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# Emerging Health Trends and Behavior Risk Factors for Chronic Disease Risk in Rural and Urban Pennsylvania: Implications for Health Education

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EMERGING HEALTH TRENDS AND BEHAVIOR RISK FACTORS FOR CHRONIC  
DISEASE RISK IN RURAL AND URBAN PENNSYLVANIA: IMPLICATIONS FOR  
HEALTH EDUCATION

A Dissertation

Submitted to the School of Graduate Studies and Research

in Partial Fulfillment of the

Requirements for the Degree

Doctor of Education

Kristine Marie Zaragoza Anderson

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May 2008

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Title: Emerging Health Trends and Behavior Risk Factors for Chronic Disease Risk in Rural and Urban Pennsylvania: Implications for Health Education

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The purpose of this study was to gain a greater understanding of the health access and utilization, health risk and preventive behaviors, chronic diseases, and selected public health issues for rural and urban residents of Pennsylvania. Only by the examination of these factors of health can policy makers and health providers make connections and understand the recommendations of implementing health education to prevent the onset of chronic diseases. It is not enough to recognize the data alone but to relate them to each other and use the data to design educational programs to avert poor health.

This study analyzed pre-existing data from the Behavioral Risk Factor Surveillance System (BRFSS), a Centers for Disease Control and Prevention (CDC) coordinated, state-based, continuously conducted, telephone-administered health survey that monitored risk behaviors related to chronic diseases, injuries, and death. The data was analyzed with descriptive and inferential statistical procedures to determine any significance among rural and urban residents of Pennsylvania.

The results indicated that there were no significant differences among rural and urban Pennsylvania residents and their health behaviors. Persons from rural and urban areas both had instances of chronic diseases, risk health behaviors, and persons from rural areas had less access to healthcare than persons from urban areas. While, this relationship

among rural and urban areas remained consistent, there were some areas where people from rural areas were better than urban areas. People from urban areas reported more instances of asthma and diabetes.

Most importantly, the results of the quantitative data confirmed the need for more effective educational interventions to teach patients proper healthy behaviors and how to manage their chronic diseases correctly.

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Dedicated to my late grandmother, Clara Gelegonya Zaragoza, an immigrant from Hungary seeking the American dream and to my father, Stephen Zaragoza Sr., a Vietnam Veteran combat medic (U.S. Army 11<sup>th</sup> Armored Cavalry), "welcome home".

He who is mighty has done great things for me (Luke 1:49).



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## CHAPTER ONE

### INTRODUCTION

#### Statement of the Problem

Everyone is a patient of healthcare at one time or another in our lives. The current medical system in the United States promotes crisis intervention while allowing for little disease prevention. Research indicates that disease prevention by providing patient education is a major factor in health and disease management (Jansen, Weert, Dulmen, Heeren, & Bensing, 2007; Gardner, 2004; Spath, 2001).

The fact that many Americans do not receive appropriate preventive care, and care for chronic conditions like diabetes and hypertension, also means that annually there are thousands of preventable second heart attacks, kidney failures and other conditions (Edwardson, 2007; Pauker & Schwartzberg, 2001). Several recent studies like the 2005 Controller's Report demonstrate that a handful of such conditions account for more than half of American medical costs (Connolly, 2005). The State of Healthcare Quality 2004 report demonstrated that more than \$9 billion in lost productivity and nearly \$2 billion in hospital costs could be averted through more consistent delivery of best-practice-care (National Committee for Quality Assurance, 2004; Anonymous, 2004). More than 14,000 heart attacks and strokes could be prevented each year through better diabetes management alone (HbA1c control).

Despite having serious lifelong diseases, many people know little about their condition. Many patients do not know why they take their prescribed medications, do not fully understand their disease state, and do not know what steps or changes in their life

they can take to better their situation concerning their individual disease states. Patients deserve an opportunity to receive medical education in a concise, effective, useful manner that they can easily apply in their daily lives (Anonymous, 2004; Hill, 2004). However, the United States current policy on healthcare is not focused on preventive medicines but treatments of chronic diseases (Colman, 2006; Connolly, 2005). The State of Healthcare Quality 2004 report indicates that chronic diseases have become more serious as higher numbers of people are diagnosed with chronic diseases and the self-treatment options become more complex (National Committee for Quality Assurance, 2004).

Research has increasingly demonstrated that many opportunities to deliver needed care are missed simply because physician' offices and health plans lack the ability to identify and track patients who need it (National Committee for Quality Assurance, 2004). This is especially a common circumstance for rural medicine where there is less access to healthcare and few medical education training seminars for patients (Cutilli, 2006; Connolly, 2005).

The Behavioral Risk Factor Surveillance System (BRFSS) is data collected by the Pennsylvania Department of Health that identified data on a variety of health risk factors, preventive behaviors, chronic conditions, and emerging public health issues that physician' offices and health plans can use to better understand medical conditions and behaviors in rural and urban Pennsylvania. This can also extend to understanding health trends in the nation and how they reflect to current health statistics in urban and rural areas of Pennsylvania and reforming existing health policies to reflect the current status of healthiness in the Commonwealth.

By the early 1980s, scientific research clearly showed that personal health behaviors played a major role in premature morbidity and mortality (Centers for Disease Control and Prevention, 2006). Although national estimates of health risk behaviors among U.S. adult populations had been periodically obtained through surveys conducted by the National Center for Health Statistics (NCHS), these data were not available on a state-specific basis. This deficiency was viewed as critical for state health agencies that have the primary role of targeting resources to reduce behavioral risks and their consequent illnesses. National data may not be appropriate for any given state; however, state and local agency participation was critical to achieve national health goals.

Health care providers and patients in rural areas face vastly different obstacles than do their counterparts in urban areas (Office of Rural Health, 2007). Many rural Americans face health disparities in health care absent in urban areas. The factors for this include economic, cultural and social differences; educational shortcomings, lack of recognition by legislators and the sheer isolation of living in remote rural areas impede rural Americans in their struggle to lead a normal, healthy life (Office of Rural Health, 2007).

According to the Agency for Healthcare Research and Quality (2007) one-fourth of America's population lives in rural areas. Compared with urban Americans, rural residents have higher poverty rates, a larger percentage of elderly, tend to be in poorer health, have fewer doctors, hospitals, and other health resources, and face more difficulty having access to transportation to health services. This national data indicates differences among rural and urban areas but research is needed to identify the differences in rural and urban areas in Pennsylvania. This study is focused at the research of the BRFSS data to

conduct a comparison of rural and urban areas in Pennsylvania to determine any differences. The identification of these differences can recognize areas of needed improvement to better the health of all residents of Pennsylvania.

Two recent Institute of Medicine reports highlight that the quality of healthcare in America is less than what should be expected from the world's most extensive and expensive healthcare system (Lutfiyya, Bhat, Gandhi & Nguyen, 2007). The quality of healthcare and the health behaviors of Americans begin at a young age in the school system. Schools have long been identified as a key setting for childhood health promotion (Izumi, Rostant, Moss & Hamm, 2006). This model of education for prevention of a disease should carry into adulthood based on the needs of the national health goals set by state and local agencies and based on the results of other research that show a disparity between rural and urban health care among adults in the United States (Wooltorton, 2003).

A study, based on 2001 data, shows a United States that is pocked by places where millions of adults face a risk of premature death like that in Angola, Mexico, Nigeria, and other parts of the developing world (Brown, 2006). In terms of life expectancy an urban black man can expect to live 21 fewer years than a woman of Asian descent in the United States. However, white rural people also have a life expectancy that is much shorter than the vast majority of urban and suburban inhabitants (Brown, 2006). The study went further to research the access of healthcare among people in the United States. It found that while there is less variation among United States citizens in the rate of health insurance coverage and the frequency of routine medical appointments than that

of life expectancy, there are apparent disadvantages for rural citizens and urban black males (Brown, 2006).

The study found that in rural areas such as the Appalachia and Mississippi Valley area of the United States has a lower high school graduation rate and citizens earn less income per year than that of Middle America. These populations of rural people do not have the earning power to afford health care insurance and there is less access to healthcare in rural communities than in suburban and urban areas of the nation (Brown, 2006).

Researchers at the Harvard School of Public Health cite one of the reasons for the persistence of the disparities is that biggest difference in mortality is seen among people in middle age (Brown, 2006). That part of the population has not been a major focus of new investment in government health education programs in the past two decades (Seward, 2007). The researchers claim that instead the very young and elderly (among who the disparities are less severe) have been the principal targets of new and innovative health education spending. Examples of these programs include free vaccines for poor children, the state and federal governments' Children's Health Insurance Program (CHIP) and the drug benefit (Part D) program recently added to the Medicare program.

While all of these programs are beneficial for children and the elderly they do not focus on the group of Americans with the largest healthcare disparities. This population of Americans has the largest disparity of access to health care and health insurance coverage. This population also is the highest at risk for obtaining a preventable life-threatening disease. Chronic diseases are a detrimental disease that is preventable by good preventive health behaviors like going to regular checkups, being screened for

cancer, eating right and exercising. However, if an at-risk population does not have the income to afford healthcare or access to health care is hardly to non-existent, their disease can persist untreated or not diagnosed.

The majority of current health education programs that are affluent in the United States are aimed at children and the elderly with programs like CHIP and the Part D Medicare program. These programs have proven effective in educating on preventive health behaviors, identifying chronic disease, providing access to health care and health insurance. This model of providing continuing education on health can and should be distributed to the population of Americans with the most health disparities. The purpose of this thesis is to highlight the population of Pennsylvanians with the most health disparities in the commonwealth, to draw attention to the problems, and suggest solutions of educational interventions on a statewide basis to improve the health of Pennsylvanians based on previous research and models of effective health education programs like CHIP and the Part D Medicare program. The health disparities in this population can be overcome by policy reform to introduce educational programs and increase spending to decrease the risk and onslaught of chronic diseases in Pennsylvania (Graling, 2006).

According to the National Rural Health Association (2007) the obstacles faced by health care providers and patients in rural areas are vastly different than those in urban areas. Rural Americans face a unique combination of factors that create disparities in health care not found in urban areas. Economic factors, cultural and social differences, educational shortcomings, lack of recognition by legislators and the sheer isolation of living in remote rural areas all conspire to impede rural Americans in their struggle to lead a normal, healthy life (Holman, Lorig, Chodosh, & Morton, 2006).

Rural Healthy People 2010 — "*Healthy People 2010: A Companion Document for Rural Areas*," – is a project funded by the CDC with grant support from the federal Office of Rural Health Policy. Some of the factors and their effects that are present in the report pertaining to rural America are listed below:

- Only about ten percent of physicians practice in rural America despite the fact that nearly one-fourth of the population lives in these areas.
- Rural residents are less likely to have employer-provided health care coverage or prescription drug coverage, and the rural poor are less likely to be covered by Medicaid benefits than their urban counterparts.
- Although only one-third of all motor vehicle accidents occur in rural areas, two-thirds of the deaths attributed to these accidents occur on rural roads.
- Rural residents are nearly twice as likely to die from unintentional injuries other than motor vehicle accidents as are urban residents. Rural residents are also at a significantly higher risk of death by gunshot than urban residents.
- Rural residents tend to be poorer. On the average, per capita income is \$7,417 lower than in urban areas, and rural Americans are more likely to live below the poverty level. The disparity in incomes is even greater for

minorities living in rural areas. Nearly 24% of rural children live in poverty.

- People who live in rural America rely more heavily on the federal Food Stamp Program, according to The Carsey Institute at the University of New Hampshire. The Institute's analysis found that while 22 percent of Americans lived in rural areas in 2001, a full 31 percent of the nation's food stamp beneficiaries lived there. In all, 4.6 million rural residents received food stamp benefits in 2001, the analysis found.
- There are 2,157 Health Professional Shortage Areas (HPSA's) in rural and frontier areas of all states and US territories compared to 910 in urban areas.
- Abuse of alcohol and use of smokeless tobacco is a significant problem among rural youth. The rate of DUI arrests is significantly greater in non-urban counties. Forty percent of rural 12th graders reported using alcohol while driving compared to 25% of their urban counterparts. Rural eighth graders are twice as likely to smoke cigarettes (26.1% versus 12.7% in large metro areas.)
- Anywhere from 57 to 90 percent of first responders in rural areas are volunteers.

- There are 60 dentists per 100,000 population in urban areas versus 40 per 100,000 in rural areas.
- Cerebrovascular disease was reportedly 1.45 higher in non-Metropolitan Statistical Areas (MSAs) than in MSAs.
- Hypertension was also higher in rural than urban areas (101.3 per 1,000 individuals in MSAs and 128.8 per 1,000 individuals in non-MSAs.)
- Twenty percent of non-metropolitan counties lack mental health services versus five percent of metropolitan counties. In 1999, 87 percent of the 1,669 Mental Health Professional Shortage Areas in the United States were in non-metropolitan counties and home to over 30 million people.
- The suicide rate among rural men is significantly higher than in urban areas, particularly among adult men and children. The suicide rate among rural women is escalating rapidly and is approaching that of men.
- Medicare payments to rural hospitals and physicians are dramatically less than those to their urban counterparts for equivalent services. This correlates closely with the fact that more than 470 rural hospitals have closed in the past 25 years.

- Medicare patients with acute myocardial infarction (AMI) who were treated in rural hospitals were less likely than those treated in urban hospitals to receive recommended treatments and had significantly higher adjusted 30-day post AMI death rates from all causes than those in urban hospitals.
- Rural residents have greater transportation difficulties reaching health care providers, often travelling great distances to reach a doctor or hospital.
- Death and serious injury accidents account for 60 percent of total rural accidents versus only 48 percent of urban. One reason for this increased rate of morbidity and mortality is that in rural areas, prolonged delays can occur between a crash, the call for EMS, and the arrival of an EMS provider. Many of these delays are related to increased travel distances in rural areas and personnel distribution across the response area. A national average response time from motor vehicle accident to EMS arrival in rural areas was 18 minutes, or eight minutes greater than in urban areas.

The Rural Healthy People 2010 — "*Healthy People 2010: A Companion Document for Rural Areas*", report also outlines factors not clearly known concerning rural areas. These top rural health concerns outlined by this report conducted by the CDC includes:

- lack of access to health care, including access to emergency medical services, health workforce, general health services, health insurance, mental care, oral care, and access to primary care
- lack of educational and community-based programs
- increased onset of diabetes and risk factors of diabetes
- poor nutrition and overweight
- increased tobacco use
- increased risk factors for heart disease, stroke, cancer

This study of the BRFSS data is needed because it is not known of the differences among rural and urban areas in Pennsylvania in respect to health access and utilization, health behaviors, chronic diseases, and other health issues. The 2005 BRFSS data set was the first time that health questions in the survey were collected by geographic location. The analysis of this data would identify emerging health risks in rural and urban residents of Pennsylvania and assist in the identification of forecasting future health concerns for the Commonwealth.

With the 2008 presidential election on the horizon, it is important to research health data that affects people in rural and urban Pennsylvania and determine areas in need of assistance that could be improved through federal or state policies and regulations. The BRFSS data in Pennsylvania is used to support policy recommendations and aid in the creation of new health regulations for the state. In the past, the BRFSS data to support these policies and recommendations was of Pennsylvania as a whole state not in reference to the unique geographic makeup of the state. Pennsylvania consists of a few

metropolitan cities (such as Pittsburgh and Philadelphia) and a large rural geographical area. For the first time, the 2005 BRFSS data is reported in reference to rural and urban areas and the analysis of this data is needed to determine any statistical differences. The analysis of this data would have potential impact on to health policies and recommendations for rural and urban areas of Pennsylvania.

It is important to analyze the health behaviors of rural and urban areas of Pennsylvania because it has not yet ever been performed with the BRFSS data and the information does provide solid reasons for the implementation of effective preventive health education for Pennsylvanians based on educational theories proven effective to improve healthy behaviors. While several reports have been conducted on the health of the nation to document the major health care issues facing the United States, what are the major health care issues for Pennsylvania? For example, it is estimated that over 46 million Americans are currently uninsured and 64.5% of American adults are overweight (NOE, 2007). The study analysis of the 2005 BRFSS data documented the major health care issues of rural and urban areas of Pennsylvania.

Another reason why this study is needed is that while health education programs for patients with chronic diseases have been in existence, there is not a wealth of resources or research in relation to the application of learning theories in health education. This study is needed to review and suggest effective instructional theories to conduct health education programs. Effective health education programs are needed because they have the ability to change bad health behaviors in people. The improvement of health behaviors leads to better health and better quality of life.

The study of the 2005 BRFSS data would benefit health care providers and patients, health education instructors and students, and policymakers for Pennsylvania. The rural and urban areas of Pennsylvania would have the specific attention paid to their indicators of health behaviors and permit determination factors to be established concerning their state of health. This information is beneficial to these stakeholders and is beneficial for future BRFSS data collections pertaining to rural and urban areas of Pennsylvania.

This thesis examined the data from the BRFSS to identify if there is in fact a statistically significance difference among health access and utilization, health behaviors, chronic diseases, and other health issues for rural and urban residents of Pennsylvania. Then the study researched theories to reduce health risk behaviors, increase preventive health behaviors and demonstrate how these are related to chronic diseases and access to healthcare in rural and urban areas in Pennsylvania.

### Purpose of the Study

In this study, it is proposed to analyze data from the BRFSS to examine the health access and utilization, health behaviors, chronic diseases, and other health issues for rural and urban residents of Pennsylvania. The analysis of this data is to identify emerging health conditions for rural and urban residents of Pennsylvania and assist in the identification of forecasting future health concerns for the Commonwealth. The study of the BRFSS data can assist medical providers and health plans to better understand the health demographics and behaviors of the people that they serve. Specifically, the health risk and preventive behaviors for rural and urban areas in Pennsylvania would be

compared to determine any statistical significance. Also, chronic diseases and other health issues for rural and urban residents of Pennsylvania. Finally, the study explored how urban and rural areas of Pennsylvania implement health education to increase preventive health behaviors.

The outcome of this study sought to improve the health and well being of all Pennsylvanians by monitoring behavioral risk factors and chronic diseases through the collection, interpretation, and dissemination of BRFSS surveillance data, educating the public and health professionals, collaborating with communities and other partners in the planning, implementation and evaluation of evidence-based strategies and interventions, and advocating for the prevention and control of chronic diseases and promoting healthy lifestyles.

#### Research Questions

The study is designed to explore whether or not rural or urban location of people in Pennsylvania improves health access and utilization, health behaviors, chronic diseases, and other health issues for rural and urban residents of Pennsylvania.

The research questions asked in the study are:

1. How do urban and rural areas of Pennsylvania compare with health access and utilization?
2. How do urban and rural areas of Pennsylvania compare with health risk factors?
3. How do urban and rural areas of Pennsylvania compare with preventive health behaviors?

4. How do urban and rural areas of Pennsylvania compare with chronic disease conditions?
5. How do urban and rural areas of Pennsylvania compare with selected public health issues?
6. What are the educational implications of implementation of effective preventive health education for urban and rural areas of Pennsylvania?

#### Definition of Terms

BRFSS: Behavioral Risk Factor Surveillance System. A Centers for Disease Control and Prevention (CDC) coordinated, State-based, continuously conducted, telephone-administered health survey that monitors risk behaviors related to chronic diseases, injuries, and death. Questions focus on health behaviors related to several leading causes of death and disease, for example: using condoms to prevent the spread of AIDS, taking medication for high blood pressure, smoking or using tobacco, getting a mammogram, and not exercising on a regular basis (National Institute for Occupational Safety and Health, 2006).

Chronic Disease: A disease with one or more of the following characteristics: permanence, leaves residual disability, caused by non-reversible pathological alteration, requires special training of the patient for rehabilitation, or may require a long period of supervision, observation, or care (Connecticut Department of Public Health, 2006). In medicine, a persistent and lasting condition is said to be chronic (from Greek *chronos*). A disease or illness that is

associated with lifestyle or environment factors as opposed to infectious diseases. It is a disease that lasts a long time; often has many causes and a disease that can be controlled, but not cured.

**Health Risk Behavior:** An action that can cause or worsen a chronic disease risk. Such as smoking, drinking, inactivity, and poor dietary habits (Centers for Disease Control and Prevention, 2006).

**Preventive Behavior:** An action that helps prevents illness and promotes health. Such as a healthy diet and exercise (Centers for Disease Control and Prevention, 2006)..

**Pennsylvania Rural Area:** The Center for Rural Pennsylvania's (2006) county level definition of rural, which is based on population density from the 2000 United States Census Bureau. The following counties in Pennsylvania are identified as rural in this study: Crawford, Mercer, Lawrence, Washington, Greene, Warren, Venango, Butler, Fayette, Forest, Clarion, Armstrong, McKean, Elk, Jefferson, Indiana, Somerset, Cambria, Clearfield, Cameron, Potter, Tioga, Bradford, Susquehanna, Wayne, Clinton, Centre, Blair, Bedford, Fulton, Franklin, Adams, Huntingdon, Mifflin, Juniata, Perry, Snyder, Union, Northumberland, Montour, Columbia, Lycoming, Sullivan, Wyoming, Monroe, Carbon, Pike, and Schuylkill.

**Pennsylvania Urban Area:** The Center for Rural Pennsylvania's (2006) county level

definition of urban, which is based on population density from the 2000 United States Census Bureau. The following counties in Pennsylvania are identified as urban in this study: Erie, Beaver, Allegheny, Westmoreland, Luzerne, Lackawanna, Cumberland, Dauphin, Lebanon, York, Lancaster, Berks, Chester, Lehigh, Northampton, Montgomery, Delaware, Philadelphia, and Bucks.

Selected Public Health Issues: Society's interest about conditions (immunizations, injury prevention, oral health, HIV/AIDS) that affect the overall health of the nation (Centers for Disease Control and Prevention, 2006).

### Significance of the Study

The study examined data from the BRFSS to analyze the presence of preventive health behaviors, risk behaviors, and chronic diseases for rural and urban residents in Pennsylvania. The results of this study found any connections among the research questions that are in the BRFSS survey. The answers to these questions are applicable for the medical community and citizens of Pennsylvania to realize and identify health factors in the state.

The study's findings are a valuable contribution to the education and medical fields' body of literature and practice. The results of the BRFSS survey questions that are analyzed in the study have implications for the practice of health education in Pennsylvania. While several health education programs are beginning to be executed in the state, (these health education programs are described below), they can be refined according to researched educational theories on effective behavioral modification for

maximum usefulness. The outcomes of this research also outline areas of future research and areas of health concern for the commonwealth.

Additionally, this information on health factors would forecast predictions concerning health behavior and diseases so action by stakeholders in the medical community can take place to better the health of Pennsylvania residents. The stakeholders in the community with the means to implement statewide health education programs must be educated and made aware of the current state of health in Pennsylvania so those stakeholders can make educated decisions to implement the educational initiatives that this study strives for. This population of stakeholders in Pennsylvania includes health insurance programs, state law makers that have influence and voting abilities to implement new health programs, and employers that can implement member services offered by health insurance companies. Some examples of member services include Blue Cross/Blue Shield's Silver Sneakers program, Dr. Dean Ornish Program for Reversing Heart Disease, Walk for a Healthy Community, HOPE program, and the annual Fun, Fit and Fabulous health conference for women of color (Highmark, 2006).

Through the Silver Sneakers program, Highmark direct-pay senior products members receive a basic fitness center membership at no additional charge beyond their monthly premium. They can take advantage of specialized low-impact classes that focus on improving and increasing strength, endurance and mobility (Highmark, 2006).

The Dr. Dean Ornish Program for Reversing Heart Disease is a treatment option that focuses on a low-fat, whole foods nutrition plan, moderate exercise, stress management and group support. The Walk for a Healthy Community presented and underwritten by Highmark, encourage physical fitness and help participating

organizations raise money for their individual missions like Relay for Life or Breast Cancer Research (Highmark, 2006). A new program is HOPE, the Highmark Osteoporosis Prevention and Education Program, is an online learning experience to learn more about osteoporosis and how to prevent it. Finally, the annual Fun, Fit and Fabulous health conference for women of color helps empower them to make healthy lifestyle choices (Highmark, 2006).

