., 1999).

Overall, however, these conclusions from the study are underscored by the fact that the sample used is very unique and different from the general population, as well as other vulnerable populations. They are a group of vulnerable, low-income women, most of whom are racial and ethnic minorities and immigrants. Also, they are a hospital sample that may have been exposed to the safety-net healthcare network’s policy, if any, on preventive Pap smear screening.

The arguments in support of the ubiquitous nature of a hospital sample in relation to Pap smear screening are three-fold. First, not having a usual source of care (and/or health insurance and/or frequent contact with physicians) translates into underutilizing Pap smear screening (Denniston, 1981; Martin et al., 1996). Second, women who use health services more frequently have a higher chance of being referred by health practitioners to have a Pap smear (Burack et al., 1998; Mandelblatt et al., 1992). Third, in general, women who use other preventive screening services have a higher likelihood of screening for feminine cancers such as (breast and) cervical cancer (Denniston, 1981; Weinrich et al., 1995; Zambrana et al., 1999).
Other unique characteristics of the sample of this study which makes them different from all others are the following: they are relatively younger, with a mean age of 35.5 years, standard deviation of 11.4 years, a modal age of 19 years and a median age of 34 years; 80% of them have some form of health insurance, including 60.5% who have JPS Connections, a subsidized health insurance premium, and 86.9% of them who have a usual source of care and access to safety-net providers. Consequently, this study lacks external validity and is, therefore, unrepresentative of other populations outside it.

Recommendations and Policy Implications

This section specifies seven recommendations and policy implications for the study. The recommendations from this study are based on the above-stated results, and focus particularly on the implications for practice of medicine with vulnerable populations such as the sample for this study. First, the effect of race/ethnicity/immigration status in predicting Pap smear screening in this study suggests that guidelines for utilization of Pap smear tests and public education efforts to promote appropriate Pap smear screening for vulnerable populations should be tailored to specific race/ethnic/immigration status groups. Such public education should address this sensitive public issue within the cultural context of each group. Public health education campaigns should employ primary languages, popular media, and folklore of the target racial and ethnic groups.

Second, it is recommended that publicly funded healthcare programs for vulnerable populations, such as JPS Connections and Medicaid be maintained and strengthened. With regard to this recommendation, Rosenbaum and Zuvekas (2000) noted that such programs are positively associated with access to healthcare for such vulnerable populations and will have a positive impact on the health of such underserved populations.
Third, this study found that younger women are less likely than older women to ever have a Pap smear, but are more likely than older women to have a Pap smear within the past year. The study suggests that younger women may be having Pap smears more often within the past year than older women due to the greater risk of pregnancy. This study found that pregnant women who get prenatal care are more likely to have had a Pap smear. This finding suggests that publicly funded healthcare programs should make special efforts to encourage young women, especially those who are sexually active, to get preventive Pap smear tests, and to educate them to continue to get these exams regularly throughout their lives.

There is the need to have safety-net healthcare providers develop Pap smear screening guidelines, when they do not exist, and to educate and emphasize the need for both its younger and older female clients to have regular Pap smears, as well as have it within shorter intervals.

Fourth, having a usual source of care is an important prerequisite to having a Pap smear for this group of vulnerable women. This finding underscores the importance of having the U.S. healthcare system reformed so that universal access to healthcare is possible for all, regardless of socioeconomic or cultural background. The study demonstrates that this all-important policy issue will immensely improve access to and utilization of healthcare for vulnerable populations such as the one in this study.

For preventive public health purposes, this recommended universal access to healthcare in the U.S. should cover immigrants. The negative impact of communicable diseases such as tuberculosis and hepatitis, which are known to be common among immigrant populations in the U.S., underscores the need to extend this provision to immigrants as well.

Fifth, this study found that competing needs for food, clothing and housing are barriers to having Pap smears for some women. The safety-net providers in this study provide tax-
subsidized healthcare for people living in families up to 200% of poverty. Furthermore, the healthcare network delivers care in geographically depressed community clinics throughout the county as well as in outpatient clinics at the hospital campus.

Henderson and Markus (1996) are supportive of Community Health Clinics (CHCs). These authors have documented that CHCs could be the ultimate recourse to healthcare for such populations. These centers play crucial roles in serving vulnerable populations. They offer comprehensive primary and preventive healthcare, in addition to providing essential services to these populations, regardless of ability to pay. Moreover, the proximity advantage of such centers is highly desirable.

As commendable as CHCs are, there remain major issues of providing adequate food, clothing and housing for low-income populations that also need to be addressed in order to increase the health of the low-income populations. Safety-net healthcare programs could liaise with policy makers and philanthropic groups and organizations such as homeless shelters, the Salvation Army and Good Will Industries to help cater to some of the competing needs for such underprivileged populations as well as for working for more enlightened welfare policies at the local, state and national levels.