The past few years (2004-2006) have introduced several new health education programs into Pennsylvania that focus on preventive health behaviors. However, the majority of these programs focus on certain populations, (such as the elderly or women of color), and are not offered by all companies that have health insurance for their employees. Such as the Dr. Dean Ornish Program for Reversing Heart Disease is only offered in ten hospitals, mostly in Western Pennsylvania around Pittsburgh (Highmark, 2006). Also more programs must be aimed at the population of Pennsylvanians in rural and urban areas with the most health disparities. This population may not have access to health insurance and cannot participate in these programs. There is a definite sign that health organizations are realizing that preventive health education is important as the health programs are becoming available. However, these health programs need to focus more on the populations of Pennsylvanians with the most health disparities, be available to more people, and incorporate educational strategies for effective instruction to adults.

The research in this study is very significant and timely to address current health issues in Pennsylvania. The Commonwealth has several unique situations like there are a number of counties that do not have a hospital or a physician specialist in areas like gynecology and nose/ear/throat specialists (Center for Rural Pennsylvania, 2006). These

unique situations are brought out in this study to closely analyze the needs of the people in rural and urban areas in the state. Also this study did not only give reason as to why health education programs would be implemented but also suggest educational strategies that have shown in other health programs to be effective in changing a person's health behaviors.

#### Limitations of the Study

The study is limited by the data from the BRFSS collected by the Pennsylvania Department of Health. The BRFSS study is a telephone interview to randomly chosen land line telephones and private residence telephone numbers in Pennsylvania by employees of the Pennsylvania Department of Health.

The BRFSS is a Centers for Disease Control and Prevention (CDC) coordinated, State-based, continuously conducted, telephone-administered health survey that monitors risk behaviors related to chronic diseases, injuries, and death. The questions focus on health behaviors related to several leading causes of death and disease, for example: using condoms to prevent the spread of AIDS, taking medication for high blood pressure, smoking or using tobacco, getting a mammogram, and not exercising on a regular basis (Centers for Disease Control and Prevention, 2006).

The survey limitation of the BRFSS is that it relies on information reported directly by the respondent who must be over 18 and is a non-institutionalized civilian. As such, this self-reported data may be subject to a number of sources of possible error. How questions are worded can elicit responses in a certain way and can result in what is called measurement error. Similarly, the ability of individuals to accurately recall details is subject to response error.

Because the questionnaire is asked in English and Spanish in Pennsylvania, adults who are not able to be interviewed in English or Spanish are not included in the sample. Also, individuals without telephones are not contacted, so some populations including the homeless and persons with disabilities that use TDD communication systems are excluded from the survey. As a result, BRFSS findings can only be generalized to English-speaking and Spanish-speaking adults living in households with telephones. Also, indicators of SES and acculturation available in the BRFSS are limited and lack specificity.

Another limitation of the study is that there is a lack of research conducted on preventive health education. Health education in rural and urban areas is a relatively new measure that has developed in Pennsylvania. In fact, the BRFSS only began to collect health data pertaining to rural and urban residents in 2005 (CDC, 2005).

Health education is an emerging trend that is addressing more risk health behaviors. However, research on the effectiveness of these health education programs in Pennsylvania is scarce. Research on health programs outside of Pennsylvania is discussed to address this limitation in the literature.

### Summary

This study of the BRFSS data as it relates to residents of Pennsylvania researched to find any statistical significant data of preventive health and risk behaviors among rural and urban people. The study also researched the onset of chronic diseases and access to healthcare among rural and urban areas in Pennsylvania. This study is significant to document the health behaviors and policies in the research questions asked and examine

how chronic diseases are interrelated with health behaviors. This information seeks to educate public and health professionals and advocate for the prevention of chronic diseases and promoting healthy lifestyles.

The next chapter examined theories of continuing medical education for patients concerning their chronic disease and statistics concerning preventive and risk health behaviors, health trends and chronic diseases in the commonwealth. A literature review of these concepts built a conceptual framework for a better understanding of each of the main components of the study.

## CHAPTER TWO

### LITERATURE REVIEW

#### Introduction

The study of the BRFSS data sought to identify if there is a relationship among preventive and risk health behaviors, onset of chronic diseases, and access to healthcare among rural and urban areas in Pennsylvania. Health behaviors of an individual with a chronic disease can greatly influence the possibility of complications and the quality of life experienced by the person. For example, the risk of complications of diabetes can be reduced by proper adherence; patient non-adherence to treatment recommendations is often frustrating for diabetes health care professionals because the complications of diabetes can be very severe (Delamater, 2006; Malone, Shilliday, Ives, & Pignone, 2007). Health professionals understand the scope of the problem with chronic diseases and health behaviors of the individual. Many chronic diseases are challenging to manage successfully and this investigation into the trends of American health and seeking to understand the meaning of behavior and what cognitively causes a person to behave in a certain way provided meaningful and significant information for the medical community (Ahmed & Villagra, 2006; Giuntoli, 2005).

This literature review researched similar studies and their outcomes then analyzed research theories that patient education has the potential to reduce health risk behaviors, increase preventive health behaviors and demonstrate how these are related to chronic diseases and access to healthcare in rural and urban areas in Pennsylvania.

## Access to Healthcare

People use health care services for many reasons: to cure illnesses and health conditions, to mend breaks and tears, to prevent or delay future health care problems, to reduce pain and increase quality of life, and sometimes merely to obtain information about their health status and prognosis. Health care utilization can be appropriate or inappropriate, of high or low quality, expensive or inexpensive (Bernstein, Hing, Moss, Allen, Siller, & Tiggle, 2003).

Health care utilization also has evolved as the population's need for care has changed over time (Anonymous, 2005). Aging, socio-demographic population shifts, and changes in the prevalence and incidence of different diseases are factors that influence the use of health care. As the prevalence of chronic conditions increases, for example, residential and community-based health-related services have emerged that are designed to minimize loss of function and to keep people out of institutional settings.

According to Obesity, Fitness & Wellness Week (2007) multiple forces determine how much health care people use, the types of health care they use, and the timing of that care. Some forces encourage more utilization; others deter it. The factors below are reasons that may decrease and increase health services utilization.

### *Factors that may Decrease Health Services Utilization*

The following factors were compiled from the latest comprehensive Centers for Disease Control and Prevention's 2003 report on health care in America. The report indicated that hospital closures and large numbers of physicians retiring lead to decreased supply of health services for people. Also public health and sanitation advances like

quality standards for food and water distribution have lead to less people needing medical attention.

Health education like smoking cessation programs and organized weight loss classes have lead to a better understanding of the risk factors of chronic diseases as more people participate in prevention initiatives (Morchon, Masuet, & Ramon, 2007). However, how to design and implement a health education program is varied and unclear on the best approaches. The medical science community has also been discovering and implementing treatments that prevent or eliminate these chronic diseases.

A change in medical practices has also been occurring as technology increases such as ambulatory surgery or alternative sites of care become available like assisted living. The encouragement of self-care and healthy lifestyles reduce the length of hospital stays and enact alternative choices like home birthing and alternative medicine.

Technology is playing a role in self-care with the availability of internet health information. A study at Massey University found that greater understanding of health issues and changes to personal health management has been reported as a consequence of internet use. However, there are significant disparities in the access and use of Internet health information linked to income, education and ethnicity (Gilmour, 2007). These disparities are common to results found by researchers analyzing health care access and utilization among rural and urban citizens.

#### *Factors that may Increase Health Services Utilization*

The following factors were compiled from the Centers for Disease Control and Prevention's 2003 report on health care in America. A growing population creates an

increased need for medical services like ambulatory surgery centers and assisted living residences. The current population in America has a growing elderly community. The elderly have more functional limitations associated with again, more illness associated with again, and more deaths among increased number of elderly; which the Centers for Disease Control and Prevention (2003) have found that this correlates with high medical services utilization.

Advances in technology have produced new procedures and technologies like hip replacements and stent insertion. New technologies have also developed more effective drugs and expanded use of existing drugs with increased health insurance coverage. The increase in health insurance coverage has lead to changes in medical practice patterns like more aggressive treatment of the elderly. Also, consumer preferences and demand have changed the use of medical services as more people request cosmetic surgery and the direct marketing of drugs to consumers.

Another reason for the increase in health services is due to the new government polices and increased funding for anti-terrorism after the terrorist attacks on America on September 11, 2001. New government organizations and policies have been formed since this day to enact education, training, and prevention of a terrorist attack in America. The medical community has been focusing on educating health professionals, first responders, and the public on bioterrorism. This is because bioterrorism is a realistic threat that is relatively easy to enact and has the potential to harm many people.

The CDC's 2003 report on health care in America articulates in the research that health education programs lead to a better understanding of the risk factors of chronic diseases as more people participate in prevention initiatives (Morchon, Masuet, &

Ramon, 2007). However, the report acknowledges that the medical education programs are lacking clear educational theories to guide the process of behavior modification. This study of rural and urban areas in Pennsylvania addressed best practices for implementing health education for positive behavior modification change.

Technology and new medical procedures are additional factors that affect the use of health services. As the scientific community develops new medical procedures they can assist more of the population with physical ailments and chronic diseases. However, technology for patients is lacking, especially in terms of computers and internet availability to learn about their diseases and prevention techniques. In this study of rural and urban areas in Pennsylvania, community-based programs are analyzed for what programs are available for residents.

#### *Major Policy Initiatives Affecting Health Care Utilization*

In the United States, there are at least three major payers for health care: governments (Federal, State, and local); employers, (by employer-based health insurance plans); and health care consumers themselves, (via out-of-pocket payments). Commonly, services that are covered by insurance or payment programs are more likely to be utilized than services that must be paid for directly by consumers (Bernstein et. al., 2003). So, the benefit and payment structure of Medicare and Medicaid programs, private insurers, and managed care plans tend to strongly influence utilization patterns in healthcare.

Major Medicare and Medicaid cost-containment efforts have created incentives to shift sites of services provided (Banthin & Miller, 2006). Use of the hospice and ambulatory surgery benefits, as well as the supply of these providers, increased

substantially after the Medicare program began to cover these services (Bernstein et. al., 2003). The changes implemented in the payment policy also created incentives to provide services differently. For example, the increase in a captivated payment and the need to use gatekeepers has been associated with a changing mix of primary and specialty care (Bernstein et. al., 2003). The expansion of the Medicaid program and implementation of state wide insurance programs like Pennsylvania's CHIP share the goal of increasing utilization of services by poor children and their families.

Employer-based health insurance plans work with managed care companies to determine benefit packages offered to employees. These plans pay on per-person rather than a per-service basis, managed care organizations do not set payment rates for individual services; they have some freedom to substitute services across sites and to be somewhat flexible in the range of services they provide (Elliott, 2005). These types of insurance plans that mix health services affect the availability and utilization of healthcare for people enrolled in the program (Butler, 2007).

The major policy initiatives affecting health care use in terms of types of insurance and programs available in the United States are known but not the types available in Pennsylvania. It is not known of the health care access programs and insurances used in rural and urban areas of Pennsylvania. However, it is addressed in the analysis of the BRFSS data.

### Use of Health Services

Health care utilization rates are important indicators of what general types of care specific populations seek, and they also indicate how services may be shifting from one

site to another (Bernstein et. al., 2003). According to the CDC's 2005 Trends in Health Care report, visits to physicians' offices rates per 1,000 populations were relatively stable since 1990. The number of visits to emergency rooms has not increased significantly since 1992. However, the overall rates of visits per 1,000 persons to hospital outpatient departments increased by 29 percent, from 1992-93 through 2000. In part, this reflects hospitals' greater emphasis on expanding their outpatient services.

Declining hospital use and length of stay has been attributed to cost containment measures instituted by Medicare and Medicaid programs, other payers, and employers, as well as to scientific and technological advances that allowed a shift in services from hospitals to ambulatory outpatient settings, the community, home, and nursing homes (Bernstein et. al., 2003). Because certain care currently can be provided only in inpatient settings, hospitalization rates cannot decrease indefinitely.

#### *Healthcare Access in Rural and Urban Pennsylvania*

The health care system is important to the overall economic growth and community development of Pennsylvania. An integral part of this system is availability of health care professionals and the affordability of services. In the most recent study on this, the Center for Rural Pennsylvania in 2003 analyzed data on health care providers and health insurance participation rates to determine the number of health care professionals throughout the state and to understand the use of health insurance throughout the commonwealth.

The Center for Rural Pennsylvania (2003) found that of the 41,500 physicians, 10 percent practiced in rural counties serving 21 percent of the state's total population. The

remaining 90 percent of physicians serve 79 percent of the population living in urban counties. To breakdown those numbers per capita means that there are 162 doctors for every 100,000 rural residents in Pennsylvania (and 15 doctors for every 100 square miles in rural areas). In urban areas this per capita rate is doubled with 385 doctors for every 100,000 urban residents in Pennsylvania (226 doctors for every 100 square miles).

This disparaging number of physicians in rural areas of Pennsylvania is worth noting. In fact there are 42 rural counties in Pennsylvania that share 4,194 physicians for an average of 100 per county. In rural Pennsylvania there are four counties that have less than 10 physicians in the entire county and 10 other counties that have less than 50 physicians. In contrast, there is only one urban county that has less than 100 physicians the remaining urban counties have over 100 physicians.

Another significant factor for rural residents beside less access to physicians is the distance one must travel to visit a physician. According to the Center for Rural Pennsylvania (2003) rural Pennsylvania accounts for 10 percent of the physicians but 63 percent of the land area in the state. That means there are 148 rural physicians for every 1,000 square miles. The polar opposites of this are represented by the two physicians available in rural Forest County versus the 774 physicians available in urban Lebanon County. The rural resident in Pennsylvania must travel to visit a physician no matter inclement weather conditions or poor health conditions and often rural areas do not have public transportation available.

The examination of the Center for Rural Pennsylvania (2003) data on the type of physicians available in rural and urban areas reveals interesting statistics. Nearly half (1,974) of all rural physicians are primary care physicians this is at a per capita rate of 51

primary care physicians per 100,000 rural residents. (There is a per capita rate of 153 primary care physicians per every 100,000 urban residents.)

The number of obstetricians/gynecologists in rural Pennsylvania is scarce. Ten percent of obstetricians/gynecologists practice in rural areas with a per capita rate of 21 obstetricians/gynecologists per 100,000 women in rural areas compared with 47 in urban counties. There are seven rural counties that have fewer than eight obstetricians/gynecologists per 1,000 square miles compared with 110 in urban areas. Woman in rural areas of Pennsylvania do not have the same access to female medical care like preventive care screenings and childbirth services as women in urban areas have available.

The number of pediatricians in rural Pennsylvania is even scarcer. The per capita rate in rural areas is 32 per 100,000 children and in urban areas it is doubled at 94 pediatricians per 100,000 children. There are seven rural counties that do not have any pediatricians and 22 other rural counties have fewer than five pediatricians. There are seven pediatricians per 1,000 miles in rural areas and 132 pediatricians per 1,000 miles in urban areas. A mere 8 percent of Pennsylvania's pediatricians operate in rural areas. This is the lowest percentage of any medical professional in the Center for Rural Pennsylvania (2003) analysis.

Other medical professionals such as nurse practitioners, physician assistants, and dentists are also critical parts of health care access in rural Pennsylvania. There are 510 nurse practitioners and 488 physician assistants in rural areas for an average of 12 of each per county. Ten rural counties have fewer than five nurse practitioners and three counties

have none. Eleven rural counties have less than five physician assistants and three counties have none.

Dentists are primarily concentrated in urban areas in Pennsylvania. Rural areas have about 14 percent of the state's dentists (1,154 dentists) to serve more than 20 percent of the population.

In Pennsylvania there are six rural counties that do not have a hospital and approximately 10 percent of Pennsylvanians do not have health insurance coverage in recent years. In 2000, of the people that did have health insurance coverage, 72 percent had employment-based health coverage, 14 percent had Medicare coverage, and 9 percent have Medicaid.

Although access to health care services in Pennsylvania's rural counties continues to lag behind urban areas, there have been efforts to insure the commonwealth's children have health care coverage through a program called CHIP (the Children's Health Insurance Program). According to the Census Bureau's Current Population Survey (1999 to 2001 based on a three-year annual average), about 33 percent of Pennsylvania's children live at or below 200 percent of poverty and of those, 4.3 percent have no health insurance. Before the CHIP program 6.3 percent of children in this category did not have health insurance coverage.

Health care access and affordability remain priority issues, especially for rural Pennsylvania. Rural healthcare needs to receive more attention from state and federal governments to enact more programs like CHIP that have a significant impact on to the rural population of the commonwealth. A study of health trends of rural and urban areas in Pennsylvania is needed to fully understand the health conditions of the state.

According to the Center for Rural Pennsylvania (2003) data, Pennsylvania rural areas are behind urban areas when it comes to health care access and use. Rural areas also have less access to medical professionals, services, and centers such as hospitals than persons in urban areas of Pennsylvania. In this study, the BRFSS data is analyzed to answer questions regarding comparison between rural and urban areas of Pennsylvania.

### Health Trends

Monitoring the health of the American people is an essential step in making effective health policy and setting priorities for research and programs. The measurement of the population's health provides essential information for assessing how the Nation's resources would be directed to improve the health of the population (National Center for Health Statistics, 2005). Examination of emerging trends identifies diseases, conditions, and risk factors that warrant study and intervention.

The latest health study conducted by the National Center for Health Statistics (2005) presents trends and current information on measures and determinants of the Nation's health. Health trends in the nation have shown improvements in several categories and outlined a need for attention to health issues in other circumstances. The information presented in this section is from the most recent report on the trends of the nation's health as reported by the 2005 National Center for Health Statistics (NCHS), Centers for Disease Control and Prevention (CDC). The National Committee on Vital and Health Statistics served in a review capacity. This report is the most recent and encompassing trends analysis available on the healthcare and health behaviors in America.

The categories that were reported on are health insurance and expenditures, health risk factors, morbidity and limitation of activity, health care utilization, and mortality. Within each category several health questions are detailed for the Nation and the ones most appropriate when discussing the study of the BRFSS data for Pennsylvania are discussed below. These selected trends analysis can provide a landscaping analysis of America's status of health and better understanding of the association between health behaviors and chronic diseases.

Most diseases result from a complex interaction between inherited risk factors and environmental risk factors such as diet, lifestyle, and social factors. Adopting a healthy lifestyle, which includes being physically active, eating nutritiously, and avoiding tobacco, can prevent or help to control many diseases. Benefits of regular physical activity include a reduced risk of premature mortality and reduced risks of coronary heart disease, diabetes, colon cancer, hypertension, and osteoporosis (NCHS, 2005, p. 57).

The changes of health care policy in America can be associated with the trends of past years data that reflect and identify problem areas and highlight positive directions of improved health for Americans. Health policy not only influences treatments and availability of healthcare but also the amount of money dedicated by government health plans and influence of private care health insurance coverage plans.

### *Trends in Health Insurance and Expenditures*

#### *Trends in Health Insurance Coverage among Persons under 65 years of Age*

The NCHS 2005 report found that uninsured persons under 65 years of age are substantially less likely to have a usual source of health care or a recent health care visit

than their insured counterparts. People who have health insurance have more access to health care and others who have no health insurance are more likely to not request health services due to the cost of needed health care. In 2003, about 17 percent of people did not have health insurance coverage this number decreases as the population becomes older since as people become older than 65 they qualify for Medicaid health insurance coverage. The most likely group of people to not have health insurance coverage are people between the ages of 18-24 and 55-64, incomes below or near the poverty level, and Hispanic persons and non-Hispanic black persons.

The NCHS report speculates that the current increase of immigration of Hispanic people (mostly from Mexico) may further reduce the percent of the population with health insurance coverage through employment and increase the percent of people with no health insurance coverage. This immigration of Hispanic people includes legal and illegal residents of the United States.

The report also found that the most prevalent source, about 69–73 percent of the population, of health insurance coverage was from employer-based plans that sponsored group health insurance. These plans were less expensive and offered more services than found in private health insurance plans purchased from individuals. The report found that persons with private health care coverage have declined between 1984 and 1994. This is in line with a steady increase of uninsured people (since 1998 about 16-17 percent of people do not have health insurance coverage) and people with Medicaid coverage.

Another source of health insurance coverage that is used by the public is healthcare plans like Medicaid (the Federal health program for persons 65 years of age and over and the disabled) and Medicaid (the joint Federal and State program for the

disenfranchised) (Centers for Medicare and Medicaid Services, 2007). Approximately 9-12 percent of the nation is receiving Medicaid health insurance coverage. Another government plan is statewide initiatives like the Children's Health Insurance Program (CHIP). CHIP provides free or low cost health insurance coverage for low-income families (Managed Care Weekly Digest, 2007). CHIP is designed for families who earn too much money to qualify for Medicaid and cannot afford private insurance for their children. CHIP coverage provides eligible children with coverage for a full range of health services including regular checkups, immunizations, prescription drugs, lab tests, X-rays, and hospital visits.

#### *Trends in National Health Expenditures*

The United States spends more of its Gross Domestic Product (GPD) on health care, about 15 percent, more than any other developed country in the world (Office of Economic Cooperation and Development, 2005). The United States had a stable budget with spending on health care between 1992-2000 then it increased about 7.7 percent from 2000 to 2003 (NCHS, 2005). Then the spending rate on health care decreased after the war with Iraq began in March 2003 and funding was diverted for wartime efforts. However, the United States still spent more on health care than any other industrialized nation.

According to the NCHS 2005 report the United States spent \$1.7 trillion on health in 2003, which equates to an average of \$5,671 per person in the nation. About 86% of this was spent to treat or prevent chronic diseases. The remaining 14 percent was spent on administration, government public health activities, research, and construction (NCHS, 2005). The total health insurance expenditures for 2003 is broken down into 36 percent

paid by private health insurance plans, 33 percent paid by the Federal government, 11 percent paid by State and local governments, and 16 percent paid out-of-pocket by private citizens for their own health care. The expansion of government health plans like CHIP and Medicaid have caused out-of-pocket expensive for consumers of health care to decline.

### *Trends in Personal Healthcare Expenditures*

According to the NCHS 2005 report in 2003 the government was the primary source for the payment of personal health care expenditures. This includes hospital costs and nursing home care. About 35 percent of hospital costs were paid by Medicare and 17 percent by Medicaid. Half of nursing home care in 2003 was paid by Medicaid and a smaller portion of 12 percent was paid by Medicare primarily for short-term care (NCHS, 2005).

Prescription drugs and physician services were paid from health care consumers at 30 percent each. About 50 percent of prescription drugs and physician services were paid from private health insurance coverage plans. About twenty years earlier in 1980 health care consumers accounted for more than double of paying for prescription drugs at 69 percent. The expenditures for health care consumers for physician services declined to 10 percent in 2003, from 30 percent in 1980 (NCHS, 2005).

A staggering fact from the NCHS 2005 report is that in 2002, more than 40 percent of non-institutionalized adults 65 years of age and over with medical expenses spent at least \$1,000 dollars from their own pockets to pay for health care. With the inflation of health care costs, the growing population of people over 65, and since drug expenses are less likely to be covered by health insurance coverage plans the number of

people paying from their own pocket increased and the amount of money spent also increased.

According to the NCHS 2005 report, health insurance coverage is mostly provided by employer-based plans that sponsored group health insurance and there has been a steady increase of uninsured people since 1998. The trends in national and personal health expenditures is that the cost of healthcare is increasing and more individuals are seeking programs like Medicare and CHIP to meet the financial needs of their healthcare. It is not known of the health insurance coverage in comparison of rural and urban Pennsylvanians and is addressed in this study.

### *Trends in Health Risk Factors*

#### *Trends in Cigarette Smoking among Men and Women*

A major health initiative and campaign in the nation has been cigarette smoking cessation and prevention programs. Cigarette smoking has been researched to show an association with a significantly increased risk of chronic and life threatening diseases like heart disease, stroke, and cancer (American Cancer Society, 2007). The first Surgeon General's Report on smoking in 1964 signaled to the nation the dangers of smoking at a time when 50 percent of males and 33 percent of females were cigarette smoking on a regular basis. Since the first anti-smoking campaign began in 1965 there has been a steady drop in the rate of cigarette smoking and an increase of people who have never smoked. In 2003, 24 percent of men and 19 percent of women were cigarette smokers which are nearly half the number of people smoking than in 1964 when the first data was collected (NCHS, 2005). Also the NCHS 2005 reported the number of pregnant females

is declining, to 11 percent in 2003 with the highest ethnic group being American Indian or Alaska Native mothers at 20 percent of all cigarette smoking mothers.

### *Trends in Leisure-Time Physical Activity*

Physical activity is an important part of a person's life (American Cancer Society, 2007). A regular routine of physical activity can improve symptoms associated with depression, anxiety, and help with maintaining an ideal weight. Physical activity can also help prevent overweight and obesity which can decrease the risk of chronic diseases. The national recommendation for physical activity is for adults to engage in at least 30 minutes of moderate physical activity on most days of the week and more if the goal is to lose weight (American Cancer Society, 2007).

According to the NCHS report in 2003, 3 in 10 adults engaged in regular leisure-time activity and 4 in 10 adults were inactive in their leisure time. Men were more likely than women to engage in physical activity and people 18-24 and adults over 65 are the most likely to have an active lifestyle. The poverty line also distinguished that individuals with higher incomes are more likely to participate in regular leisure-time physical activity.

A question is raised that people may be obtaining physical activity that is associated with their job and not in their leisure time. Such as having a physically laborious job or walking to their job every day. However, the report found that only a small percentage (1 in 5 adults) met these criteria to be placed in a category that required physical activity in employment.

### *Trends in Overweight and Obesity by Age*

The risk of cardiac disease, diabetes, cancer, and other chronic diseases is increased with a higher percentage of persons who are overweight and obese. This condition is associated with increases in the risk of chronic diseases like high cholesterol, hypertension, and diabetes. There are several factors that contribute to a person who is overweight or obese, some of these are controllable by the individual and others are out of their control. The factors include diet, physical activity, genetic factors, environment, and health conditions of the individual (Fung, McCullough, Van Dam, & Hu, 2007). Public health policy has recognized the benefits of maintaining an ideal body weight and has implemented nationwide campaigns to help Americans get in good physical shape. VERB is an example of a program that targets people to get out and get active with their lifestyle. The U.S. Department of Health and Human Services Centers for Disease Control and Prevention (CDC) sponsors VERB which can be found online at <http://www.verbnow.com>.

National Health and Nutrition Examination Surveys (NHANES) data that started collecting data in early 1960s, shows substantial increases in overweight and obesity among adults in recent years. The latest national figures collected in 1999–2002 show that 65 percent of adults were overweight with 31 percent of adults being obese. The ethnic breakdown of persons overweight in 1999–2002, 14 percent of non-Hispanic white adolescents, 21 percent of non-Hispanic black adolescents, and 23 percent of Mexican-origin adolescents were overweight (NCHS, 2005).

The weight trends of American adults since 1960 have shown that today Americans are about an inch taller and 25 pounds heavier on average. The average

weight of a man in 1960 would be 166 pounds and today it is 191 pounds. The average weight of a woman in 1960 would be 140 pounds and today it is 164 pounds. The rise in obesity in America can be seen by the upward progress of these weight figures.

The trends of health risk factors are a growing epidemic. For example, even though the American Cancer Society (2007) states that cigarette smoking, obesity, and lack of exercise significantly increases the risk of chronic and life threatening diseases like heart disease, stroke, and cancer, there is a growing trend of people smoking, overweight, and not exercising at least to the daily recommended minimum. It is known according to the NCHS 2005 data that individuals with higher incomes are more likely to participate in regular leisure-time physical activity and less likely to be obese. However, it is not known of the comparison of cigarette smoking, weight, and amount of exercise in rural and urban areas of Pennsylvania.

### *Morbidity and Limitation of Activity*

#### *Trends in Selected Chronic Health Conditions Causing Limitation of Activity among Working-Age Adults by Age*

Chronic diseases are a concern for individuals because they can impose limitations on a person's ability to function in daily life (Falagas, Vardakas, & Vergidis, 2007). This includes functions such as taking care of themselves or others and the ability to work at a job. "In the National Health Interview Survey, limitation of activity in adults is defined as limitations in handling personal care needs (activities of daily living), routine needs (instrumental activities of daily living), having a job outside the home, walking, remembering, and other activities (NCHS, 2005, p. 45)" While limitations in

activities in an aging population may be more common, the onset of activity limitations in younger people has highlighted a trend of chronic diseases causing limitations.

Since 1997 the percent of adults reporting any activity limitation caused by a chronic health condition has been collected and remained stable until the most recent data collected in 2003. Adults 18-44 reported that 6 percent had activity limitation, adults 55-64 had 21 percent with an activity limitation and one-third of adults over 65 reported limitation of activity. The most common limitation reported was arthritis and other musculoskeletal conditions. The 2003 data showed that people 45-64 reported heart and other circulatory conditions were the second most common cause of activity limitation. Another common cause for activity limitations reported was diabetes. Adults 18-44 reported that mental illness was the second leading cause of activity limitation and fractures and joint injury were the third most common causes of activity limitation (NCHS, 2005).

#### *Trends in the Use of Mammography*

The second leading cause of cancer deaths for women in America is breast cancer (American Cancer Society, 2006). In 2002 approximately 204,000 women in the United States were diagnosed with breast cancer and nearly 42,000 women died from the disease (NCHS, 2005). The NCHS data shows that rates of newly diagnosed breast cancer, breast cancer survival rates, and death rates vary among race and ethnic groups.

Diagnosis of breast cancer and death rates from breast cancer are the highest for white and black women than Asian and Hispanic women. Death rates from breast cancer have been declining since the early 1990s but the percentage decrease in mortality has been substantially greater among white women than among black women (NCHS, 2005).

In a policy reform and a national effort to battle breast cancer, the U.S. Department of Health and Human Services released its updated recommendation from the U.S. Preventive Services Task Force (USPSTF) in 2002 that called for screening mammography, with or without clinical breast examination, every 1 to 2 years for women age 40 years and over (NCHS, 2005). In the years 1999 to 2003, 70 percent of women had a mammogram within the past 2 years. This is more than double the percent of women that had a mammogram in 1987 (NCHS, 2005).

In terms of ethnic divisions among women who have had a recent mammogram, in 2003 mammography rates for non-Hispanic white and black women (71 percent) were higher than rates for Asian and Hispanic women (58 and 65 percent) (NCHS, 2005). Also, economic divisions among women have an influence on who has had a recent mammogram. Women with lower incomes were less likely to have a recent mammogram than women with higher incomes. According to 2003 data 55 percent of women with lower incomes had a recent mammogram and 74 percent of woman with higher incomes had a recent mammogram.

Policy reform in women's health enforces that reducing death rates from breast cancer is contingent on increasing mammography screening rates to detect the disease at an early stage and providing access to follow-up treatment for women who are diagnosed with breast cancer (NCHS, 2005). Programs like National Breast and Cervical Cancer Early Detection Program (NBCCEDP), and the Breast Cancer Treatment and Prevention Act of 2000 focus on assisting low income, uninsured, and underserved women obtain access to both screening and follow-up care.

### *Trends in the Use of Pap Smear within the Past 3 Years for Women at least 18 Years of Age*

A Pap smear, also called a Pap test, is the collection of cells from the cervix for examination under a microscope (Department of Health and Human Services, 2007). It is used to detect changes that may be cancer or may lead to cancer, and can show non-cancerous conditions, such as infection or inflammation. The U.S. Preventive Services Task Force, the American Cancer Society, and the American College of Obstetricians and Gynecologists all recommend regular Pap smear screening for cervical cancer (NCHS, 2005).

In data collected from 1987 to 2003 the percent of women 18 years of age and over with a Pap smear within the past 3 years increased from 74 percent to 79 percent, with increases occurring among women of all race and ethnic groups (NCHS, 2005). An interesting finding in the NCHS 2005 data is that despite high Pap smear screening rates, black women had the highest death rates from cervical cancer in 1997–2001, 5.6 deaths per 100,000 women. The reasons for the higher death rates among black women despite their high screening rates are not fully understood. This higher mortality among black women may be in part due to diagnosis at more advanced cancer stages and lower socioeconomic status (NCHS, 2005). Programs like National Breast and Cervical Cancer Early Detection Program (NBCCEDP) focus on assisting low income, uninsured, and underserved women obtain access to both screening and follow-up care.

### *Trends in Visits to Physician Offices and Hospital Outpatient Departments*

In 2002–03 there were, on average, 1 billion visits per year to physician offices and hospital outpatient departments to receive preventive and screening services,

diagnosis and treatment of health conditions, medical counseling, and other types of ambulatory health care. These visits were twice as high for black people as for white people (NCHS, 2005).

Visit rates overall to physician offices and hospital outpatient departments have been on the increase since the mid-1990s. Between 1996–97 and 2002–03 the average number of ambulatory care visits for persons of all ages rose from 3.1 to 3.6 visits per person. This increase was driven by rising visit rates among men 65 years of age and over and women 45 years of age and over (NCHS, 2005).

The increasing prevalence of chronic diseases such as asthma, diabetes, and hypertension contribute to rising visit rates to physician offices and hospital outpatient departments. These diseases can be associated with poor health behaviors and causes an increased risk of a person having a chronic disease. People with chronic diseases are increasingly visiting physician offices and hospital outpatient departments to receive diagnostic testing and treatments for their disease (NCHS, 2005).

#### *Trends in Hospital Insertions of Coronary Artery Stents*

Heart disease is any of a number of chronic diseases related to the heart and blood vessels; also known as coronary artery disease. According to the American Heart Association (2007) when grouped together, these diseases are the leading cause of death in the United States. Advancements in medicine and technology have invented the coronary artery stent. It is a tiny, stainless steel coil or mesh tube that is inserted into the clogged artery to form a rigid support which holds the artery open. This stent is an innovation in technology that is saving and prolonging lives of Americans.

Among adults 45 years of age and over, there were more than half a million hospital discharges with at least one coronary stent insertion procedure performed in 2002–03 (NCHS, 2005). Between 1996–97 and 2002–03 the rate of coronary stent insertion procedure for adults age 45 years and over more than doubled from 22 to 49 per 10,000 population. Among adults age 75 years and over, the rate of hospitalizations that included this procedure more than tripled from 23 per 10,000 population in 1996–97 to 73 in 2002–03. For persons 45–64 years the rate of stent procedures per population stabilized after 1999 (NCHS, 2005).

The invention of the coronary artery stent has improved the survival rate for heart attack patients to about 70%. This advancement in technology demonstrates how science can combat chronic diseases like heart disease to prolong the life of sufferers (American Heart Association, 2007).

According to the NCHS 2005 report, chronic diseases are a concern for individuals because they can impose limitations on a person's ability to function in daily life and contribute to rising visit rates to physician offices and hospital outpatient departments. The most common limitation reported was arthritis and other musculoskeletal conditions. However, it is not known of the onset of chronic diseases such as arthritis in rural and urban Pennsylvania and is researched in the analysis of the BRFSS 2005 data.

The progress of technology has made prognosis advancements in health care including women health issues and heart health. However, these screening advancements, mammography, pap tests, and coronary artery stents are only effective if the patient receives them. The NCHS 2005 report states that lack of financial resources and access to

the procedures prevents patients from receiving the tests. The NCHS 2005 report does not state the financial resources and access for Pennsylvania and this study researched it for rural and urban areas.

### *Mortality*

#### *Trends in Life Expectancy at Birth and at 65 Years of Age by Sex*

Life expectancy is a measure that is often used in research and policy to gauge the overall health of a population. Life expectancy is the number of years that a person could expect to live on average, based on the mortality rates of the population in a given year. Life expectancy can change over the lifecycle. For example, at birth a person may be expected to live for 75 years, but if they survive to 75 they may be expected to live for another 10 years (Population and Sustainable Development, 2003). In America this is an indicator that can describe trends in mortality.

The life expectancy of a person in America in 1900 was 48 years for men and 51 years for women and it has increased to the latest figures in 2002 for a life expectancy of 75 years for men and 80 years for women. The steps taken in prevention and control of infectious and chronic diseases through patient education and advancements in technology have had a major impact on increasing life expectancy in America. 1950 was a turning point for healthcare in America as advancements in vaccinations and medicine improved access to health care and resulted in decreased death rates among older Americans (NCHS, 2005).

The gain in years of life expectancy for women has exceeded that for men until the 1970s, widening the gap in life expectancy between men and women. (This gap narrowed in 1970 due to greater decreases of heart disease, cancer, and chronic lower

respiratory disease in men.) The increasing gap during those years, according to the NCHS 2005 study, is attributed to increases in male mortality due to ischemic heart disease and lung cancer, both of which rose largely as the result of men's early and widespread adoption of cigarette smoking.

#### *Trends in Death Rates for Leading Causes of Death for all Ages*

According to the NCHS 2005 study in 2002 there was 2.4 million deaths reported in America. The death rate in America is steadily declining, down 42 percent from 1950. Advancements in technology and implementation of patient education for healthy behaviors have declined the risk of death associated with leading killers such as heart disease, stroke and other chronic diseases. Heart disease was the leading cause of death in 1950, today deaths from heart disease have declined 59 percent and deaths from stroke are down 69 percent (NCHS, 2005). Heart disease and stroke mortality are associated with risk factors such as high blood cholesterol, high blood pressure, smoking, and dietary factors. Many of these factors are behaviors that can be controlled by the patient, themselves increasing the need for additional policy reform to promote additional patient education to improve health behaviors and prevent chronic diseases.

Some factors that have contributed to the decline of heart disease and stroke in American is a better control of risk factors, improved access to early detection, and better treatment and care, including new drugs and expanded uses for existing drugs (NCHS, 2005). Other important factors like obesity and physical activity influence the risks of obtaining a chronic disease. The trend in the overall cancer death rate reflects the trend in the death rate for lung cancer. Another disease that is strongly associated with health behaviors is lung cancer and smoking (American Cancer Society, 2006).

*Trends in the Leading Causes of Death in Pennsylvania*

Finally, in this section reviewed the trends in Pennsylvania compared with the data presented of the United States on the leading causes of death in Pennsylvania which are chronic diseases. The most prevalent chronic diseases are heart disease, stroke, cancer, and diabetes (CDC, 2005). All of these are costly and preventable health problems. Seven of every ten Americans who die each year, or more than 1.7 million people, die of a chronic disease (CDC, 2005).

Chronic diseases are not prevented by vaccines, nor do they just disappear. To a large degree, the major chronic disease killers are an extension of what people do, or not do, as they go about the business of daily living. Health-damaging behaviors—in particular, tobacco use, lack of physical activity, and poor nutrition—are major contributors to heart disease and cancer, our nation's (United States) leading killers. However, tests are currently available that can detect breast cancer, colon cancer, heart disease, and other chronic diseases early, when they can be most effectively treated (CDC, 2005, p.2).

According to the CDC (2005) Heart disease and stroke are the first and third leading causes of death for both men and women in the United States. Heart disease is the leading cause of death in Pennsylvania, accounting for 38,291 deaths or approximately 30% of the state's deaths in 2002 (the most recent year for which data are available). Stroke is the third leading cause of death, accounting for 8,442 deaths or approximately 7% of the state's deaths in 2002.

Cancer is the second leading cause of death and is responsible for one of every four deaths in the United States (CDC, 2005). In 2004, over 560,000 Americans—or more than 1,500 people a day—die of cancer. Of these annual cancer deaths, 29,910 are expected in Pennsylvania. About 1.4 million new cases of cancer are diagnosed nationally in 2004 alone. This figure includes 72,590 new cases that are likely to be diagnosed in Pennsylvania.

According to the CDC (2005) study cardiovascular disease (CVD), including heart disease and stroke, is the leading cause of death in Pennsylvania, accounting for about 34% of all deaths in the state. From 1996 to 2001, the state's heart disease death rate was 567 per 100,000, which was higher than the national rate of 536 per 100,000. The stroke death rate, however, was lower than the national rate. From 1991 to 1998 the stroke rate in Pennsylvania was 116 per 100,000, compared with the national rate of 121 per 100,000. Risk factors for CVD include poor nutrition, physical inactivity, overweight and obesity, and high blood pressure.

Data from the BRFSS indicate that in 2003 only one quarter (24.7%) of adults in Pennsylvania reported consuming 5 or more servings of fruits and vegetables per day. In addition, 22.6% did not participate in any leisure time physical activity during the past month. As a result of these behaviors, approximately 60% of Pennsylvania adults were overweight (36.3%) or obese (23.8%). Over one quarter (26.5%) of adults in Pennsylvania reported having been told that they have high blood pressure. Diabetes also is a risk factor for CVD and is the sixth leading cause of death in Pennsylvania. CDC mortality data from 2001 indicate that the diabetes death rate in the state (25.7 per 100,000) was higher than the national diabetes death rate (25.2 per 100,000). In 2003,

8.0% of Pennsylvanians reported having been told by a doctor that they have diabetes, compared with the national rate of 7.1%.

African Americans, who comprise approximately 12% of the U.S. population—roughly 35 million people—experience disproportionate health disparities. They have higher stroke death rates than other groups as well as a higher prevalence of the risk factors for chronic diseases. They suffer higher death rates for cancer and heart disease as well. In addition, approximately 2.7 million African Americans in the United States have diabetes; however, one third of them do not know it. African American communities throughout the United States experience hardships due to these health disparities.

In Pennsylvania, African Americans constitute about 9% of the state's population. Heart disease is the leading cause of death among African Americans in the state. The heart disease death rate for African Americans in Pennsylvania is 298.5 per 100,000; the rate for their white counterparts is 255.1 per 100,000. According to 2003 BRFSS data, African Americans also had higher prevalence rates for high blood pressure than whites or Hispanics in the state (33.1% of African Americans in Pennsylvania reported having been told they had high blood pressure versus 26.1% of whites and 24.2% of Hispanics).

Data from the 2003 BRFSS also indicate that in Pennsylvania, the rate of overweight and obesity was highest among African Americans (76.4%). The rate of obesity (based on body mass index) for African Americans was 35.1%, compared with the rate for whites, 23.1%. The rate of obesity among African Americans in Pennsylvania also was higher than the rate of obesity among African Americans in the United States (32.6%). African Americans in Pennsylvania were less likely to participate in regular leisure time physical activity (71.7%) than whites (78.6%).

Approximately 14% of African Americans in Pennsylvania were diagnosed with diabetes in 2003, in comparison to 7.6% of whites. The diabetes death rate in 2002 for African Americans in the state (42.0 per 100,000) was also significantly higher than the rate for whites (24.5 per 100,000).

Americans are living longer and the death rate is steadily declining. The leading cause of death for all Americans continues to be heart disease and stroke. In Pennsylvania heart disease is the leading cause of death and cancer is the second leading cause of death. However, it is not known of the current onset of these leading causes of death in comparison of rural and urban areas of Pennsylvania and is researched in the analysis of the BRFSS data. These diseases are both associated with risk factors such as high blood cholesterol, high blood pressure, smoking, and dietary factors. These factors can be controlled by the patient and effective methods of health education for behavior modification are needed.

#### Overall Health of the Nation

The overall health of the nation continues to improve from ongoing funding to public health programs, research, health care, and health education.

Over the past century many diseases have been controlled or their morbidity and mortality substantially reduced. Notable achievements in public health have included the control of infectious diseases such as typhoid and cholera through decontamination of water; implementation of widespread vaccination programs to eradicate or contain polio, diphtheria, pertussis, and measles; fluoridation of water to drastically reduce the prevalence of dental caries. (NCHS, 2005, p. 22)

A sharp decline in deaths from cardiovascular disease is a major public health achievement that resulted in large part from public education campaigns emphasizing a healthy lifestyle. The Pennsylvania Department of Health developed the Pennsylvania Nutrition and Physical Activity Plan (PaNPA Plan) to address the risk factors associated with heart disease and stroke. It is designed to improve nutrition and physical activity statewide through policy and environment interventions. The mission of the PaNPA Plan is to create a Pennsylvania where individuals, communities and public and private entities share the responsibility for developing an environment to support and promote active lifestyles and access to healthy food choices. The plan presents strategies and activities necessary for community-based interventions to increase healthy eating and physical activity opportunities. This reform on health education policy is an innovative mission that with proper instructional design and implementation of health education strategies can be very beneficial for people with chronic diseases. Educational campaigns for other chronic diseases like asthma, diabetes, and stroke can also have a significant impact on the United States population. The promotion of healthy habits and a decrease of risk behavior can lead to a longer, healthier life (American Cancer Society, 2007).

Many infectious diseases like mumps and measles have been nearly eradicated, but the prevalence of many chronic diseases is increasing in part associated with increased longevity and aging of the population (NCHS, 2005). According to the NCHS 2005 report in 1999-2002, more than 9 percent of persons 20 years of age and over and about one-fifth of adults 60 years and over had diabetes, including those with diabetes previously diagnosed by a physician and those with undiagnosed diabetes determined by results of a fasting blood sugar test.

A growing concern lately has been the documented increase of people who are overweight and obese; these are risk factors for many chronic diseases and disabilities including heart disease, stroke, and diabetes. The future of America's health can be influenced with education directed at patients of health care to prevent chronic diseases and serve as an intervention for risky health behaviors (American Cancer Society, 2007).

This study of the BRFSS data conducted a comparison of rural and urban areas in Pennsylvania to analyze existing questions regarding the risk factors in the population. The majority of these risk factors can be addressed by effective methods of health education. Recommend instructional design strategies for positive health behavior change are explored below.

#### Health Behaviors

Health behaviors and risk factors have a significant effect on health outcomes. Cigarette smoking increases the risk of lung cancer, heart disease, emphysema, and other respiratory diseases. Overweight and obesity increase the risk of death and disease as well as the severity of disease. Regular physical activity lessens the risk of disease and enhances mental and physical functioning. Heavy and chronic use of alcohol and use of illicit drugs increase the risk of disease and injuries (NCHS, 2005).

Health education relies heavily on human motivation to foster healthy behaviors, especially since most health education efforts depend on the voluntary commitment of individuals – as opposed to coerced participation – for behavioral change to occur (Dunsmore & Goodson, 2006). Behavior change programs that target motivation as an important factor are more successful in accomplishing at least some of the behavioral goals and remain more consistent with the principle of individual autonomy and

according to Dunsmore and Goodson (2006) this is a cornerstone value of health promotion practice.

The construct of motivation is important to understand to examine how and why good and bad health behaviors occur and also how to change bad health behaviors in people. This section analyzes the theoretical history of motivation to understand health behaviors and how frameworks of transtheoretical model of health behavior change, self-management approaches and self-efficacy can identify the ubiquitous nature and crucial importance of the construct of motivation.

### *Theoretical History of Motivation*

The most influential theory within the framework of motivation is that proposed by Kurt Lewin (Lewin, 1951).

Lewin suggested that motivation depends on the value that is placed upon a specific goal, as well as the probability of achieving that goal. The greater the value of the satisfactory circumstances resulting from the achievement of the goal, the stronger the level of motivation. (Dunsmore & Goodson, 2006, p. 171)

For example, a person who understands that maintaining an ideal weight enables them to reduce the risk of chronic diseases and believes that there is a high probability of them achieving an ideal weight is more motivated to obtain the ideal weight than someone who does not value the goal of decreased risk of chronic diseases.

The understanding of specific health behaviors (such as undergoing preventive cancer screenings) is now greatly enhanced through the study of factors that shapes individuals' motivation for healthy practices (Dunsmore & Goodson, 2006).

### *Transtheoretical Model of Health Behavior Change*

According to Dunsmore and Goodson (2006) although motivation is not proposed as a construct within the Transtheoretical Model, an individual's "readiness" to behave functions as an indicator of motivation in this model.