Sixth, health insurance coverage is not a statistically significant prerequisite for Pap smear screening in this study. This is due to the fact that the sample already had a source of usual healthcare in a safety-net system where most patients are eligible for county-subsidized healthcare or Medicaid. Nonetheless, the U.S. should consider making healthcare accessible to all, not just vulnerable populations who are fortunate enough to live in a geographical area that provides subsidized care for those who fit the restrictive guidelines for Medicaid.
One solution might be a primarily federal and state sponsored healthcare system, at least, for the benefit of vulnerable populations such as the one studied. This need not be entirely free, but should be a co-pay system where patrons are charged a minimal fee. It is anticipated that the co-pay will serve a dual purpose. It will prevent irresponsible use of health services, as well as generate some minimal income to support the services rendered.

Unfortunately, a study conducted by the Kaiser Commission (1999) on Medicaid and the uninsured indicates that Medicaid may be cutting back on its role as a safety-net for the poor and uninsured. Such populations are unusually burdened by medical out-of-pocket expenditures (Aday, 1993; 2001), with the effect of reducing healthcare utilization for such groups. Beyond increased utilization, such policies are cost effective in the long run (American Public Health Association, 1982; Brook et al., 1983).

Furthermore, groups such as the American Public Health Association, the American Medical Association and other healthcare and health- and insurance-related organizations could encourage healthcare practitioners to accommodate vulnerable populations. Several researchers, such as Strong (2000) have documented that the failure of healthcare practitioners to accept Medicaid and other publicly-funded health insurance schemes from obviously vulnerable groups serves as a barrier to access to healthcare for such populations. To serve as a booster for such healthcare practitioners, efforts should be made to provide them with incentives such as paying them in a timely manner, equitable reimbursement for their services, and possible tax rebates and/or relief for repayment of education loans.

Seventh, employment status and Pap smear screening were not correlated for this group. The women in the study who were employed or married to men who were employed were dependent on publicly funded health insurance or publicly subsidized care. This calls attention to
the fact that for low-income employed workers, employers are not able to provide affordable health insurance for the workers or especially for their dependants. Affordable insurance options for small businesses need to be explored further to promote a healthy workforce (Aday, 1993; 2001; Starr, 1982).

Future Research

This final section gives suggestions for future research. This study has answered some questions but raised several others. Some questions that future research might address are as follows: first, the finding that Hispanic Americans are less likely to have had a Pap smear than Hispanic immigrants require further investigation. Although it is very difficult to be conclusive on this, selective migration and/or relative deprivation theses may offer further clues in explaining these unanticipated differences in Pap smear screening between the two Hispanic groups, as preempted in chapter 2.

Second, as suggested by Chavez et al. (1997) and others, studies on utilization of health services by Hispanic/Latina populations should emphasize between- and within-Hispanic/Latina group differences, as this study shows that Hispanic Americans are different from Hispanic immigrants in having a Pap smear. Leon and Dziegielewski (1999: 70) supported Castex (1994) in highlighting the problem of grouping Latina populations together in studies as follows “‘Clear differences do exist in language, customs, economic resources, and educational systems among Hispanic cultures’…Grouping this diverse group of individuals into one classification ‘Hispanics’ remains problematic.”

Third, other studies could focus on the relationship between Hispanic immigrant women’s length of stay in the U.S. and their having preventive Pap smears. Previous research, including the 1998 National Health Interview Survey, found that immigrants in the U.S. may not
utilize preventive cancer screening exams, including those for (breast and) cervical cancer till they have been in the country for five or more years (Oropesa et al., 2000; Wells and Horm, 1998). Interestingly, Wells and Horm (1998) found a negative correlation between residing in communities with moderate to high concentration of low-income or poor Hispanic immigrants who have lived in the U.S. for less than five years and prior cervical (and breast) cancer utilization. Yi (1994) documented similar findings.

Fourth, this study should be replicated, focusing on breast cancer screening for the female sample, and prostrate cancer screening with a larger male sample. The implications that being low-income and vulnerable has for Pap smear screening for the sample used in this study may or may not differ for screening of breast and prostrate cancer for a similar group of vulnerable respondents.

Fifth, the study should be replicated using other vulnerable populations in other safety-net healthcare systems in the U.S. Sixth, and finally, future research could also explore the probable narrowing gap for Pap smear screening between whites and other racial and ethnic/immigration status groups in the U.S.


Smear Use in a Health Maintenance Organization: Results of a Randomized Controlled Trial. Cancer. 82(12): 2391-400.


214