The application of health knowledge into daily life is known as transformation or the Transtheoretical Model of Health Behavior Change (DiClemente, 2007; Kim 2007). Patients of healthcare can experience improvements in their health by transforming health knowledge into daily life. The transtheoretical model uses a temporal dimension, the stages of change, to integrate processes and principles of change from different theories of intervention, hence the name transtheoretical (Kim, 2007; Cullen, Baranowski & Smith, 2001; Prochaska & Velicer, 1997). The transtheoretical model posits that health behavior change involves progress through six stages of change: pre-contemplation, contemplation, preparation, action, maintenance, and termination.

According to Mhurchu, Margetts, and Speller (1997) behavior change is a process involving a series of six stages. The first is pre-contemplation; it is the stage in which people are not intending to take action in the foreseeable future. "People may be in this stage because they are uninformed about the consequences of their behavior (p.39)." This group of people tends to avoid reading, talking, or thinking about their high risk health behaviors. This group of people is not ready for health promotion programs and traditional health promotion programs do not meet the needs of the patient and the motivation of the individual.

The next stage is contemplation. In this stage is when the individual is intending to change in the next six months. They become more aware of the pros of changing and

are also very aware of the cons of their risk behavior. However, when contemplating between the preventive and risk behaviors often people becomes stuck in this stage for long periods of time, also referred to as behavioral procrastination. This group is also not ready for traditional health promotion programs.

The third stage is preparation. This group of people plans to make a behavior change in the immediate future. They take on some significant preventive behavior like joining a gym, seeing a counselor, or buying a self-help book. This population of patients is now ready for an action-oriented health promotion programs like a cardio workout class or a smoking cessation support group.

The next stage is action. This is when a person has made a specific behavior change has been modifying their lifestyle within the past 6 months. A person must meet a criterion set by scientists and professionals that is sufficient to reduce risks for chronic diseases. Such as lowering calories from fat to 25% in a person's diet.

The fifth stage is maintenance. This is when a person is working not to relapse into a risk behavior. The maintenance period, based on temptation and self-efficacy data, lasts from 6 months to five years (Prochaska & Velicer, 1997). However, relapse is common when trying to modify health behaviors. According to Prochaska and Velicer (1997) the vast majority that do relapse return to contemplating or preparing for another attempt at a serious behavioral change and not the whole way back to the beginning of the transtheoretical model.

The final stage is termination. This is when an individual has complete self-efficacy and no temptation. No matter the situation the person does not return to their unhealthy ways. It would be like the person never had the risk behavior in the first place.

An example is a person who successfully quits smoking. However, being in complete self-control without temptation may be too hard to achieve for other risk behaviors like exercise and weight control. For these risk behaviors a lifetime of maintenance of the risk behavior may be the reality for control of the behavior.

The steps of Transtheoretical Model of Health Behavior Change in practical application for an individual attempting to change a poor health behavior such as to stop smoking cigarettes encounters a decisional balance, self-efficacy, and a change process as demonstrated in Figure 1 (Andersen, 2007). To discuss this process we use the fantasy example of Joe, a 36 year old cigarette smoker from rural Pennsylvania that enrolls in a well-designed cessation program.

When Joe enrolls in the cessation program he is at the Pre-Contemplation stage, he thinks about quitting smoking but the decisional balance between pro and con leans to con since Joe has a low confidence level and high temptation level to smoke (Edwards, Jones & Belton, 1999; Kim 2007). While Joe has raised his conscience level about his negative health behavior and has made contact with a program that can foster helpful relationships and provide relief to stop smoking, he is not ready to commit to changing his behavior.

The next stage of the model is Contemplation. At this stage Joe is enrolled and attending the cessation program. His self-efficacy level is high and he begins to see the decisional balance on smoking begin to equalize between pro and con. He develops a higher confidence level and re-evaluates his self and his environment concerning smoking (Edwards, Jones & Belton, 1999; Kim, 2007).

As Joe progresses thru the cessation program he enters the Preparation stage. He continues a high level of self-efficacy to maintain his health behavior and continues to increase his confidence to quit smoking. The cessation program changes his decisional balance to more pro than con concerning smoking (Edwards, Jones & Belton, 1999; Kim, 2007). He begins to liberate his self and social environment to control triggers for smoking.

Finally, Joe enters the Action stage where the cessation program delivers a high confidence level and a low temptation level. Joe's decisional balance is pro over con and he understands his stimulus control, counter conditions, and his health relationship with smoking and the effects of smoking on his body (such as chronic diseases like cancer) (Edwards, Jones & Belton, 1999; Kim, 2007).

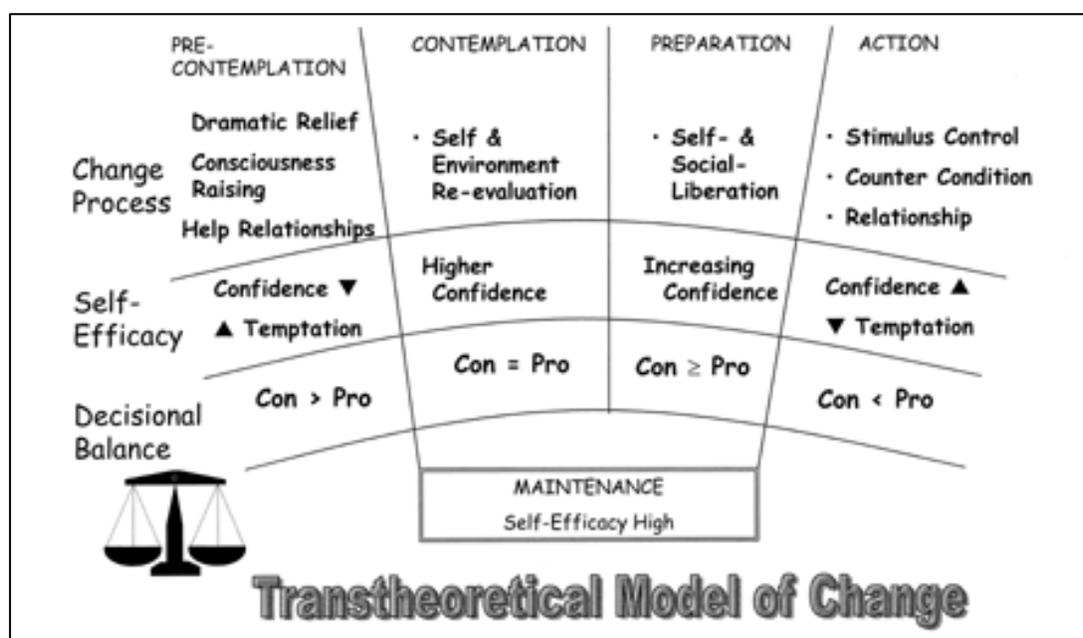


Figure 1

Transtheoretical model of health behavior change.

If results with stage-matched interventions continue to be replicated, health promotion programs would be able to produce unprecedented impacts on entire at-risk populations (Povey, Conner, Sparks, James & Shepherd, 1999; Prochaska & Velicer, 1997). The process of change involves conscious raising, dramatic relief, self-evaluation, and environmental evaluation (Prochaska & Velicer, 1997). The process of conscious raising is to create awareness about the causes, consequences, and cures for chronic diseases. In other words, to create and distribute media interventions that increases awareness. The intervention would include dramatic relief to move people emotionally and combine cognitive and affective assessments of the individual. The portrait of one's self-image can reveal particular unhealthy habits and provide clarification on preventive health behaviors. Also, communicating the environmental portrait of an individual's life can provide connections to change a risk behavior. For example, California's anti-tobacco campaign was designed to show the effects of second-hand smoke (Prochaska & Velicer, 1997). This process of change thru the transtheoretical model can provide an individual with a sense of self-liberation from their risk behavior to pursue self-management approaches (Horng, 2005; Kim, 2007).

This model of health behavior change can be very beneficial for the medical community to adopt and help rural and urban citizens in Pennsylvania to change their negative risk-type health behaviors. The Transtheoretical Model has general implications for all aspects of intervention development and implementation of health education programs; it impacts the areas of recruitment, retention, progress, process, and outcome.

The Transtheoretical Model addresses the recruitment of an entire population. In other words, traditional health education interventions often assume that individuals are

ready for an immediate and permanent behavior change; when in fact only a very small proportion of the population fits this category (Velicer, Prochaska, Fava, Norman, & Redding, 1998). The Transtheoretical Model has no assumption about how ready individuals are to change. It recognizes that different individuals would be in various stages of the model and that appropriate interventions must be developed for everyone. As a result, very high participation rates have been achieved (Cancer Prevention Research Center, 2007).

The model can result in high retention rates. Health education programs that consist of traditional interventions often have very high dropout rates. This is because the participants feel that the program does not fit their needs and readiness level (Velicer, et al., 1998). The Transtheoretical Model is designed to develop interventions that are matched to the specific needs of the individual (Cancer Prevention Research Center, 2007). Since the interventions are individualized to their needs, they are less likely to drop out of the health education program.

The model can also provide sensitive measures of progress. The model recommends action oriented programs and includes a set of outcome measures that are sensitive to a full range of cognitive, emotional, and behavioral changes and recognize and reinforce smaller steps than traditional action-oriented approaches (Cancer Prevention Research Center, 2007).

The Transtheoretical Model can also facilitate an analysis of the mediational mechanisms. Interventions are likely to be effective for different people on various levels. Given the multiple constructs and clearly defined relationships, the model can facilitate a

process analysis and guide the modification and improvement of the intervention (Velicer, et. al., 1998).

Finally, the model can support a more appropriate assessment of outcome of a health education program. The model provides instructional design guidance that the interventions of the program would be evaluated in terms of their impact (Velicer, et. al., 1998). For example, a smoking cessation intervention could have a very high efficacy rate but a very low recruitment rate. Interventions based on the Transtheoretical Model have the potential to have both a high efficacy and a high recruitment rate and dramatically increasing the potential impact on entire populations of individuals with behavioral health risks (Cancer Prevention Research Center, 2007).

The Transtheoretical Model is an instructional design strategy that consists of proven strategies for effective behavior change. The model is recommended to health education programs to guide their behavior modification courses. The analysis of the 2005 BRFSS data presents the health deficiencies in rural and urban Pennsylvania and the Transtheoretical Model is an instructional design strategy recommended to change behavioral health risks in this population.

### *Self-Management Approaches*

Self-management training, the process of teaching individuals to manage their chronic disease, has been considered an important part of clinical management since the 1930s (Norris, Engelgau & Narayan, 2001). An increasing number of interventions have been developed for patients to better manage their chronic diseases (Newman, Steed & Mulligan, 2004; Berry, Plotnikoff, Raine, Anderson, & Naylor, 2007). These

interventions are characterized by substantial responsibility taken by patients. This includes management with taking medications, making lifestyle changes, or other preventive health actions (Heisler, Bouknight, Hayward, Smith, & Kerr, 2002).

Evidence is growing that chronic disease self-management support—providing patients the education, motivation, and equipment to make health behavior changes—leads to improvement in health status, increased patient satisfaction, and, in some cases, reductions in utilization and costs (CHCF, 2007).

The health care system can play a critical role in increasing patient self-management activities, but success requires better decision-making tools, proactive clinical information systems, enhanced delivery systems, and active involvement by patients and their families (CHCF, 2007).

Well-designed health education programs would promote effective self-management support strategies that involve interaction between the health care service provider and the patient; support organizations that are ready to make permanent changes to integrate self-management support into care delivery; enable implementation of these strategies in diverse settings; directly assist organizations and individuals with training curricula, tools, and technical assistance; and evaluate success of the implementation and success factors in different settings (Heisler, Bouknight, Hayward, Smith & Kerr, 2002).

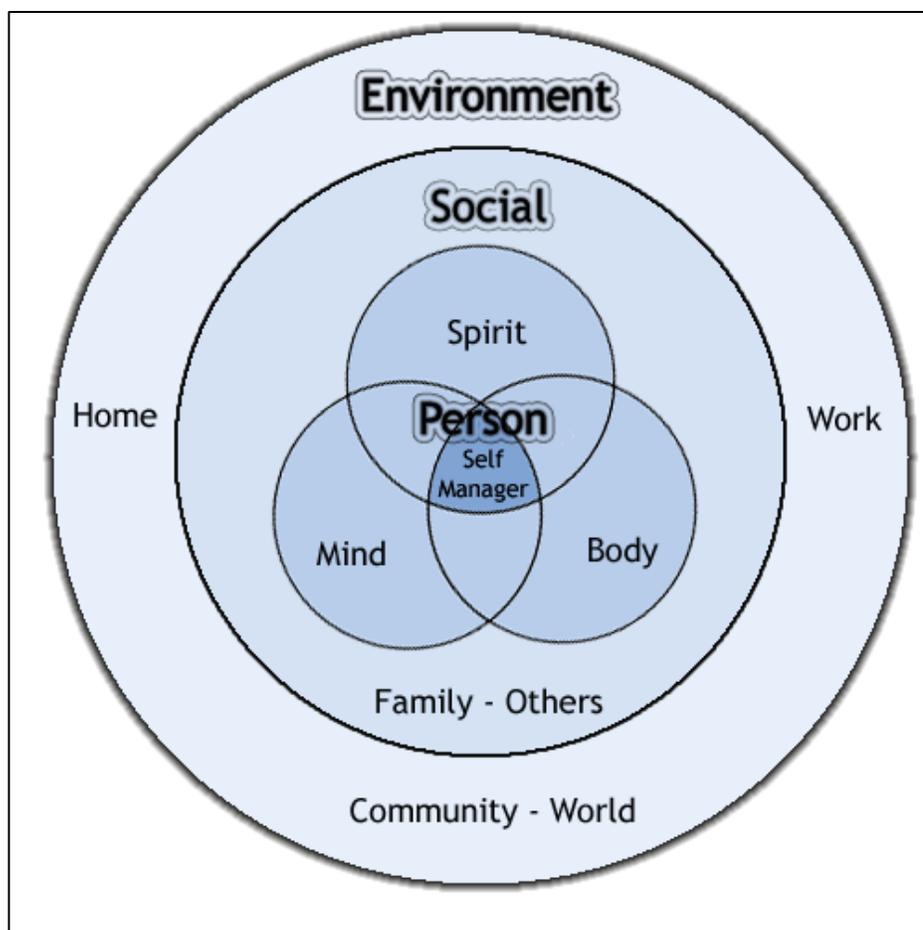
Self-management is important because if a person does not become responsible for their health, the treatment recommendations by a health professional cannot be effective. A self-management plan creates a partnership between the patient and health professional. The Figure 2 demonstrates the Self-Management Approach Model, a plan

to improve a person's health that encompasses a person's environment experiences, social experiences, and personal experiences.

The Self-Management Approach Model is a holistic approach at a person attempting to change a health behavior. The model consists of three circles. The person is placed at the center with their mind, body, and spirit contained in their person circle. A larger circle is their social circle (family, friends, others). A broader circle of their environment (home, work, community) is placed around their social circle (Holistic Health Education Program, 2006).

If we return to Joe the smoker from the previous example, we can see how this model can build upon the Transtheoretical Model of Health Behavior Change. The Transtheoretical Model of Health Behavior Change focuses on the change process and steps a person in a successful health education program would encounter towards a successful behavior change. The Self-Management Approach Model looks more deeply at the person attempting to change their behavior to understand the personal barriers to successful behavior change.

In this model Joe becomes a self manager of his personal, social, and environmental circles. An educational health program that addresses these influences and communicates to the student the effect they can have would ensure a more successful approach to a positive health behavior change (Norris, Engelgau & Narayan, 2001).



*Figure 2*

Self-management approach model.

The effectiveness of self-management approaches have been illustrated in research studies, such as with self-management approaches concerning diabetes. The goals of diabetes education are to optimize metabolic control, prevent acute and chronic complications, and optimize quality of life while keeping costs acceptable (Mensing, Boucher, Cypress & Weinger, 2003; Anonymous, 2007). A large body of literature exists on diabetes education and its effectiveness, including several important quantitative reviews showing positive effects. For example a study by researchers at the National

Center for Chronic Disease Prevention and Health Promotion found that self-management education improves glycemic control levels at immediate follow-ups and increased contact time increases the effect (Norris, Lau & Smith, 2002).

However, these reviews aggregated studies of heterogeneous quality and types of interventions and do not identify the most effective form of diabetes education for specific populations or outcomes (Bodenheimer, Lorig, Holman & Grumbach, 2002). Moreover, educational techniques have evolved since these reviews and have shifted from didactic presentations to interventions involving patient empowerment or also known as self-efficacy (Norris et al, 2001).

Self-management techniques addressed in behavioral modification of health education programs is important to include. The Transtheoretical Model is an instructional design outline and the model of self-management above focuses on design guidelines for the content of the health education program. In this study, several health education programs available for rural and urban areas of Pennsylvania are addressed and the guidelines presented on self-management techniques are best-practices for effective health education programs. The self-management techniques in this chapter would guide the viewpoint and analysis of existing health education programs in rural and urban Pennsylvania.

### *Self-Efficacy*

Health behavior interventions are often grounded in Social Cognitive Theory (Kalichman et al, 2005; Ngamvitroj & Kang, 2007). The act of self-efficacy of patients of healthcare is when they take control of their own life by implementing healthy behaviors and removing risk behaviors from their life. Self-efficacy is defined as the personal belief

that one can successfully perform a specific action under specified conditions (Bandura, 1997). People living with chronic diseases must commit to acts of self-efficacy by strictly adhering to multi-drug regimens to achieve optimal treatment responses (Kalichman, Cain, Fuhrel, Eaton, Di Fonzo & Ertl, 2005; Christensen & Remler, 2007).

Patients who must adhere to complex preventive health behaviors by taking several medications must have confidence in their own ability to take those medications as directed (Catz, Kelly, Bogart, Benotsch, McAuliffe, 2000). This also extends to understanding other preventative behaviors like exercise and a healthy diet. Health and exercise psychologists define exercise and diet a complex and dynamic process influenced by psychological, physiological, social, and behavioral parameters (McAuley, 1993). According to McAuley (1993) previous research has suggested that perceived capabilities, or self-efficacy cognitions play an important role in both the adoption and the maintenance of preventive health behaviors. Self-efficacy variables present in patients are a significant predictor for executing preventive health behaviors (McAuley, 1993).

Bandura's (1989) perspective is that cognitive control systems play their most important role in the acquisition of behavioral proficiencies. As the desired preventive health behavior becomes more demanding of the person, self-efficacy is hypothesized to play a more important role in that behavior (Bandura, 1989). Another example of this is with self-management of diabetes mellitus.

Self-efficacy is the belief in one's capabilities to organize and execute the courses of action required to produce given attainments (such as a person improving their dietary habits to lower cholesterol or to quit smoking) (Kalichman et. al., 2005). The focus of a health education program would have self-efficacy of the person to change their negative

health behavior at the center of the program. The Transtheoretical Model of Health Behavior Change and Self-Management Approach Model are based on the idea of self-efficacy. Health educators understand that self-efficacy consists of four components (Kalichman et. al., 2005):

1. Enactive Attainment - The most influential source of efficacy information because it is based on authentic mastery experience. Successes raise efficacy appraisals and failures lower them.
2. Vicarious Experience - Some factors make us more sensitive to vicarious influence: uncertainty about our own capability, little prior experience and criteria by which ability is evaluated
3. Verbal Persuasion - Can contribute to successful performance if the heightened appraisal is within realistic bounds
4. Physiological Factors - Treatments that eliminate emotional arousal to subjective threats heighten perceived self-efficacy with corresponding improvements in performance

In the previous example of Joe the smoker, he encounters each of these stages of self-efficacy in both the Transtheoretical Model of Health Behavior Change and Self-Management Approach Model. The educational models both encounter enactive attainment when the decisional balance of the negative health behavior is explored. Then

vicarious experience is encountered by examining the circles around a person that influence the negative health behavior to occur. A health education program that consists of verbal persuasion thru instruction on healthy behaviors can have a successful impact when it also addresses physiological factors. The triggers for a negative health behavior can be explored in a health education program for an individual to understand and control (Kalichman et. al., 2005).

Although technical processes of diabetes management such as glycosylated hemoglobin (A1c) monitoring have improved in many health care systems, outcomes for large numbers of patients remain sub-optimal (Piette, Schillinger, Potter & Heisler, (2003). This reflects the central role that patients with diabetes play a determining role with their health status and the challenges associated with supporting their efforts to manage the complexities of self-care. People with diabetes must modify long-standing lifestyle behaviors such as their diet and exercise and adhere to often complex hypoglycemic medication schedules. It is not a surprise that many people have difficulty meeting the demands of their chronic disease and experience unfortunate outcomes as a result (Piette et al, 2003).

People with chronic diseases often must display self-efficacy in management of their illness. This can be a tough task but medical providers can play a key role in the process by providing treatment plans (Adams, Smith, Allan, & Anzueto, 2007). Medical providers can contribute to patients of chronic diseases by: providing patients with the information the need for priority setting and problem solving, assisting them in identifying realistic targets for behavior changes, and providing ongoing emotional support and encouragement (Piette et al, 2003; Austin, 2007). Though these efforts the

medical system can improve patients' long-term ability to maintain an effective self-management regimen and help them avoid the emotional burnout that is common with patients of chronic diseases (Piette et al, 2003).

### Prevention Opportunities

Chronic diseases are not prevented by vaccines, nor do they just disappear. To a large degree, the major chronic disease killers are an extension of what people do, or not do, as they go about the business of daily living (Casey, 2007). Health-damaging behaviors—in particular, tobacco use, lack of physical activity, and poor nutrition—are major contributors to heart disease and cancer, our nation's leading killers (Seals, 2007). However, tests are currently available that can detect breast cancer, colon cancer, heart disease, and other chronic diseases early, when they can be most effectively treated.

The Transtheoretical Model of Health Behavior Change, Self-Management Approach Model, and the process of self-efficacy are educational theories that are implemented in the instructional design process of health education (McAuley, Konopack, Morris, & Motl, 2006). The theories help health care providers and educators how the behavior change process occurs and when implemented in health education programs can develop positive change to negative health behavior trends discussed in the chapter. The CDC (2005) reports that health behavior programs have been successful to accomplish:

- Statistically significant decreases in cancer deaths among men and women across all races, with the greatest decrease occurring among African

American men (433.9 per 100,000 in 1990 versus 365.8 per 100,000 in 2000).

- A 17.1% decrease in the number of women older than age 50 who reported not having a mammogram in the last 2 years (from 38.2% in 1992 to 21.1% in 2002).
- A lower prevalence rate than the corresponding national rate for Hispanic women older than age 18 who reported not having had a Pap smear in the last 3 years (16.0% in Pennsylvania versus 17.3% nationally).

Health policies should reform to collaborate with public and private health organizations to establish a national framework to help Pennsylvania citizens obtain the information, resources, surveillance data, and funding needed to implement effective chronic disease prevention programs and ensure that all Pennsylvanians have access to quality health care.

The statistical data on health trends reviewed, illustrate a need for health education programs to improve the health of Pennsylvanians to prevent and improve chronic disease management with conditions like heart disease, stroke, and cancer.

Two major independent risk factors for heart disease and stroke are high blood pressure and high blood cholesterol (CDC, 2005). Other important risk factors include diabetes, tobacco use, physical inactivity, poor nutrition, and being overweight or obese (Magson, 2007). A key strategy for addressing these risk factors is to educate the public and health care practitioners about the importance of prevention. All people should also partner with their health care providers to have their risk factor status assessed, monitored, and managed in accordance with national guidelines. People should also be

educated about the signs and symptoms of heart attack and stroke and the importance of calling 911 quickly. Forty-seven percent of heart attack victims and about the same percentage of stroke victims die before emergency medical personnel arrive (CDC, 2005).

The number of new cancer cases can be reduced and many cancer deaths can be prevented. Adopting healthier lifestyles—for example, avoiding tobacco use, increasing physical activity, achieving a healthy weight, improving nutrition, and avoiding sun overexposure—can significantly reduce a person’s risk for cancer (CDC, 2005). Making cancer screening, information, and referral services available and accessible is essential for reducing the high rates of cancer and cancer deaths (CDC, 2005). Screening tests for breast, cervical, and colorectal cancers reduce the number of deaths by detecting them early.

## Review of BRFSS Data

### *Data Collection*

The BRFSS is a cross-sectional telephone survey conducted by the Pennsylvania state health department with technical and methodological assistance provided by the Centers for Disease Control and Prevention. Every year, Pennsylvania conducts monthly telephone surveillance using a standardized questionnaire to determine the distribution of risk behaviors and health practices among non-institutionalized adults (Centers for Disease Control and Prevention, 2006). Pennsylvania forwards the survey responses to the CDC, where the data is aggregated monthly. The data is then returned to Pennsylvania and published on the BRFSS Web site.

The BRFSS survey consists of only adults 18 years or older and only one adult is interviewed per household. The participants in the BRFSS study are not compensated for

participating in the survey. However, their responses to the survey questions help shape public health policy in towns, states, and the nation. Another reward for participating is the knowledge that these efforts would help America be healthier (Centers for Disease Control and Prevention, 2006).

The content of the BRFSS questionnaire is comprised of core questions and optional modules. There are three types of core questions. Fixed core questions are asked every year. Rotating core questions are asked every other year. Emerging core questions typically focus on “late-breaking” health issues. These questions are evaluated at the end of a survey year to determine if they are valuable. If the coordinators decide to keep the questions, they are added to the fixed core, rotating core, or optional modules, whichever is most appropriate (Centers for Disease Control and Prevention, 2006). The Pennsylvania Department of Health must ask all core questions. The optional modules are standardized questions that are supported by the Centers for Disease Control and Prevention that cover additional health topics or are more detailed questions on a health topic included in the core. Each year Pennsylvania must choose which optional modules they would use based on the data needs of the state.

#### *Method of Obtaining Data*

The Behavioral Risk Factor Surveillance System (BRFSS) is an on-going data collection program administered and supported by the Division of Adult and Community Health, National Center for Chronic Disease Prevention and Health Promotion. By 1994, all states, the District of Columbia, and three territories were participating in the BRFSS.

The Centers for Disease Control and Prevention (CDC) developed the standard core questionnaire for states to use to provide data that could be compared across states.

The method of collecting the data for the BRFSS is by telephone interview questions. A disproportionate stratified random digit dial sampling strategy generates telephone numbers that determine which households are surveyed. Within each household, the respondent is selected randomly from all adults 18 years of age or older who reside in the household. The data collection is confidential and anonymous.

The telephone interviews are conducted monthly from a central calling facility by professional interviewers employed by the Pennsylvania state health department. The Pennsylvania state health department uses a computer-assisted telephone interviewing system to record respondents' answers to the survey questions. Standard protocols, developed by the CDC, are used in all states collecting BRFSS survey data. These protocols specify survey systems, such as adequate call-backs to contact target households, which improve data quality and comparability across states.

#### *Instrument Used*

The Behavioral Risk Factor Surveillance System (BRFSS) was designed by the Centers for Disease Control and Prevention to collect data on the key behavioral health risks which contribute to the leading causes of death, such as smoking, alcohol use, being overweight, etc. The BRFSS is an ongoing survey consisting of telephone interviews, which are conducted every month. This study used data from the past ten years of data collection from the BRFSS telephone interview survey.

The BRFSS instrument is a standardized questionnaire which consists of three sections, the core (which includes demographics), and a set of optional modules and may include state specific questions. The questionnaire covers such topics as health status, health care access, nutrition, physical activity, diabetes, tobacco use, alcohol use, demographics, women's health, injury prevention, and HIV/AIDS awareness.

Participation in the BRFSS survey is random, anonymous and confidential. Respondents are randomly selected from among the adult members of the household. Only those living in households are surveyed. Those living in institutions (i.e., nursing homes, dormitories) are not surveyed.

Pennsylvania began participating in the BRFSS in 1989. This study makes use of data gathered in 2005 to present an analysis of the health status in rural and urban areas of Pennsylvania. The BRFSS data was combined into a single dataset and analyzed by the categories of: Department of Health District, county, and county groupings when sample size was too small for reliable numbers by single county (Centers for Disease Control and Prevention, 2006).

The BRFSS survey results provide valuable tools in measuring health status, assessing chronic disease risk, and monitoring the effectiveness of policies, programs, and awareness campaigns. The intention of the BRFSS is to provide local public health agencies, community health improvement partnerships, and concerned citizens with useful information concerning health.

*BRFSS Pilot Study*

About the same time as personal health behaviors received wider recognition in relation to chronic disease morbidity and mortality, telephone surveys emerged as an acceptable method for determining the prevalence of many health risk behaviors among populations. In addition to their cost advantages, telephone surveys were especially desirable at the state and local level, where the necessary expertise and resources for conducting area probability sampling for in-person household interviews were not likely to be available (Centers for Disease Control and Prevention, 2006).

As a result, surveys were developed and conducted to monitor state-level prevalence of the major behavioral risks among adults associated with premature morbidity and mortality. The basic philosophy was to collect data on actual behaviors, rather than on attitudes or knowledge, that would be especially useful for planning, initiating, supporting, and evaluating health promotion and disease prevention programs.

To determine feasibility of behavioral surveillance, initial point-in-time state surveys were conducted in 29 states from 1981-1983. In 1984, The Centers for Disease Control and Prevention (CDC) established the Behavioral Risk Factor Surveillance System (BRFSS), and 15 states participated in monthly data collection. Although the BRFSS was designed to collect state-level data, a number of states from the outset stratified their samples to allow them to estimate prevalence for regions within their respective states.

CDC developed standard core questionnaire for states to use to provide data that could be compared across states. The BRFSS, administered and supported by the Division of Adult and Community Health, National Center for Chronic Disease

Prevention and Health Promotion, CDC, is an ongoing data collection program. By 1994, all states, the District of Columbia, and three territories were participating in the BRFSS.

### Summary

The health trends of the Nation and in rural and urban areas of Pennsylvania document a growing number of people with or at risk of a chronic disease. Chronic diseases are the most prevalent, costly, and preventable health problem in the country. Preventive health education programs that address the theories of Transtheoretical Model of Health Behavior Change, Self-Management Approach Model, and the process of self-efficacy can change health behaviors by fully understanding the person and their environment. A holistic approach in health education can be achieved by the existing theories found in the field of education.

Chapter two discussed health access and utilization, health behaviors, chronic diseases, and other health issues for rural and urban residents of Pennsylvania. The chapter also discussed educational learning theories that have been researched to be effective plans of behavior modification. What can be documented from previous health research is that there is a rural deficiency in the access and availability of healthcare, healthcare is increasingly expensive, and people with or at risk of chronic diseases is steadily rising. What we do not know from previous research is what are the health access and utilization, health behaviors, and instance of chronic diseases for rural and urban citizens of Pennsylvania. Especially, when compared among rural and urban people. The BRFSS began only collecting this survey data in reference to geographic location in

2005. This survey data with the capability of comparing rural and urban areas produced statistical outcomes that are interesting contributions to the field of educational science.

The outcome of this study sought to improve the health and well being of all Pennsylvanians by monitoring behavioral risk factors and chronic diseases through the collection, interpretation, and dissemination of BRFSS surveillance data, educating the public and health professionals, collaborating with communities and other partners in the planning, implementation and evaluation of evidence-based strategies and interventions, and advocating for the prevention and control of chronic diseases and promoting healthy lifestyles.

The benefits of this study by the implementation of health education programs that include the instructional design concepts of the Transtheoretical Model of Health Behavior Change, self-management approaches, and self-efficacy include more than \$9 billion in lost productivity and nearly \$2 billion in hospital costs could be averted through more consistent delivery of best-practice-care and more than 14,000 heart attacks and strokes could be prevented each year through better diabetes management alone (National Committee for Quality Assurance, 2004).

A review of these instructional design concepts discussed in chapter 2 are the Transtheoretical Model of Health Behavior Change: process of 6 levels a person encounters to achieve a positive health behavior change (Dunsmore & Goodson, 2006); self-management approaches: person takes responsibility for doing what it takes to manage their illness (Norris, Engelgau & Narayan, 2001); and self-efficacy: person demonstrates control over their thoughts, feelings, and actions to demonstrate healthy behaviors (Kalichman, Cain, Fuhrel, Eaton, Di Fonzo & Ertl, 2005; Bandura, 1977).

According to the data analyzed in the chapter , chronic diseases are becoming more serious as higher numbers of people are diagnosed with chronic diseases and the self-treatment options become more complex (National Committee for Quality Assurance, 2004). This epidemic of chronic diseases is analyzed in the rural and urban areas of Pennsylvania of the 2005 BRFSS survey.

The health behaviors of an individual with a chronic disease can greatly influence the possibility of complications and the quality of life experienced by the person (Delamater, 2006). The educational implications of effective preventive health programs are researched in this study to understand that it can positively influence health.

The statistical analysis of the BRFSS data in rural and urban areas of Pennsylvania produced the most current picture of health behaviors and chronic diseases in the Commonwealth. This data analyzed along with healthcare policies and educational programs in place in Pennsylvania to increase preventive health behaviors. The next chapter discussed the methodology for the statistical analysis of the data in the study.

## CHAPTER THREE

### METHODOLOGY

#### Data Source

The study is designed to examine the research questions inquired, based on a statistical analysis of the data in the BRFSS. The data from the Pennsylvania BRFSS was used to provide information on health access and utilization, health risk factors, preventive behaviors, chronic disease conditions, and selected public health issues. The BRFSS was conducted using a disproportionate stratified sample (DSS) design methodology.

According to the CDC, (2006) a DSS design as most commonly practiced in the BRFSS, telephone numbers are divided into two groups, or strata, which are sampled separately. One group, the high-density stratum, contains telephone numbers which are expected to contain a large proportion of households. The other group, the low-density stratum, contains telephone numbers which are expected to contain a small proportion of households. Whether a telephone number goes into the high-density or low-density stratum is determined by the number of listed household numbers in its hundred block. A hundred block is a set of one hundred telephone numbers with the same area code, prefix, and first two digits of the suffix and all possible combinations of the last two digits. Numbers that come from hundred blocks with one or more listed household numbers (1+ blocks, or banks) are put in the high density stratum. Numbers that come from hundred blocks with no listed household numbers (0 blocks, or banks) are put in the low density stratum. Both strata are sampled to obtain a probability sample of all households with

telephones. The high density stratum is sampled at a higher rate than the low density stratum (that is, disproportionately) to obtain a sample that contains a larger proportion of household numbers than would be the case if all numbers were sampled at the same rate.

In most cases, each state constitutes a single stratum, including Pennsylvania. In other words, Pennsylvania 2005 is an un-weighted data set. When data are used without weights, each record counts the same as any other record. Implicit in such use are the assumptions that each record has an equal probability of selection and that non-coverage and non-response are equal among all segments of the population (BRFSS, 2005).

No subjects with compromised or nonexistent abilities to give informed consent were a part of the BRFSS study. Also, participants in the study are 18 years of age or older and were not exposed to any physical risks or discomforts. All personal information gathered in the data are handled confidentially and reported anonymously.

The BRFSS data set provides information about key behavioral health risks which contribute to the leading causes of death, such as smoking, alcohol use, being overweight, etc. The operational definition of the key variables in the study is found below.

The document analysis procedure for the study is to first identify health policies and health education programs that are current and address the populations of rural and urban areas of Pennsylvania. Document analysis begins with defining the document context, defining the document type and defining the different document features and relationships to the study population. The context of the document is analyzed to summarize the purpose and effect of it and its relationship to the study population.

## Operational Definition of Key Variables

### *Urban Counties in Pennsylvania*

The Center for Rural Pennsylvania's (2006) county level definition of urban, which is based on population density from the 2000 United States Census Bureau. The following counties in Pennsylvania are identified as urban in this study: Erie, Beaver, Allegheny, Westmoreland, Luzerne, Lackawanna, Cumberland, Dauphin, Lebanon, York, Lancaster, Berks, Chester, Lehigh, Northampton, Montgomery, Delaware, Philadelphia, and Bucks.

### *Rural Counties in Pennsylvania*

The Center for Rural Pennsylvania's (2006) county level definition of rural, which is based on population density from the 2000 United States Census Bureau. The following counties in Pennsylvania are identified as rural in this study: Crawford, Mercer, Lawrence, Washington, Greene, Warren, Venango, Butler, Fayette, Forest, Clarion, Armstrong, McKean, Elk, Jefferson, Indiana, Somerset, Cambria, Clearfield, Cameron, Potter, Tioga, Bradford, Susquehanna, Wayne, Clinton, Centre, Blair, Bedford, Fulton, Franklin, Adams, Huntingdon, Mifflin, Juniata, Perry, Snyder, Union, Northumberland, Montour, Columbia, Lycoming, Sullivan, Wyoming, Monroe, Carbon, Pike, and Schuylkill.

### *Healthcare Access and Utilization*

The determination of healthcare access and utilization are composed of answers on the BRFSS survey if respondents have healthcare insurance and if they have a personal doctor or health care provider.

### *Health Risk Factors*

The following variables are chosen as indicators of health risk factors: (a) overweight and obesity; (b) tobacco use; and (c) alcohol consumption (acute drinkers, chronic drinkers, drinking and driving).

### *Preventive Behaviors*

The following variables are chosen as indicators of preventive behaviors: (a) exercise; (b) fruit; and (c) vegetable consumption.

### *Chronic Disease Conditions*

The following variables are chosen as indicators of chronic disease conditions: (a) heart disease; (b) stroke; (c) diabetes; (d) arthritis; and (e) asthma.

### *Selected Public Health Issues*

The following variables are chosen as indicators of selected public health issues: (a) immunizations; (b) injury prevention; (c) oral health; and (d) HIV/AIDS.

### *Measurement of Behavior Risk Factors*

For the purpose of this study, the following behavior risk factors indicators were developed to measure health trends, assess chronic disease risk and identify emerging trends for rural and urban Pennsylvania residents. The information below is the major categories, indicators and measurement, and the numbered survey questions from the 2005 BRFSS survey that were required data in the study. The table below is the BRFSS

2005 survey questions that analyzed the health behavior variables in the study. The data from each question was compared between rural and urban areas of Pennsylvania.

Table 1		
<i>2005 Pennsylvania Behavioral Risk Factor Surveillance System Survey Questions</i>		
Major Categories	Indicators & Measurement	BRFSS 2005
Health Access and Utilization	Health Care Insurance A personal doctor or health care provider	3.1 Do you have any kind of health care coverage, including health insurance, prepaid plans such as HMOs, or government plans such as Medicare?
		3.2 Do you have one person you think of as your personal doctor or health care provider?
Health Risk Factors	Overweight and Obesity Tobacco use Alcohol consumption (Acute Drinkers, Chronic Drinkers, Drinking and Driving)	11.1 Have you smoked at least 100 cigarettes in your entire life?
		11.2 Do you now smoke cigarettes every day, some days, or not at all?
		12.2 During the past 30 days, how many days per week or per month did you have at least one drink of any alcoholic beverage?
		12.3 One drink is equivalent to a 12-ounce beer, a 5-ounce glass of wine, or a drink with one shot of liquor. During the past 30 days, on the days when you drank, about how many drinks did you drink on the average?
		12.4 Considering all types of alcoholic beverages, how many times during the past 30 days did you have 5 or more drinks on an occasion?
		Module 18: Weight Control  5. In the past 12 months, has a doctor, nurse or other health professional given you advice about your weight?

Preventive Behaviors	Exercise, Fruit and Vegetable Consumption	17.2 Not counting juice, how often do you eat fruit?
		17.6 Not counting carrots, potatoes, or salad, how many servings of vegetables do you usually eat? (Example: A serving of vegetables at both lunch and dinner would be two servings.)
		18.2 Now, thinking about the moderate activities you do [fill in “when you are not working” if “employed” or self-employed”] in a usual week, do you do moderate activities for at least 10 minutes at a time, such as brisk walking, bicycling, vacuuming, gardening, or anything else that causes some increase in breathing or heart rate?
		18.3 How many days per week do you do these moderate activities for at least 10 minutes at a time?
		18.4 On days when you do moderate activities for at least 10 minutes at a time, how much total time per day do you spend doing these activities?
		18.5 Now, thinking about the vigorous activities you do [fill in “when you are not working” if “employed” or “self-employed”] in a usual week, do you do vigorous activities for at least 10 minutes at a time, such as running, aerobics, heavy yard work, or anything else that causes large increases in breathing or heart rate?
		18.6 How many days per week do you do these vigorous activities for at least 10 minutes at a time?
		18.7 On days when you do vigorous activities for at least 10 minutes at a time, how much total time per day do you spend doing these activities?

Chronic Disease Conditions	Heart Disease and Stroke Diabetes, Arthritis, Asthma	5.1 Have you ever been told by a doctor that you have diabetes?
		8 Has a doctor, nurse, or other health professional EVER told you that you had any of the following?
		8.1 (Ever told) you had a heart attack, also called a myocardial infarction?
		8.2 (Ever told) you had angina or coronary heart disease?
		8.3 (Ever told) you had a stroke?
		9.1 Have you ever been told by a doctor, nurse, or other health professional that you had asthma?
Selected Public Health Issues		10.1 A flu shot is an influenza vaccine injected into your arm. During the past 12 months, have you had a flu shot?
		10.2 During the past 12 months, have you had a flu vaccine that was sprayed in your nose? The flu vaccine sprayed in the nose is also called FluMist™.
		10.3 A pneumonia shot or pneumococcal vaccine is usually given only once or twice in a person's lifetime and is different from the flu shot. Have you ever had a pneumonia shot?
		19.1 Have you ever been tested for HIV? Do not count tests you may have had as part of a blood donation. Include testing fluid from your mouth.

## Data Analysis Procedures

Descriptive statistics and inferential statistics were performed to provide profiles of how urban and rural areas of Pennsylvania compare with preventive health and risk behaviors.

This summary includes the research questions listed as goals and the analysis procedures that will be conducted with each goal. The summary of the analysis methodology in the study is displayed in the table below.

Table 2

### *Data Analysis Methodology*

Goals	Analysis Procedures
1. How do urban and rural areas of Pennsylvania compare with health access and utilization?	Descriptive statistics <ul style="list-style-type: none"> <li>• Frequency distribution</li> </ul> Inferential statistics <ul style="list-style-type: none"> <li>• Chi-square</li> </ul>
2. How do urban and rural areas of Pennsylvania compare with health risk factors?	Descriptive statistics <ul style="list-style-type: none"> <li>• Frequency distribution</li> </ul> Inferential statistics <ul style="list-style-type: none"> <li>• Chi-square</li> </ul>
3. How do urban and rural areas of Pennsylvania compare with preventive health behaviors?	Descriptive statistics <ul style="list-style-type: none"> <li>• Frequency distribution</li> </ul> Inferential statistics <ul style="list-style-type: none"> <li>• Chi-square</li> </ul>
4. How do urban and rural areas of Pennsylvania compare with chronic disease conditions?	Descriptive statistics <ul style="list-style-type: none"> <li>• Frequency distribution</li> </ul> Inferential statistics <ul style="list-style-type: none"> <li>• Chi-square</li> </ul>
5. How do urban and rural areas of Pennsylvania compare with selected public health issues?	Descriptive statistics <ul style="list-style-type: none"> <li>• Frequency distribution</li> </ul> Inferential statistics <ul style="list-style-type: none"> <li>• Chi-square</li> </ul>

## Data Analysis Methodological Issues

The data analysis procedures were carried out to investigate the information associated with each goal and objective of the study. The BRFSS data in the study consists of many methodological issues that must be considered in the analysis of the data.

### *Percentage and Population Estimates*

The percentage estimates in the BRFSS data were calculated using Statistical Analysis System (SAS) data analysis software. SAS provides tools for information storage and retrieval, data modification, report writing, file handling, and statistical analysis. SAS/Graph provides a complete graphics system, for plotting on a variety of printers and graphics terminals. SAS includes interface routines for linking with the other available statistical packages.

The missing values (e.g., “don’t know” and “refused to answer” categories) were excluded from the denominator before the percentages were calculated in the percentage estimates in the BRFSS data.

The percentage estimates for population counts to derive an estimate for the total number of persons in the BRFSS Pennsylvania study to whom the behavior probably applies. For example, the survey estimate of the percentage of persons who drank was applied to the total adult population of Pennsylvania to derive an estimate of the total number of drinkers in Pennsylvania. The data source for the population count estimates used to determine urban and rural areas of Pennsylvania in this study was from the United States Census Bureau, reported in 2000.

### *Sampling Error and Non-Sampling Error*

Sampling error refers to random variation that occurs because only a subset of the entire population is sampled and used to estimate the finding for the entire population. It is often called margin of error and is expressed as the plus or minus term. In the BRFSS data, sampling error has been expressed as confidence interval bounds. The 95% confidence interval (calculated as 1.96 times the standard error of a statistic) indicates the range of values within which the statistic would fall 95% of the time if the researcher were to calculate the statistic (e.g., a percentage) from an infinite number of samples of the same size drawn from the same base population. Figures in this study include charts showing the estimated confidence intervals around the percentage estimates.

The non-sampling error exists in survey estimates. Sources of non-sampling error include characteristic interpretation of survey questions by respondents, variations in interviewer technique, household non-response to questions, coding errors, and so forth. Every effort was made to avoid non-sampling error in the data collection and analysis process, by the data collectors. However, no specific efforts were made to quantify the magnitude of non-sampling error in the BRFSS survey.

### Document Analysis

A document analysis was performed to provide information on what are the healthcare policies that are being implemented in urban and rural areas of Pennsylvania. The documents chosen to be analyzed in this study were chosen from the library of health policies and programs in the Pennsylvania Department of Health and includes active programs being put into practice that impact urban and rural areas of Pennsylvania.

The table below presents the analysis procedures for the document analysis. This includes a historical review of public health policies in rural and urban areas of Pennsylvania. Then any findings of significance will be reported from this analysis and how they affect rural and urban areas of Pennsylvania.

Table 3

*Health Policy Document Analysis*

Document Analysis: Health Policy	
<b>Instrument:</b> Pennsylvania Health Policies	Description
Historical review of public health policies implemented in Pennsylvania concerning health behaviors and chronic diseases.	<b>Rural Areas of Pennsylvania:</b> Policies <b>Urban Areas of Pennsylvania:</b> Policies
<b>Analysis:</b> The study population (rural vs. urban) was described by the document analysis of how they affect rural and urban areas of Pennsylvania.	
<b>Report:</b> Any findings of significance to describe the study group (determined by research interpretation)	<b>Analysis Chart:</b> Table of Health Policies

## Summary

The methodology for this study consisted both statistics data analysis and document analysis. Both descriptive statistics and inferential statistics were performed on existing data sets from the BRFSS survey. This data provides information on health access and utilization, health risk factors, preventive behaviors, chronic disease conditions, and selected public health issues. The BRFSS survey in Pennsylvania uses an adjusted weight procedure to compensate for the persons that are not contacted for the

telephone survey. It is weighted for the probability of selection of a telephone number, the number of adults in a household, and the number of phones in a household.

The quantitative methodology of analyzing the BRFSS survey data was a chi square analysis to determine any statistical significance among rural and urban people in Pennsylvania. The chi square was chosen to be conducted with the data since a comparison of groups with several variables was needed. The data was first described though descriptive statistics of how each survey question was answered by the respondents. This was performed to analyze the answers of the survey respondents.

The document analysis was conducted by researching recent healthcare legislation and current health care education programs in Pennsylvania. The different document features and relationships to health care and health behaviors are identified and how they affect people in the state.

The next chapter reported the results of the statistical analysis of the data and its outcomes in relation to the research questions asked in the study.

## CHAPTER FOUR

### DATA ANALYSIS AND FINDINGS

#### Introduction

The data analysis procedure and process is presented in this chapter. This research study analyzed pre-existing data from the Behavioral Risk Factor Surveillance System (BRFSS), a Centers for Disease Control and Prevention (CDC) coordinated, state-based, continuously conducted, telephone-administered health survey that monitors risk behaviors related to chronic diseases, injuries, and death. The BRFSS pre-existing data was examined in this study to analyze the health access and utilization, health behaviors, chronic diseases, and other health issues for rural and urban residents of Pennsylvania. The analysis of this data identified emerging health risks in rural and urban residents of Pennsylvania and assisted in the identification of forecasting future health concerns for the Commonwealth. The study of the BRFSS pre-existing data can assist medical providers and health plans to better understand the health demographics and behaviors of the people that they serve. Specifically, the health risk and preventive behaviors for rural and urban areas in Pennsylvania were compared to determine any statistical significance. This information gave solid reasons for the implementation of effective preventive health education for Pennsylvanians based on educational theories proven effective to improve healthy behaviors.

The data analysis plan consists of three sections. The first is a comprehensive report of the preventive health behaviors and the risk health behaviors in rural and urban areas of Pennsylvania. The focus of this report was on the similarities and differences in

(a) health access and utilization, (b) health risk factors, (c) preventive health behaviors, (d) chronic disease conditions, and (e) selected public health issues. This section addressed the research questions with descriptive and inferential statistical analysis.

1. How do urban and rural areas of Pennsylvania compare with health access and utilization?
2. How do urban and rural areas of Pennsylvania compare with health risk factors?
3. How do urban and rural areas of Pennsylvania compare with preventive health behaviors?
4. How do urban and rural areas of Pennsylvania compare with chronic disease conditions?
5. How do urban and rural areas of Pennsylvania compare with selected public health issues?

The second section is a comprehensive health policy analysis and health policy recommendations for rural and urban areas of Pennsylvania. The focus of this report is a description on (a) the history of health policy concerning health access and utilization, health risk factors, preventive health behaviors, chronic disease conditions, and selected public health issues, and (b) reasons for changes to health policies for improved health in rural and urban areas of Pennsylvania.

The third and final section is a comprehensive health education report on existing health education programs in rural and urban areas in Pennsylvania. The focus of this report is a description on (a) the history of health education concerning health access and utilization, health risk factors, preventive health behaviors, chronic disease conditions,

and selected public health issues, and (b) reasons for changes to current health education for improved health in rural and urban areas of Pennsylvania.

## Section 1: Analysis of BRFSS Data

### *Health Access and Utilization*

The first research objective examined how urban and rural areas of Pennsylvania compare with health access and utilization. Two questions from the BRFSS 2005 survey are measured for this research objective. The first question for analysis is:

- Do you have any kind of health care coverage, including health insurance, prepaid plans such as HMOs, or government plans such as Medicare?

The BRFSS survey question on health care coverage was conducted with 13,378 rural and urban citizens of Pennsylvania. The research compared the two groups (rural and urban) and their response to the health care coverage question. The survey participants were categorized by their location into the following groups: rural and urban. The survey respondents utilized a yes, no, and don't know scale for the variable. Additionally, missing responses (such as refusing to answer the question) for the variable were listed under the name 'missing'.

SPSS was used to perform a chi square analysis of the responses to determine the chi-square value, the level of significance, and the degrees of freedom. For comparison, an accepted alpha of .05 was used for each variable as a basis for the rejection or maintenance of the null hypothesis. The column totals and percentages were also calculated.

A table of observed frequencies and column percentage for urban and rural geographic location and health care coverage of respondents is in table 4. Table 4 shows that of a total of 13,378 survey participants, 11,985 (89.6%) people do have health care coverage and 1,346 (10.1) do not have health care coverage. Urban participants that do have health care coverage are 7,944 (90.4%) and urban participants that do not have health care coverage are 814 (9.2%). Rural participants that do have health care coverage are 4,041 (88.1%) and rural participants that do not have health care coverage are 532 (11.7%). The remaining responses refused to answer (missing) or did not know if they had health care coverage.

Table 4

*Summary of Urban and Rural Response to the Health Care Coverage*

Health Care Coverage	Geographic Location		
	Urban n(%)	Rural n(%)	Total n(%)
Yes	7944(90.4)	4041(88.1)	11985(89.6)
No	814(9.2)	532(11.7)	1346(10.1)
Don't Know	17(0.2)	10(0.1)	27(0.2)
Missing	15(0.2)	5(0.1)	20(0.1)
Total	8790(100.0)	4588(100.0)	13378(100.0)

Notes:  $X^2 = 18.97$ ,  $df = 3$ ,  $p \leq .000***$

A chi-square analysis of the responses of the four groups of the variable 'Health Care Coverage' provided an  $X^2$  value of 18.97, a degree of freedom of 3. The  $X^2$  value was significant ( $p \leq .000$ ). This means that the null hypothesis is rejected in favor of the

alternative hypothesis. Therefore, there is a significant difference in responses for having health care coverage. The rural survey respondents answered 88.1% yes to having health care coverage and 90.4% of urban said yes. However, there is no difference with regards to the geographic location and their answers towards health care coverage.

As shown in table 4, when comparing the values in each category, 7,944 (90.4%) of urban and 4,041 (88.1%) of rural have health care coverage, the majority of both urban and rural residents answered that yes they have health care coverage. Also as shown in table 4, 814 (9.2%) of urban and 532 (11.7%) of rural do not have health care coverage. Urban and rural areas in Pennsylvania both have an average of 10% of individuals that do not have health care coverage.

The second survey question pertaining to the first research objective examined how urban and rural areas of Pennsylvania compare with health access and utilization is:

- Do you have one person you think of as your personal doctor or health care provider?

The BRFSS survey question on having a personal health care provider was conducted with 13,378 rural and urban citizens of Pennsylvania. The research compared the two groups (rural and urban) and their response to the health care coverage question. The survey participants were categorized by their location into the following groups: rural and urban. The survey respondents utilized a yes only one, more than one, no, and don't know scale for the variable. Additionally, missing responses (such as refusing to answer the question) for the variable were listed under the name 'missing'.

SPSS was used to perform a chi square analysis of the responses to determine the chi-square value, the level of significance, and the degrees of freedom. For comparison,

an accepted alpha of .05 was used for each variable as a basis for the rejection or maintenance of the null hypothesis. The column totals and percentages were also calculated.

A table of observed frequencies and column percentage for urban and rural geographic location and personal health care provider of respondents are in table 5. Table 5 shows that of a total of 13,378 survey participants, 11,137 (83.3%) people do have one person they think of as a personal doctor or health care provider. Additionally, 934 (6.9%) have more than one and 1,264 (9.6%) do not have a personal doctor or other health care provider. The remaining do not know (23 (0.1%) or refused to answer/missing (20 (0.1%). Urban participants that have more than one personal doctor are 7,388 (84.1%) and those that have more than one personal doctor are 628 (7.1%). The number of urban participants that did not have a personal doctor was 750 (8.6%). The remaining responses did not know if they had a personal doctor 11 (0.1%) or refused to answer/missing 13 (0.1%).

Table 5

*Urban and Rural Geographic Location/ Health Care Provider of Respondents*

Health Care Provider	Geographic Location		
	Urban n(%)	Rural n(%)	Total n(%)
Yes, only one	7388(84.1)	3749(81.7)	11137(83.3)
More than one	628(7.1)	306(6.7)	934(6.9)
No	750(8.6)	514(11.2)	1264(9.6)
Don't know	11(0.1)	12(0.3)	23(0.1)
Missing	13(0.1)	7(0.1)	20(0.1)
Total	8790(100.0)	4588(100.0)	13378(100.0)

Notes:  $X^2 = 28.98$ ,  $df = 4$ ,  $p \leq .000^{***}$

A chi-square analysis of the responses of the five groups of the variable 'Have Personal Health Care Provider' provided an  $X^2$  value of 28.98, a DF of 4. The  $X^2$  value was significant ( $p \leq .000$ ). This means that the null hypothesis is rejected in favor of the alternative hypothesis. Therefore, there is a significant difference in responses to the number of doctors. Majority of them, both urban and rural, (over 80%) have only one doctor.

There is no significant difference with regard to geographic location groups and their answers towards personal having a personal health care provider.

As shown in table 5, when comparing the values in each category, 7,388 (84.1%) of urban and 3,749 (81.7%) of rural have one personal health care provider. Both geographical groups reported at least 80% of having one personal health care provider.

Additionally, it was reported if the survey respondents had more than one personal health care provider. As shown in table 5, when comparing the values in each category, 628 (7.1%) of urban and 306 (6.7%) of rural have more than one personal health care provider. The majority of them do have one personal health care provider with a small percentage (about 7%) having more than one.

As shown in table 5, when comparing the values in each category, 750 (8.6%) of urban and 514 (11.2%) of rural do not have a personal health care provider. While a slightly higher amount of the rural people responding to the survey did answer that they did not have a personal health care provider, the majority of both groups do have one.

In summary, the first research objective asked how urban and rural areas of Pennsylvania compare with health access and utilization. A descriptive data analysis concerning health care coverage found that the majority of urban and rural people do have some type of health care coverage. While this finding was significant it cannot be ignored that 9.2% of urban and 11.7% of rural of survey participants do not have any kind of health insurance. This is consistent when asking if they have a personal doctor or health care provider. The majority of urban and rural people in the survey do have a personal doctor. However, 8.6% of urban and 11.2% of rural survey participants do not have a personal doctor. The lack of utilization of healthcare in the survey audience was present and consistent in the survey data. This lack of healthcare was also found in the research of national data and program efforts addressing the lack of access and use of health care for rural and urban areas. The recommendations for change addressed in this study have implications to increase access to health care. This study has shown a need for

health care reform based on the 10.1% of the Pennsylvanians that do not have health care insurance coverage.

### *Health Risk Factors*

The second research objective examined how urban and rural areas of Pennsylvania compare with health risk factors. Six questions from the BRFSS 2005 survey are measured for this research question. The first question for analysis is:

- Have you smoked at least 100 cigarettes in your entire life?

The BRFSS survey question on cigarette smoking was conducted with 13,378 rural and urban citizens of Pennsylvania. The research compared the two groups (rural and urban) and their response to the smoked at least 100 cigarettes question. The survey participants were categorized by their location into the following groups: rural and urban. The survey respondents utilized a yes, no, and don't know scale for the variable. Additionally, missing responses (such as refusing to answer the question) for the variable were listed under the name 'missing'.

A table of observed frequencies and column percentage for urban and rural geographic location and smoked at least 100 cigarettes question of respondents is in table 6. Table 6 shows that of a total of 13,378 survey participants, 6,669 (49.9%) people have smoked at least 100 cigarettes in their lifetime and 6,652 (49.7%) have not. Urban participants that have smoked at least 100 cigarettes in their lifetime are 4,323 (49.2%) and 4,430 (50.4%) have not. Rural participants that have smoked at least 100 cigarettes in their lifetime are 2,346 (51.3%) and 2,222 (48.5%) have not. The remaining responses refused to answer or did not know if they had smoked at least 100 cigarettes in their

entire life. Table 6 shows a near 50-50 split between yes and no for both urban and rural groups for had smoked at least 100 cigarettes in their entire life than from survey participants in urban areas.

Table 6

*Urban and Rural Geographic Location/ Smoked At Least 100 Cigarettes of Respondents*

At Least 100 Cigarettes	Geographic Location		
	Urban n(%)	Rural n(%)	Total n(%)
Yes	4323(49.2)	2346(51.3)	6669(49.9)
No	4430(50.4)	2222(48.5)	6652(49.7)
Don't know	34(0.2)	15(0.1)	49(0.2)
Missing	3(0.1)	5(0.1)	8(0.1)
Total	8790(100.0)	4588(100.0)	13378(100.0)

Notes:  $X^2 = 7.77$ ,  $df = 3$ ,  $p = .051$

A chi-square analysis of the responses of the four groups of the variable 'smoked at least 100 cigarettes' provided an  $X^2$  value of 7.77, a degree of freedom of 3. The  $X^2$  value was a non-significant ( $p = .051$ ). This means that the null hypothesis is accepted. Therefore, there is not a significant difference in responses among the geographic location groups and their answers towards smoked at least 100 cigarettes.

The second survey question analyzed to examine how urban and rural areas of Pennsylvania compare with health risk factors is:

- Do you now smoke cigarettes every day, some days, or not at all?

The BRFSS survey question on frequency of days now smoking was conducted with 6,669 rural and urban citizens of Pennsylvania. The research compared the two groups (rural and urban) and their response to the days of now smoking question. The survey participants were categorized by their location into the following groups: rural and urban. The survey respondents utilized an every day, some days, not at all, and don't know scale for the variable. Additionally, missing responses (such as refusing to answer the question) for the variable were listed under the name 'missing'.

SPSS was used to perform a chi square analysis of the responses to determine the chi-square value, the level of significance, and the degrees of freedom. For comparison, an accepted alpha of .05 was used for each variable as a basis for the rejection or maintenance of the null hypothesis. The column totals and percentages were also calculated.

A table of observed frequencies and column percentage for urban and rural geographic location and frequency of days now smoking of respondents is in table 7. Table 7 shows that of a total of 6,669 survey participants 2,295 (34.4%) people smoke everyday, 716 (10.7%) people smoke some days, and 3,651(54.7%) people now do not smoke at all. Urban participants that smoke every day are 1,447 (33.5%), smoke some days 456 (10.5%), and 2, 416 (55.8%) now smoke not at all. Rural participants that smoke every day are 848 (36.1%), smoke some days 260 (11.1%), and 1,235 (52.6%) now smoke not at all. The remaining responses refused to answer or did not know their frequency of smoking.

Table 7 shows that 2.6% more rural participants within their geographic location have smoked everyday with the majority of both urban and rural, over 50%, do not smoke.

Table 7

*Urban and Rural Geographic Location/ Frequency of Cigarette Smoking of Respondents*

Smoking Frequency	Geographic Location		
	Urban n(%)	Rural n(%)	Total n(%)
Every Day	1447(33.5)	848(36.1)	2295(34.4)
Some Days	456(10.5)	260(11.1)	716(10.7)
Not at All	2416(55.8)	1235(52.6)	3651(54.7)
Don't Know	2(0.1)	1(0.1)	3(0.1)
Missing	2(0.1)	2(0.1)	4(0.1)
Total	4323(100.0)	2346(100.0)	6669(100.0)

Notes:  $X^2 = 6.88$ ,  $df = 4$ ,  $p = .142$

A chi-square analysis of the responses of the five groups of the variable 'frequency of days now smoking' provided an  $X^2$  value of 6.88, a degree of freedom of 4. The  $X^2$  value was a non-significant ( $p = .142$ ). This means that the null hypothesis is accepted. Therefore, there is not a significant difference in responses among the geographic location groups and their answers towards their frequency of days now smoking.

The third survey question analyzed to examine how urban and rural areas of Pennsylvania compare with health risk factors is:

- During the past 30 days, how many days per week or per month did you have at least one drink of any alcoholic beverage?

The BRFSS survey question on days in the past 30 days have had an alcoholic beverage was conducted with 6,819 rural and urban citizens of Pennsylvania. The research compared the two groups (rural and urban) and their response to the days of drinking question. The survey participants were categorized by their location into the following groups: rural and urban. The survey respondents utilized a days per week, days in past 30 days, no drinks in past 30 days, and don't know scale for the variable. Additionally, missing responses (such as refusing to answer the question) for the variable were listed under the name 'missing'.

SPSS was used to perform a chi square analysis of the responses to determine the chi-square value, the level of significance, and the degrees of freedom. For comparison, an accepted alpha of .05 was used for each variable as a basis for the rejection or maintenance of the null hypothesis. The column totals and percentages were also calculated.

A table of observed frequencies and column percentage for urban and rural geographic location and days in the past 30 days have had an alcoholic beverage of respondents is in table 8. Table 8 shows that of a total of 6,819 survey participants 1,531 (22.5%) drank an alcoholic beverage 1 to 3 days per week and 360 (5.3%) 4 to 7 days per week. Of the number of days in the past 30 days, 4,010 (58.8%) 1 to 10 days, 308 (4.5%) 11 to 20 days, 416 (6.1%) 21 to 30 days, and 86 (1.3%) have not had an alcoholic drink in the past 30 days. Urban participants that drank an alcoholic beverage 1 to 3 days per week was 995 (22.1%) and 240 (5.3%) 4 to 7 days per week. Of the number of days in

the past 30 days, 2,673 (59.2%) 1 to 10 days, 214 (4.8%) 11 to 20 days, 271 (6.1%) 21 to 30 days, and 54 (1.2%) have not had an alcoholic drink in the past 30 days. Rural participants that drank an alcoholic beverage 1 to 3 days per week was 536 (23.2%) and 120 (5.2%) 4 to 7 days per week.

Of the number of days in the past 30 days, 1,337 (58.1%) 1 to 10 days, 94 (4.1%) 11 to 20 days, 145 (6.3%) 21 to 30 days, and 32 (1.4%) have not had an alcoholic drink in the past 30 days. The remaining responses refused to answer or did not know their frequency of drinking alcoholic beverages.

Table 8

*Urban and Rural Geographic Location/ Frequency of Alcoholic Beverage of Respondents*

Alcoholic Beverage	Geographic Location		
	Urban n(%)	Rural n(%)	Total n(%)
Days per week			
1 to 3	995(22.1)	536(23.2)	1531(22.5)
4 to 7	240(5.3)	120(5.2)	360(5.3)
Days in past 30			
1 to 10	2673(59.2)	1337(58.1)	4010(58.8)
11 to 20	214(4.8)	94(4.1)	308(4.5)
21 to 30	271(6.1)	145(6.3)	416(6.1)
No drinks in past 30	54(1.2)	32(1.4)	86(1.3)
Don't know	53(1.2)	33(1.4)	86(1.3)
Missing	12(0.1)	10(0.1)	22(0.2)
Total	4512(100.0)	2307(100.0)	6819(100.0)

Notes:  $X^2 = 38.66$ ,  $df = 7$ ,  $p = .308$

A chi-square analysis of the responses of the eight groups of the variable 'days in past 30 days had alcoholic beverage' provided an  $X^2$  value of 38.66, a degree of freedom of 7. The  $X^2$  value was a non-significant ( $p = .308$ ). This means that the null hypothesis is accepted. Therefore, there is not a significant difference in responses among the geographic location groups and their answers towards days in the past 30 days have had an alcoholic beverage.

The fourth survey question analyzed to examine how urban and rural areas of Pennsylvania compare with health risk factors is:

- One drink is equivalent to a 12-ounce beer, a 5-ounce glass of wine, or a drink with one shot of liquor. During the past 30 days, on the days when you drank, about how many drinks did you drink on the average?

The BRFSS survey question on average alcoholic drinks per day in past 30 days was conducted with 6,733 rural and urban citizens of Pennsylvania. The research compared the two groups (rural and urban) and their response to the average alcoholic drinks question. The survey participants were categorized by their location into the following groups: rural and urban. The survey respondents utilized a 1 to 5 alcoholic beverages in the past 30 days, 6 to 10 alcoholic beverages in the past 30 days, 11 to 15 alcoholic beverages in the past 30 days, 16 to 25 alcoholic beverages in the past 30 days, more than 30 alcoholic beverages in the past 30 days, and don't know scale for the variable. Additionally, missing responses (such as refusing to answer the question) for the variable were listed under the name 'missing'.

SPSS was used to perform a chi square analysis of the responses to determine the chi-square value, the level of significance, and the degrees of freedom. For comparison,

an accepted alpha of .05 was used for each variable as a basis for the rejection or maintenance of the null hypothesis. The column totals and percentages were also calculated.

A table of observed frequencies and column percentage for urban and rural geographic location and average alcoholic drinks per day in past 30 days of respondents is in table 9. Table 9 shows that of a total of 6,733 survey participants 6,131(91.1%) have had 1 to 5 alcoholic beverages in the past 30 days, 349 (5.2%) have had 6 to 10 drinks, 62 (0.9%) have had 11 to 15 drinks, 14 (0.2%) have had 16 to 25 drinks, and 14 (0.2%) have had more than 30 alcoholic drinks. Urban survey participants that drank an alcoholic beverage in the past 30 days were 4,072 (91.3%) had 1 to 5 drinks, 230 (5.2%) had 6 to 10 drinks, 45 (1.0%) had 11 to 15 drinks, 10 (0.2%) had 18 to 25 drinks, and 12 (0.3%) had more than 30 drinks. Rural participants that drank an alcoholic beverage in the past 30 days were 2,059 (90.5%) had 1 to 5 drinks, 119 (5.2%) had 6 to 10 drinks, 17 (0.7%) had 11 to 15 drinks, 4 (0.2%) had 16 to 25 drinks, and 2 (0.1%) had more than 30 drinks in the past 30 days. The remaining responses refused to answer or did not know their frequency of drinking alcoholic beverages in the past 30 days.

Table 9

*Urban and Rural Geographic Location/ Average Drinks in 30 Days of Respondents*

Number of drinks	Geographic Location		
	Urban n(%)	Rural n(%)	Total n(%)
1 to 5	4072(91.3)	2059(90.5)	6131(91.1)
6 to 10	230(5.2)	119(5.2)	349(5.2)
11 to 15	45(1.0)	17(0.7)	62(0.9)
16 to 25	10(0.2)	4(0.2)	14(0.2)
More than 30	12(0.3)	2(0.1)	14(0.2)
Don't know	74(1.7)	50(2.2)	124(1.8)
Missing	15(0.3)	24(1.1)	39(0.6)
Total	4458(100.0)	2275(100.0)	6733(100.0)

Notes:  $X^2 = 40.91$ ,  $df = 6$ ,  $p = .023^*$

A chi-square analysis of the responses of the seven groups of the variable 'Number of Drinks' provided an  $X^2$  value of 40.91, a degree of freedom of 6. The  $X^2$  value was significant ( $p = .023$ ). This means that the null hypothesis is rejected in favor of the alternative hypothesis. Therefore, there is a significant difference in responses to the average number of drinks in 30 days. Majority of them (over 90%) have 1 to 5 drinks in the past 30 days.

There is no significant difference with regard to geographic location groups and their answers towards average alcoholic drinks per day in past 30 days.

As shown in table 9, when comparing the values in each category, 4,072 (91.3%) of urban and 2,059 (90.5%) of rural have had 1 to 5 drinks in the past 30 days. The

majority of urban and rural people in the survey, about 90% of them, answered they have had 1 to 5 drinks in the past 30 days. Also as shown in table 9, when comparing the values in each category, 297 (8.7%) of urban and 142 (9.5%) of rural have had more than 5 drinks in the past 30 days. About 9% have had more than 5 drinks in the past 30 days, a minority of the responses.

The fifth survey question analyzed to examine how urban and rural areas of Pennsylvania compare with health risk factors is:

- Considering all types of alcoholic beverages, how many times during the past 30 days did you have 5 or more drinks on an occasion?

The BRFSS survey question on number of occasions has had five or more alcoholic beverages were conducted with 6,733 rural and urban citizens of Pennsylvania. The research compared the two groups (rural and urban) and their response to the number of occasions question. The survey participants were categorized by their location into the following groups: rural and urban. The survey respondents utilized 1 to 5 occasions, 6 to 10 occasions, 11 to 15 occasions, 16 to 20 occasions, more than 20 occasions, no occasions, and don't know scale for the variable. Additionally, missing responses (such as refusing to answer the question) for the variable were listed under the name 'missing'.

SPSS was used to perform a chi square analysis of the responses to determine the chi-square value, the level of significance, and the degrees of freedom. For comparison, an accepted alpha of .05 was used for each variable as a basis for the rejection or maintenance of the null hypothesis. The column totals and percentages were also calculated.

A table of observed frequencies and column percentage for urban and rural geographic location and number of occasions of respondents is in table 10. Table 10 shows that of a total of 6,733 survey participants 1,393 (20.7%) have had 5 alcoholic drinks or more 1 to 5 occasions in the past 30 days, 137 (2.0%) 6 to 10 occasions, 49 (0.7%) 11 to 15 occasions, 20 (0.3%) 16 to 20 occasions, 48 (0.7%) more than 20 occasions, and 4,973 (73.9%) on no occasions. Urban survey participants that drank 5 or more alcoholic beverages during the past 30 days were 898 (20.1%) on 1 to 5 occasions, 84 (1.9%) 6 to 10 occasions, 31 (0.7%) 11 to 15 occasions, 9 (0.2%) 16 to 20 occasions, 29 (0.7%) more than 20 occasions, and 3,335 (74.8%) on no occasions. Rural survey participants that drank 5 or more alcoholic beverages during the past 30 days were 495 (21.8%) on 1 to 5 occasions, 53 (2.3%) 6 to 10 occasions, 18 (0.8%) 11 to 15 occasions, 11 (0.5%) 16 to 20 occasions, 19 (0.8%) more than 20 occasions, and 1,638 (72.0%) on no occasions. The remaining responses refused to answer or did not know how many times during the past 30 days they had 5 or more drinks on an occasion.

Table 10 shows that rural areas have had more occasions or having 5 or more alcoholic drinks. Survey respondents within their own geographic group of rural areas reported having had more drinks on occasion.

Table 10

*Urban and Rural Geographic Location/ 5 or More Drinks on Occasion of Respondents*

Number of occasions	Geographic Location		
	Urban n(%)	Rural n(%)	Total n(%)
1 to 5	898(20.1)	495(21.8)	1393(20.7)
6 to 10	84(1.9)	53(2.3)	137(2.0)
11 to 15	31(0.7)	18(0.8)	49(0.7)
16 to 20	9(0.2)	11(0.5)	20(0.3)
More Than 20	29(0.7)	19(0.8)	48(0.7)
Don't Know	55(1.2)	30(1.3)	85(1.3)
None	3335(74.8)	1638(72.0)	4973(73.9)
Missing	17(0.4)	11(0.5)	28(0.4)
Total	4458(100.0)	2275(100.0)	6733(100.0)

Notes:  $X^2 = 36.06$ ,  $df = 7$ ,  $p = .071$

A chi-square analysis of the responses of the eight groups of the variable 'number of occasions has had five or more alcoholic drinks' provided an  $X^2$  value of 36.06, a degree of freedom of 7. The  $X^2$  value was a non-significant ( $p = .071$ ). This means that the null hypothesis is accepted. Therefore, there is not a significant difference in responses among the geographic location groups and their answers towards their number of occasions.

The sixth survey question analyzed to examine how urban and rural areas of Pennsylvania compare with health risk factors is:

- In the past 12 months, has a doctor, nurse or other health professional given you advice about your weight?

The BRFSS survey question on professional weight advice was conducted with 12,624 rural and urban citizens of Pennsylvania. The research compared the two groups (rural and urban) and their response to the professional weight advice question. The survey participants were categorized by their location into the following groups: rural and urban. The survey respondents utilized a yes, lose weight, yes, gain weight, yes, maintain current weight, no, and don't know scale for the variable. Additionally, missing responses (such as refusing to answer the question) for the variable were listed under the name 'missing'.

SPSS was used to perform a chi square analysis of the responses to determine the chi-square value, the level of significance, and the degrees of freedom. For comparison, an accepted alpha of .05 was used for each variable as a basis for the rejection or maintenance of the null hypothesis. The column totals and percentages were also calculated.

A table of observed frequencies and column percentage for urban and rural geographic location and professional weight advice of respondents is in table 11. Table 11 shows that of a total of 12,624 survey participants 1,982 (15.7%) were advised to lose weight, 229 (1.8%) were told to gain weight, 270 (2.1%) were told to maintain weight, and 10,116 (80.1%) did not receive weight advice. Urban survey participants 1,309 (15.8%) were advised to lose weight, 144 (1.7%) were told to gain weight, 169 (2.0%) were told to maintain weight, and 6,660 (80.3%) did not receive weight advice. Rural survey participants 673 (15.6%) were advised to lose weight, 85 (1.9%) were told to gain

weight, 101 (2.3%) were told to maintain weight, and 3,456 (79.9%) did not receive weight advice. The remaining responses refused to answer or did not know their weight advice by a doctor, nurse or other health professional.

Table 11 shows that a large majority of urban (80.3%) people and a large majority of rural (79.9%) people did not receive weight advice from their doctor, nurse or other health professional.

Table 11

*Urban and Rural Geographic Location/ Weight Advice of Respondents*

Weight Advice	Geographic Location		
	Urban n(%)	Rural n(%)	Total n(%)
Yes, Lose Weight	1309(15.8)	673(15.6)	1982(15.7)
Yes, Gain Weight	144(1.7)	85(1.9)	229(1.8)
Yes, Maintain Current Weight	169(2.0)	101(2.3)	270(2.1)
No	6660(80.3)	3456(79.9)	10116(80.1)
Don't Know	14(0.1)	9(0.2)	23(0.2)
Missing	3(0.1)	1(0.1)	4(0.1)
Total	8299(100.0)	4325(100.0)	12624(100.0)

Notes:  $X^2 = 2.54$ ,  $df = 5$ ,  $p = .771$

A chi-square analysis of the responses of the six groups of the variable 'professional weight advice' provided an  $X^2$  value of 2.54, a degree of freedom of 5. The  $X^2$  value was a non-significant ( $p = .771$ ). This means that the null hypothesis is

accepted. Therefore, there is not a significant difference in responses among the geographic location groups and their answers towards their professional weight advice.

In summary, the second research objective asked how urban and rural areas of Pennsylvania compare with health risk factors. The survey results indicated an overall pattern of exhibiting health risk factors and rural residents consistently were worse than urban residents. Cigarette smoking is a risk factor for the onset of many chronic diseases (American Cancer Society, 2006). The survey participants were asked if they smoked at least 100 cigarettes in their entire lifetime. Slightly more rural people have (51.3%) compared to urban (49.2%). This was not found to be significant but when a follow-up question was asked how often they smoked, then it illustrated a clearer picture of smoking habits. More rural people (36.1%) smoked everyday compared to urban people (33.5%).

Alcohol is another risk factor that can cause negative health complications and a risk factor for other chronic diseases (American Cancer Society, 2007). The survey participants were asked during the past 30 days how many alcoholic drinks have they had. Rural people reported slightly drinking more per week (28.4%) than urban people (27.4%). While the majority of both groups had at least one drink in the past 1 to 10 days, urban (59.2%) and rural (58.1%) this was not found significant.. A follow-up question asked on when they drank, how many drinks on average was consumed. A significant find in the data was that the majority of urban (91.3%) and rural (90.5%) reported 1 to 5 drinks per occasion, with urban drinking slightly more 1 to 5 drinks per occasion. This was a unique find in the data where urban residents exhibited a risk health behavior more than rural people, since rural people in the survey had an overall pattern of worse health

behaviors. The survey participants were also asked how often they consumed 5 or more alcoholic drinks on an occasion. It was a significant contribution of the survey results that the data analysis found that 2.8% of rural people drank more than urban people.

The survey participants were asked if a medical professional has given them advice about their weight. According to the results, 80.3% of urban and 79.9% of rural have not received advice. This is an indicator outlined in the survey analysis for health providers to address weight issues with their patients. Health care providers should counsel their patients on their weight, no matter if they are ideal weight, under weight, or over weight. This consultation on weight can help a patient to modify their health behaviors and potentially prevent the onset of chronic diseases by following a plan to maintain a healthy weight.

### *Preventive Health Behaviors*

The third research objective examined how urban and rural areas of Pennsylvania compare with preventive health behaviors. Eight questions from the BRFSS 2005 survey are measured for this research question. The first question for analysis is:

- Not counting juice, how often do you eat fruit?

The BRFSS survey question on fruit consumption was conducted with 13,038 rural and urban citizens of Pennsylvania. The research compared the two groups (rural and urban) and their response to the fruit consumption question. The survey participants were categorized by their location into the following groups: rural and urban. The survey respondents utilized a 1 to 5 per day, 6 to 10 per day, 1 to 5 per week, 6 to 10 per week, 11 to 15 per week, more than 20 per week, 1 to 5 per month, 6 to 10 per month, 11

to 15 per month, 16 to 20 per month, more than 20 per month, 1 to 5 per year, 6 to 10 per year, 11 to 15 per year, 16 to 20 per year, more than 20 per year, never, and don't know scale for the variable. Additionally, missing responses (such as refusing to answer the question) for the variable were listed under the name 'missing'.

SPSS was used to perform a chi square analysis of the responses to determine the chi-square value, the level of significance, and the degrees of freedom. For comparison, an accepted alpha of .05 was used for each variable as a basis for the rejection or maintenance of the null hypothesis. The column totals and percentages were also calculated.

A table of observed frequencies and column percentage for urban and rural geographic location and fruit consumption of respondents is in table 18. Table 12 shows that of a total of 13,038 survey participants 5,730 (43.9%) ate fruit 1 to 5 times a day, 18 (0.1%) 6 to 10 times a day, 4,893 (37.5%) ate fruit 1 to 5 times per week, 249 (1.9%) ate fruit 6 to 10 times per week, 11 (0.1%) ate fruit 11 to 15 times per week, 4 (0.1%) ate fruit more than 20 times per week, 1,192 (91.4%) ate fruit 1 to 5 times per month, 86 (0.7%) ate fruit 6 to 10 times per month, 40 (0.3%) ate fruit 11 to 15 times per month, 22 (0.2%) ate fruit 16 to 20 times per month, 27 (0.2%) ate fruit more than 20 times per month, 89 (0.7%) ate fruit 1 to 5 times per year, 26 (0.2%) ate fruit 6 to 10 times per year, 4 (0.1%) ate fruit 11 to 15 times per year, 6 (0.1%) ate fruit 16 to 20 times per year, 9 (0.1%) ate fruit more than 20 times per year, and 436 (33.4%) never eat fruit.

Of the 8,575 urban survey participants 3,844 (44.8%) ate fruit 1 to 5 times a day, 11 (0.1%) 6 to 10 times a day, 3,187 (37.2%) ate fruit 1 to 5 times per week, 173 (2.0%) ate fruit 6 to 10 times per week, 7 (0.1%) ate fruit 11 to 15 times per week, 2 (0.1%) ate

fruit more than 20 times per week, 743 (8.7%) ate fruit 1 to 5 times per month, 61 (0.7%) ate fruit 6 to 10 times per month, 35 (0.4%) ate fruit 11 to 15 times per month, 12 (0.1%) ate fruit 16 to 20 times per month, 18 (0.1%) ate fruit more than 20 times per month, 51 (0.6%) ate fruit 1 to 5 times per year, 18 (0.2%) ate fruit 6 to 10 times per year, 3 (0.1%) ate fruit 11 to 15 times per year, 4 (0.1%) ate fruit 16 to 20 times per year, 5 (0.1%) ate fruit more than 20 times per year, and 280 (3.3%) never eat fruit.

Of the 4,463 rural survey participants 1,886 (42.3%) ate fruit 1 to 5 times a day, 7 (0.2%) 6 to 10 times a day, 1,706 (38.2%) ate fruit 1 to 5 times per week, 76 (1.7%) ate fruit 6 to 10 times per week, 4 (0.1%) ate fruit 11 to 15 times per week, 2 (0.1%) ate fruit more than 20 times per week, 449 (10.1%) ate fruit 1 to 5 times per month, 25 (0.6%) ate fruit 6 to 10 times per month, 1 (0.1%) ate fruit 11 to 15 times per month, 2 (0.1%) ate fruit 16 to 20 times per month, 4 (0.1%) ate fruit more than 20 times per month, 38 (0.9%) ate fruit 1 to 5 times per year, 8 (0.2%) ate fruit 6 to 10 times per year, 1 (0.1%) ate fruit 11 to 15 times per year, 2 (0.1%) ate fruit 16 to 20 times per year, 4 (0.1%) ate fruit more than 20 times per year, and 156 (34.9%) never eat fruit.

The remaining responses refused to answer or did not know how much fruit they have ate.

Table 12

*Urban and Rural Geographic Location/ Frequency of Eating Fruit of Respondents*

Fruit Consumption	Geographic Location		
	Urban n(%)	Rural n(%)	Total n(%)
<b>Per Day</b>			
1 to 5	3844(44.8)	1886(42.3)	5730(43.9)
6 to 10	11(0.1)	7(0.2)	18(0.1)
<b>Per Week</b>			
1 to 5	3187(37.2)	1706(38.2)	4893(37.5)
6 to 10	173(2.0)	76(1.7)	249(1.9)
11 to 15	7(0.1)	4(0.1)	11(0.1)
More Than 20	2(0.1)	2(0.1)	4(0.1)
<b>Per Month</b>			
1 to 5	743(8.7)	449(10.1)	1192(91.4)
6 to 10	61(0.7)	25(0.6)	86(0.7)
11 to 15	35(0.4)	5(0.1)	40(0.3)
16 to 20	12(0.1)	10(0.2)	22(0.2)
More Than 20	18(0.1)	9(0.2)	27(0.2)
<b>Per Year</b>			
1 to 5	51(0.6)	38(0.9)	89(0.7)
6 to 10	18(0.2)	8(0.2)	26(0.2)
11 to 15	3(0.1)	1(0.1)	4(0.1)
16 to 20	4(0.1)	2(0.1)	6(0.1)
More Than 20	5(0.1)	4(0.1)	9(0.1)

Never	280(3.3)	156(34.9)	436(33.4)
Don't Know	106(1.2)	67(1.5)	173(1.3)
Missing	17(0.2)	8(0.2)	25(0.2)
Total	8575(100.0)	4463(100.0)	13038(100.0)

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Notes:  $X^2 = 41.38$ ,  $df = 18$ ,  $p \leq .038^*$

A chi-square analysis of the responses of the four groups of the variable 'fruit consumption' provided an  $X^2$  value of 18.97, a degree of freedom of 3. The  $X^2$  value was significant ( $p = .038$ ). This means that the null hypothesis is rejected in favor of the alternative hypothesis. Therefore, there is a significant difference in responses to fruit consumption. Majority of them (over 40%) consume fruit 1 to 5 times a day or 1 to 5 times a week.

There is no significant difference in responses among the geographic location groups and their answers towards fruit consumption.

As shown in table 12, when comparing the values in each category, 3,844 (44.8%) of urban and 1,886 (42.3%) of rural have had 1 to 5 fruits per day. Over 40% reported that they have had 1 to 5 fruits per day. Additionally, it was reported if the survey respondents had 1 to 5 fruits per week. As shown in table 12, when comparing the values in each category, 3,187 (37.2%) of urban and 1,706 (38.2%) of rural have had 1 to 5 fruits per week. At least 37% of urban and rural survey respondents reported they have had 1 to 5 fruits per week.

The majority of them eat fruit 1 to 5 times per day (over 40%) or 1 to 5 times per week (at least 37%).

As shown in table 12, when comparing the values in each category, 11 (0.1%) of urban and 7 (0.2%) of rural have had more than 5 fruits per day. A very small percent answered they have had more than 5 fruits per day.

Additionally, it was reported if the survey respondents had more than 5 fruits per week. As shown in table 12, when comparing the values in each category, 182 (2.2%) of urban and 82 (1.9%) of rural have had more than 5 fruits per week. About 2% reported having had more than 5 fruits per week.

The second survey question analyzed to examine how urban and rural areas of Pennsylvania compare with preventive health behaviors is:

- Not counting carrots, potatoes, or salad, how many servings of vegetables do you usually eat? (Example: A serving of vegetables at both lunch and dinner would be two servings.)

The BRFSS survey question on health care coverage was conducted with 13,001 rural and urban citizens of Pennsylvania. The research compared the two groups (rural and urban) and their response to the servings of vegetables question. The survey participants were categorized by their location into the following groups: rural and urban. The survey respondents utilized a 1 to 5 times a day, 6 to 10 times a day, more than 10 times a day, 1 to 5 times per week, 6 to 10 times per week, 11 to 15 times per week, 16 to 20 times per week, more than 20 times per week, 1 to 5 times per month, 6 to 10 times per month, 11 to 15 times per month, 16 to 20 times per month, more than 20 times per month, 1 to 5 times per year, 6 to 10 times per year, 11 to 15 times per year, 16 to 20 times per year, more than 20 times per year, never eat vegetables, and don't know

scale for the variable. Additionally, missing responses (such as refusing to answer the question) for the variable were listed under the name 'missing'.

SPSS was used to perform a chi square analysis of the responses to determine the chi-square value, the level of significance, and the degrees of freedom. For comparison, an accepted alpha of .05 was used for each variable as a basis for the rejection or maintenance of the null hypothesis. The column totals and percentages were also calculated.

A table of observed frequencies and column percentage for urban and rural geographic location and servings of vegetables of respondents is in table 13. Table 13 shows that of a total of 13,001 survey participants 8,326 (64.0%) ate vegetables 1 to 5 times a day, 26 (0.2%) 6 to 10 times a day, 1 (0.1%) more than 10 times a day, 2,999 (23.1%) ate vegetables 1 to 5 times per week, 579 (4.5%) ate vegetables 6 to 10 times per week, 66 (0.5%) ate vegetables 11 to 15 times per week, 9 (0.1%) ate vegetables 16 to 20 times per week, 7 (0.1%) ate vegetables more than 20 times per week, 328 (25.2%) ate vegetables 1 to 5 times per month, 79 (0.6%) ate vegetables 6 to 10 times per month, 47 (0.4%) ate vegetables 11 to 15 times per month, 39 (0.3%) ate vegetables 16 to 20 times per month, 51 (0.4%) ate vegetables more than 20 times per month, 16 (0.1%) ate vegetables 1 to 5 times per year, 6 (0.1%) ate vegetables 6 to 10 times per year, 4 (0.1%) ate vegetables 11 to 15 times per year, 2 (0.1%) ate vegetables 16 to 20 times per year, 4 (0.1%) ate vegetables more than 20 times per year, and 179 (1.4%) never eat vegetables.

Of the 8,546 urban survey participants 5,412 (63.3%) ate vegetables 1 to 5 times a day, 13 (0.2%) 6 to 10 times a day, 1 (0.1%) more than 10 times a day, 2,045 (23.9%) ate vegetables 1 to 5 times per week, 374 (4.4%) ate vegetables 6 to 10 times per week, 42

(0.5%) ate vegetables 11 to 15 times per week, 5 (0.1%) ate vegetables 16 to 20 times per week, 5 (0.1%) ate vegetables more than 20 times per week, 220 (25.7%) ate vegetables 1 to 5 times per month, 57 (0.7%) ate vegetables 6 to 10 times per month, 35 (0.4%) ate vegetables 11 to 15 times per month, 24 (0.3%) ate vegetables 16 to 20 times per month, 36 (0.4%) ate vegetables more than 20 times per month, 8 (0.1%) ate vegetables 1 to 5 times per year, 4 (0.1%) ate vegetables 6 to 10 times per year, 3 (0.1%) ate vegetables 11 to 15 times per year, 2 (0.1%) ate vegetables 16 to 20 times per year, 3 (0.1%) ate vegetables more than 20 times per year, and 127 (1.5%) never eat vegetables.

Of the 4,455 rural survey participants 2,914 (65.4%) ate vegetables 1 to 5 times a day, 13 (0.3%) 6 to 10 times a day, 0 (0.0%) more than 10 times a day, 954 (21.4%) ate vegetables 1 to 5 times per week, 205 (4.6%) ate vegetables 6 to 10 times per week, 24 (0.5%) ate vegetables 11 to 15 times per week, 4 (0.1%) ate vegetables 16 to 20 times per week, 2 (0.1%) ate vegetables more than 20 times per week, 108 (2.4%) ate vegetables 1 to 5 times per month, 22 (0.5%) ate vegetables 6 to 10 times per month, 12 (0.3%) ate vegetables 11 to 15 times per month, 15 (0.3%) ate vegetables 16 to 20 times per month, 15 (0.3%) ate vegetables more than 20 times per month, 8 (0.1%) ate vegetables 1 to 5 times per year, 2 (0.1%) ate vegetables 6 to 10 times per year, 1 (0.1%) ate vegetables 11 to 15 times per year, 0 (0.0%) ate vegetables 16 to 20 times per year, 1 (0.1%) ate vegetables more than 20 times per year, and 52 (1.2%) never eat vegetables. The remaining responses refused to answer or did not know how much vegetables they have ate.

Table 13

Urban and Rural Geographic Location/ Frequency of Eating Vegetables of Respondents

Vegetable Consumption	Geographic Location		
	Urban n(%)	Rural n(%)	Total n(%)
<b>Serving per Day</b>			
1 to 5	5412(63.3)	2914(65.4)	8326(64.0)
6 to 10	13(0.2)	13(0.3)	26(0.2)
More Than 10	1(0.1)	0(0.0)	1(0.1)
<b>Serving per Week</b>			
1 to 5	2045(23.9)	954(21.4)	2999(23.1)
6 to 10	374(4.4)	205(4.6)	579(4.5)
11 to 15	42(0.5)	24(0.5)	66(0.5)
16 to 20	5(0.1)	4(0.1)	9(0.1)
More Than 20	5(0.1)	2(0.1)	7(0.1)
<b>Servings per Month</b>			
1 to 5	220(25.7)	108(2.4)	328(25.2)
6 to 10	57(0.7)	22(0.5)	79(0.6)
11 to 15	35(0.4)	12(0.3)	47(0.4)
16 to 20	24(0.3)	15(0.3)	39(0.3)
More Than 20	36(0.4)	15(0.3)	51(0.4)
<b>Servings per Year</b>			
1 to 5	8(0.1)	8(0.1)	16(0.1)
6 to 10	4(0.1)	2(0.1)	6(0.1)
11 to 15	3(0.1)	1(0.1)	4(0.1)

16 to 20	2(0.1)	0(0.0)	2(0.1)
More Than 20	3(0.1)	1(0.1)	4(0.1)
Never	127(1.5)	52(1.2)	179(1.4)
Don't Know	117(1.4)	90(2.0)	207(1.6)
Missing	13(0.2)	13(0.3)	26(0.2)
Total	8546(100.0)	4455(100.0)	13001(100.0)

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Notes:  $X^2 = 107.28$ ,  $df = 20$ ,  $p = .007^{**}$

A chi-square analysis of the responses of the twenty-one groups of the variable 'servings of vegetables' provided an  $X^2$  value of 107.28, a degree of freedom of 20. The  $X^2$  value was significant ( $p = .007$ ). This means that the null hypothesis is rejected in favor of the alternative hypothesis. There is no significant difference with regard to geographic location groups and their answers towards servings of vegetables.

As shown in table 13, when comparing the values in each category, 5,412 (63.3%) of urban and 2,914 (65.4%) of rural have had 1 to 5 vegetables per day. Majority of them (over 60%) have one to five servings of vegetables per day. Also as shown in table 13, when comparing the values in each category, 14 (0.3%) of urban and 13 (0.3%) of rural have had more than 5 vegetables per day. A very small number, less than 1% reported they have had more than 5 vegetables per day.

The third survey question analyzed to examine how urban and rural areas of Pennsylvania compare with preventive health behaviors is:

- Now, thinking about the moderate activities you do [fill in "when you are not working" if "employed" or self-employed"] in a usual week, do you do

moderate activities for at least 10 minutes at a time, such as brisk walking, bicycling, vacuuming, gardening, or anything else that causes some increase in breathing or heart rate?

The BRFSS survey question on frequency of days now smoking was conducted with 12,954 rural and urban citizens of Pennsylvania. The research compared the two groups (rural and urban) and their response to the moderate physical activity question. The survey participants were categorized by their location into the following groups: rural and urban. The survey respondents utilized a yes, no, and don't know scale for the variable. Additionally, missing responses (such as refusing to answer the question) for the variable were listed under the name 'missing'.

SPSS was used to perform a chi square analysis of the responses to determine the chi-square value, the level of significance, and the degrees of freedom. For comparison, an accepted alpha of .05 was used for each variable as a basis for the rejection or maintenance of the null hypothesis. The column totals and percentages were also calculated.

A table of observed frequencies and column percentage for urban and rural geographic location and moderate physical activity of respondents is in table 14. Table 14 shows that of a total of 12,954 survey participants, 10,827 (83.6%) people do moderate activities for at least 10 minutes at a time and 2,061 (15.9%) people do not. Urban participants that do moderate activities for at least 10 minutes at a time were 7,152 (84.0%) and 1,320 (15.5%) urban people do not. Rural participants that do moderate activities for at least 10 minutes at a time were 3,675 (82.7%) and 741 (16.7%) rural

people do not. The remaining responses refused to answer or did not know their frequency of moderate activities for at least 10 minutes at a time.

Table 14

*Urban and Rural Geographic Location/ Moderate Activities for At Least 10 Minutes of Respondents*

Moderate Activity	Geographic Location		
	Urban n(%)	Rural n(%)	Total n(%)
Yes	7152(84.0)	3675(82.7)	10827(83.6)
No	1320(15.5)	741(16.7)	2061(15.9)
Don't know	33(0.4)	19(0.4)	52(0.4)
Missing	6(0.1)	8(0.2)	14(0.1)
Total	8511(100.0)	4443(100.0)	12954(100.0)

Notes:  $X^2 = 6.47$ ,  $df = 3$ ,  $p = .091$

A chi-square analysis of the responses of the four groups of the variable 'moderate physical activity' provided an  $X^2$  value of 6.47, a degree of freedom of 3. The  $X^2$  value was a non-significant ( $p = .091$ ). This means that the null hypothesis is accepted. Therefore, there is not a significant difference in responses among the geographic location groups and their answers towards their moderate physical activity. The majority of them, over 80% do moderate activities for at least 10 minutes.

The fourth survey question analyzed to examine how urban and rural areas of Pennsylvania compare with preventive health behaviors is:

- How many days per week do you do these moderate activities for at least 10 minutes at a time?

The BRFSS survey question on days per week of moderate physical activity was conducted with 10,822 rural and urban citizens of Pennsylvania. The research compared the two groups (rural and urban) and their response to the days per week of moderate physical activity question. The survey participants were categorized by their location into the following groups: rural and urban. The survey respondents utilized a 1 day, 2 days, 3 days, 4 days, 5 days, 6 days, 7 days, less than 10 minutes, and don't know scale for the variable. Additionally, missing responses (such as refusing to answer the question) for the variable were listed under the name 'missing'.

SPSS was used to perform a chi square analysis of the responses to determine the chi-square value, the level of significance, and the degrees of freedom. For comparison, an accepted alpha of .05 was used for each variable as a basis for the rejection or maintenance of the null hypothesis. The column totals and percentages were also calculated.

A table of observed frequencies and column percentage for urban and rural geographic location and days per week of moderate physical activity of respondents is in table 15. Table 15 shows that of a total of 10,822 survey participants, 403 (3.7%) people do moderate activities for at least 10 minutes at a time 1 day per week, 1,006 (9.3%) 2 days per week, 1,963 (18.1%) 3 days per week, 1,359 (12.6%) 4 days per week, 1,828 (16.9%) 5 days per week, 737 (6.8%) 6 days per week, 3,407 (31.5%) 7 days per week, and 81 (0.7%) less than 10 minutes of moderate activities. Urban survey participants that do moderate activities for at least 10 minutes at a time 1 day per week was 253 (3.5%),

683 (9.6%) 2 days per week, 1,348 (18.9%) 3 days per week, 904 (12.6%) 4 days per week, 1,217 (17.0%) 5 days per week, 477 (6.7%) 6 days per week, 2,186 (30.6%) 7 days per week, and 53 (0.7%) less than 10 minutes of moderate activities. Rural survey participants that do moderate activities for at least 10 minutes at a time 1 day per week was 150 (4.1%), 323 (8.8%) 2 days per week, 615 (16.7%) 3 days per week, 455 (12.4%) 4 days per week, 611 (16.6%) 5 days per week, 260 (7.1%) 6 days per week, 1,221 (33.2%) 7 days per week, and 28 (0.8%) less than 10 minutes of moderate activities. The remaining responses refused to answer or did not know their frequency of days per week of moderate activities for at least 10 minutes at a time.

Table 15

*Urban and Rural Geographic Location/ Days per Week of Moderate Activities of Respondents*

Days per Week	Geographic Location		
	Urban n(%)	Rural n(%)	Total n(%)
1 Day	253(3.5)	150(4.1)	403(3.7)
2 Days	683(9.6)	323(8.8)	1006(9.3)
3 Days	1348(18.9)	615(16.7)	1963(18.1)
4 Days	904(12.6)	455(12.4)	1359(12.6)
5 Days	1217(17.0)	611(16.6)	1828(16.9)
6 Days	477(6.7)	260(7.1)	737(6.8)
7 Days	2186(30.6)	1221(33.2)	3407(31.5)
Less than 10 Minutes	53(0.7)	28(0.8)	81(0.7)
Don't know	14(0.2)	7(0.2)	21(0.2)
Missing	14(0.2)	3(0.1)	17(0.2)
Total	7149(100.0)	3673(100.0)	10822(100.0)

Notes:  $X^2 = 17.85$ ,  $df = 3$ ,  $p = .037^*$

A chi-square analysis of the responses of the four groups of the variable 'days per week of moderate physical activity' provided an  $X^2$  value of 17.85, a degree of freedom of 3. The  $X^2$  value was significant ( $p = .037$ ). This means that the null hypothesis is rejected in favor of the alternative hypothesis. Therefore, there is a significant difference in responses to the amount of moderate physical activity. A large percentage (over 30%) did moderate activities 7 days per week and over 50% did moderate activities 3 to 5 days

per week. However, there is no difference with regards to the geographic location and their answers towards days per week of moderate physical activity.

As shown in table 15, when comparing the values in each category, 5,036 (66.9%) of urban and 3,162 (69.3%) of rural have had moderate activities more than 3 days per week. The majority of them, over 65% participated in moderate activities for at least 10 minutes more than 3 days per week. Also as shown in table 15, when comparing the values in each category, 989 (33.1%) of urban and 501 (30.7%) of rural have had moderate activities less than 3 days per week. A lesser percentage, about 30%, reported they did moderate activities less than 3 days per week.

The fifth survey question analyzed to examine how urban and rural areas of Pennsylvania compare with preventive health behaviors is:

- On days when you do moderate activities for at least 10 minutes at a time, how much total time per day do you spend doing these activities?

The BRFSS survey question on frequency of days now smoking was conducted with 10,684 rural and urban citizens of Pennsylvania. The research compared the two groups (rural and urban) and their response to the minutes per day of moderate physical activity question. The survey participants were categorized by their location into the following groups: rural and urban. The survey respondents utilized an 10 to 20 minutes, 21 to 30 minutes, do 31 to 40 minutes, 41 to 50 minutes, 100 to 150 minutes, 151 to 200 minutes, 201 to 300 minutes, 301 to 400 minutes, do more than 400 minutes, and don't know scale for the variable. Additionally, missing responses (such as refusing to answer the question) for the variable were listed under the name 'missing'.

SPSS was used to perform a chi square analysis of the responses to determine the chi-square value, the level of significance, and the degrees of freedom. For comparison, an accepted alpha of .05 was used for each variable as a basis for the rejection or maintenance of the null hypothesis. The column totals and percentages were also calculated.

A table of observed frequencies and column percentage for urban and rural geographic location and minutes per day of moderate physical activity of respondents is in table 16. Table 16 shows that of a total of 10,684 survey participants, 2,315 (21.7%) do 10 to 20 minutes per day of moderate activities, 2,921 (27.3%) do 21 to 30 minutes per day, 242 (2.3%) do 31 to 40 minutes per day, 561 (5.3%) do 41 to 50 minutes per day, 2,324 (21.8%) do 100 to 150 minutes per day, 819 (7.7%) do 151 to 200 minutes per day, 390 (3.7%) do 201 to 300 minutes per day, 221 (2.1%) do 301 to 400 minutes per day, and 352 (3.3%) do more than 400 minutes per day of moderate activities.

Table 16 shows that of a total of 7,054 urban survey participants, 1,528 (21.7%) do 10 to 20 minutes per day of moderate activities, 1,961 (27.8%) do 21 to 30 minutes per day, 153 (2.2%) do 31 to 40 minutes per day, 368 (5.2%) do 41 to 50 minutes per day, 1,540 (21.8%) do 100 to 150 minutes per day, 522 (7.4%) do 151 to 200 minutes per day, 255 (3.6%) do 201 to 300 minutes per day, 158 (2.2%) do 301 to 400 minutes per day, and 235 (3.3%) do more than 400 minutes per day of moderate activities.

Table 16 shows that of a total of 3,630 rural survey participants, 787 (21.7%) do 10 to 20 minutes per day of moderate activities, 960 (26.4%) do 21 to 30 minutes per day, 89 (2.5%) do 31 to 40 minutes per day, 193 (5.3%) do 41 to 50 minutes per day, 784 (21.6%) do 100 to 150 minutes per day, 297 (8.2%) do 151 to 200 minutes per day, 135

(3.7%) do 201 to 300 minutes per day, 63 (1.7%) do 301 to 400 minutes per day, and 117 (3.2%) do more than 400 minutes per day of moderate activities.

The remaining responses refused to answer or did not know how much total time per day they spend doing moderate activities.

Table 16

*Urban and Rural Geographic Location/ Time per Day of Moderate Activities of Respondents*

Minutes per Day	Geographic Location		
	Urban n(%)	Rural n(%)	Total n(%)
10 to 20	1528(21.7)	787(21.7)	2315(21.7)
21 to 30	1961(27.8)	960(26.4)	2921(27.3)
31 to 40	153(2.2)	89(2.5)	242(2.3)
41 to 50	368(5.2)	193(5.3)	561(5.3)
100 to 150	1540(21.8)	784(21.6)	2324(21.8)
151 to 200	522(7.4)	297(8.2)	819(7.7)
201 to 300	255(3.6)	135(3.7)	390(3.7)
301 to 400	158(2.2)	63(1.7)	221(2.1)
More than 400	235(3.3)	117(3.2)	352(3.3)
Don't know	317(4.5)	199(5.5)	516(4.8)
Missing	17(0.2)	6(0.2)	23(0.2)
Total	7054(100.0)	3630(100.0)	10684(100.0)

Notes:  $X^2 = 51.66$ ,  $df = 10$ ,  $p = .409$

A chi-square analysis of the responses of the eleven groups of the variable 'minutes per day of moderate physical activity' provided an  $X^2$  value of 51.66, a degree of freedom of 10. The  $X^2$  value was a non-significant ( $p = .409$ ). This means that the null hypothesis is accepted. Therefore, there is not a significant difference in responses among the geographic location groups and their answers towards their minutes per day of moderate physical activity.

The sixth survey question analyzed to examine how urban and rural areas of Pennsylvania compare with preventive health behaviors is:

- Now, thinking about the vigorous activities you do [fill in "when you are not working" if "employed" or "self-employed"] in a usual week, do you do vigorous activities for at least 10 minutes at a time, such as running, aerobics, heavy yard work, or anything else that causes large increases in breathing or heart rate?

The BRFSS survey question on vigorous physical activity was conducted with 12,897 rural and urban citizens of Pennsylvania. The research compared the two groups (rural and urban) and their response to the vigorous physical activity question. The survey participants were categorized by their location into the following groups: rural and urban. The survey respondents utilized a yes, no, and don't know scale for the variable. Additionally, missing responses (such as refusing to answer the question) for the variable were listed under the name 'missing'.

SPSS was used to perform a chi square analysis of the responses to determine the chi-square value, the level of significance, and the degrees of freedom. For comparison, an accepted alpha of .05 was used for each variable as a basis for the rejection or

maintenance of the null hypothesis. The column totals and percentages were also calculated.

A table of observed frequencies and column percentage for urban and rural geographic location and vigorous physical activity of respondents is in table 17. Table 17 shows that of a total of 12,954 survey participants, 5,501 (42.5%) people do vigorous activities for at least 10 minutes at a time and 7,306 (56.4%) people do not. Urban participants that do vigorous activities for at least 10 minutes at a time were 3,657 (43.2%) and 4,752 (56.1%) urban people do not. Rural participants that do vigorous activities for at least 10 minutes at a time were 1,844 (41.6%) and 2,554 (57.7%) rural people do not. The remaining responses refused to answer or did not know their frequency of vigorous activities for at least 10 minutes at a time.

Table 17

*Urban and Rural Geographic Location/ Vigorous Activities for At Least 10 Minutes of Respondents*

Vigorous Activity	Geographic Location		
	Urban n(%)	Rural n(%)	Total n(%)
Yes	3657(43.2)	1844(41.6)	5501(42.5)
No	4752(56.1)	2554(57.7)	7306(56.4)
Don't know	49(0.6)	27(0.6)	76(0.6)
Missing	11(0.1)	3(0.1)	14(0.1)
Total	8469(100.0)	4428(100.0)	12954(100.0)

Notes:  $X^2 = 3.95$ ,  $df = 3$ ,  $p = .266$

A chi-square analysis of the responses of the four groups of the variable 'vigorous physical activity' provided an  $X^2$  value of 3.95, a degree of freedom of 3. The  $X^2$  value was a non-significant ( $p = .266$ ). This means that the null hypothesis is accepted. Therefore, there is not a significant difference in responses among the geographic location groups and their answers towards their vigorous physical activity.

The seventh survey question analyzed to examine how urban and rural areas of Pennsylvania compare with preventive health behaviors is:

- How many days per week do you do these vigorous activities for at least 10 minutes at a time?

The BRFSS survey question on days per week of vigorous physical activity was conducted with 5,492 rural and urban citizens of Pennsylvania. The research compared the two groups (rural and urban) and their response to the vigorous physical activity question. The survey participants were categorized by their location into the following groups: rural and urban. The survey respondents utilized a 1 day, 2 days, 3 days, 4 days, 5 days, 6 days, 7 days, less than 10 minutes, and don't know scale for the variable. Additionally, missing responses (such as refusing to answer the question) for the variable were listed under the name 'missing'.

SPSS was used to perform a chi square analysis of the responses to determine the chi-square value, the level of significance, and the degrees of freedom. For comparison, an accepted alpha of .05 was used for each variable as a basis for the rejection or maintenance of the null hypothesis. The column totals and percentages were also calculated.

A table of observed frequencies and column percentage for urban and rural geographic location and vigorous physical activity of respondents is in table 18. Table 18 shows that of a total of 5,492 survey participants, 928 (16.9%) people do vigorous activities for at least 10 minutes at a time 1 day per week, 1,177 (21.4%) 2 days per week, 1,408 (25.6%) 3 days per week, 570 (10.4%) 4 days per week, 651 (11.9%) 5 days per week, 205 (3.7%) 6 days per week, 482 (8.8%) 7 days per week, and 52 (0.9%) less than 10 minutes of vigorous activities.

Urban survey participants that do vigorous activities for at least 10 minutes at a time 1 day per week was 661 (18.1%), 782 (21.4%) 2 days per week, 930 (25.5%) 3 days per week, 368 (10.1%) 4 days per week, 433 (11.9%) 5 days per week, 135 (3.7%) 6 days per week, 296 (8.1%) 7 days per week, and 35 (0.9%) less than 10 minutes of vigorous activities.

Rural survey participants that do vigorous activities for at least 10 minutes at a time 1 day per week was 267 (14.5%), 395 (21.5%) 2 days per week, 478 (26.0%) 3 days per week, 202 (10.9%) 4 days per week, 218 (11.9%) 5 days per week, 70 (3.8%) 6 days per week, 186 (10.1%) 7 days per week, and 17 (0.9%) less than 10 minutes of vigorous activities. The remaining responses refused to answer or did not know their frequency of days per week of vigorous activities for at least 10 minutes at a time.

Table 18

*Urban and Rural Geographic Location/ Days per Week of Vigorous Activities of Respondents*

Days per Week	Geographic Location		
	Urban n(%)	Rural n(%)	Total n(%)
1 Day	661(18.1)	267(14.5)	928(16.9)
2 Days	782(21.4)	395(21.5)	1177(21.4)
3 Days	930(25.5)	478(26.0)	1408(25.6)
4 Days	368(10.1)	202(10.9)	570(10.4)
5 Days	433(11.9)	218(11.9)	651(11.9)
6 Days	135(3.7)	70(3.8)	205(3.7)
7 Days	296(8.1)	186(10.1)	482(8.8)
Less than 10 Minutes	35(0.9)	17(0.9)	52(0.9)
Don't know	11(0.3)	3(0.2)	14(0.3)
Missing	3(0.1)	2(0.1)	5(0.1)
Total	3654(100.0)	1838(100.0)	5492(100.0)

Notes:  $X^2 = 17.08$ ,  $df = 9$ ,  $p = .048^*$

A chi-square analysis of the responses of the ten groups of the variable 'days per week of vigorous physical activity' provided an  $X^2$  value of 17.08, a degree of freedom of 9. The  $X^2$  value was significant ( $p = .048$ ). This means that the null hypothesis is rejected in favor of the alternative hypothesis. Therefore, there is a significant difference in responses to the answers towards vigorous physical activity.

There is no significant difference with regard to geographic location groups and their answers towards vigorous physical activity.

As shown in table 18, when comparing the values in each category, 2,408 (65.0%) of urban and 131 (62.0%) of rural have had vigorous activities 3 days or less per week.

Majority of them (over 60%) do vigorous physical activity 3 days or less per week.

Also as shown in table 18, when comparing the values in each category, 1,232 (35.0%) of urban and 676 (38.0%) of rural have had vigorous activities more than 3 days per week.

The minority of them, 38% and less reported they do vigorous activities more than 3 days per week.

The eighth survey question analyzed on how urban and rural areas of Pennsylvania compare with preventive health behaviors is:

- On days when you do vigorous activities for at least 10 minutes at a time, how much total time per day do you spend doing these activities?

The BRFSS survey question on minutes per day of vigorous physical activity was conducted with 5,413 rural and urban citizens of Pennsylvania. The research compared the two groups (rural and urban) and their response to the vigorous physical activity question. The survey participants were categorized by their location into the following groups: rural and urban. The survey respondents utilized an 10 to 20 minutes per day, 21 to 30 minutes per day, 31 to 40 minutes per day, 41 to 50 minutes per day, 100 to 150 minutes per day, 151 to 200 minutes per day, 201 to 300 minutes per day, 301 to 400 minutes per day, more than 400 minutes per day and don't know scale for the variable. Additionally, missing responses (such as refusing to answer the question) for the variable were listed under the name 'missing'.

SPSS was used to perform a chi square analysis of the responses to determine the chi-square value, the level of significance, and the degrees of freedom. For comparison, an accepted alpha of .05 was used for each variable as a basis for the rejection or maintenance of the null hypothesis. The column totals and percentages were also calculated.

A table of observed frequencies and column percentage for urban and rural geographic location and minutes per day of vigorous physical activity of respondents is in table 19. Table 19 shows that of a total of 5,413 survey participants, 912 (16.8%) do 10 to 20 minutes per day of vigorous activities, 1,338 (24.7%) do 21 to 30 minutes per day, 182 (3.4%) do 31 to 40 minutes per day, 328 (6.1%) do 41 to 50 minutes per day, 1,594 (29.4%) do 100 to 150 minutes per day, 477 (8.8%) do 151 to 200 minutes per day, 213 (3.9%) do 201 to 300 minutes per day, 108 (1.9%) do 301 to 400 minutes per day, and 115 (2.1%) do more than 400 minutes per day of vigorous activities.

Table 19 shows that of a total of 3,601 urban survey participants, 612 (16.9%) do 10 to 20 minutes per day of vigorous activities, 889 (24.7%) do 21 to 30 minutes per day, 122 (3.4%) do 31 to 40 minutes per day, 216 (5.9%) do 41 to 50 minutes per day, 1,076 (29.9%) do 100 to 150 minutes per day, 300 (8.3%) do 151 to 200 minutes per day, 145 (4.0%) do 201 to 300 minutes per day, 75 (2.1%) do 301 to 400 minutes per day, and 80 (2.2%) do more than 400 minutes per day of vigorous activities.

Table 19 shows that of a total of 1,812 rural survey participants, 300 (16.6%) do 10 to 20 minutes per day of vigorous activities, 449 (24.8%) do 21 to 30 minutes per day, 60 (3.3%) do 31 to 40 minutes per day, 112 (6.2%) do 41 to 50 minutes per day, 518 (28.6%) do 100 to 150 minutes per day, 177 (9.8%) do 151 to 200 minutes per day, 68

(3.8%) do 201 to 300 minutes per day, 33 (1.8%) do 301 to 400 minutes per day, and 35 (1.9%) do more than 400 minutes per day of vigorous activities.

The remaining responses refused to answer or did not know how much total time per day they spend doing vigorous activities.

Table 19

*Urban and Rural Geographic Location/ Time per Day of Vigorous Activities of Respondents*

Minutes per Day	Geographic Location		
	Urban n(%)	Rural n(%)	Total n(%)
10 to 20	612(16.9)	300(16.6)	912(16.8)
21 to 30	889(24.7)	449(24.8)	1338(24.7)
31 to 40	122(3.4)	60(3.3)	182(3.4)
41 to 50	216(5.9)	112(6.2)	328(6.1)
100 to 150	1076(29.9)	518(28.6)	1594(29.4)
151 to 200	300(8.3)	177(9.8)	477(8.8)
201 to 300	145(4.0)	68(3.8)	213(3.9)
301 to 400	75(2.1)	33(1.8)	108(1.9)
More than 400	80(2.2)	35(1.9)	115(2.1)
Don't know	82(2.3)	58(3.2)	140(2.6)
Missing	4(0.1)	2(0.1)	6(0.1)
Total	3601(100.0)	1812(100.0)	5413(100.0)

Notes:  $X^2 = 52.71$ ,  $df = 10$ ,  $p \leq .173$

A chi-square analysis of the responses of the eleven groups of the variable 'minutes per day of vigorous physical activity' provided an  $X^2$  value of 52.71, a degree of freedom of 10. The  $X^2$  value was a non-significant ( $p = .173$ ). This means that the null hypothesis is accepted. Therefore, there is not a significant difference in responses among the geographic location groups and their answers towards their minutes per day of vigorous physical activity.

In summary, the third research question asked how urban and rural areas of Pennsylvania compare with preventive health behaviors. The overall pattern was that rural survey respondents had more positive preventive health behaviors than survey respondents in urban areas. However, this is only in reference to proper eating and less intensity exercise. People in urban areas had an overall pattern of exhibiting more intense preventive health behaviors that may be more beneficial. Additionally, a considerable percentage of both rural and urban people had poor preventive health eating habits.

The survey participants were asked how often they eat fruit. Only 44.8% of urban and 42.3% of rural people reported eating 1 to 5 servings a day. The recommended daily intake of fruit per day according to the US Department of Agriculture (USDA) food pyramid is 2 to 4 servings per day (USDA, 2007). This means that the majority of survey respondents in urban (55.2%) and rural (57.7%) do not eat at least the recommended serving of fruit. The process of following the recommended diet by the USDA can greatly assist in maintaining a healthy weight and lower the risks for chronic illnesses like diabetes and hypertension (USDA, 2007).

The survey participants were also asked how often they ate vegetables. A large percentage did eat the recommended daily serving according to the USDA, urban 63.3%

and 65.4%. However, the remaining did not eat the recommended servings, urban 36.7% and rural 34.6%. It cannot be ignored of the large percentage of the Pennsylvanian population that is not consuming enough vegetables. The proper intake of vegetables can help maintain a healthy weight and lower the risks of chronic illnesses (USDA, 2007).

In regards to exercise, the survey participants were asked if they did moderate activities for at least 10 minutes at a time (such as brisk walking, bicycling, vacuuming, gardening, etc.). The urban survey respondents reported that 84.0% they did and 82.7% of rural did moderate exercise also. A follow-up question asked how many days per week did they do these moderate activities. The Centers for Disease Control and Prevention and the American College of Sports Medicine (2007) recommend adults should engage in moderate-intensity physical activities for at least 30 minutes on 5 or more days of the week. Survey respondents that engaged in moderate activities for the at least the minimum requirements were urban 54.3% and rural 56.9%. The remaining did not exercise enough to achieve the recommended physical activities, urban 45.7% and rural 43.1%.

Another follow-up question asked how many minutes per day did they do these moderate activities. The recommended time is for at least 30 minutes a day. 50.5% of urban and 51.9% of rural people did meet the requirements. The remaining, 50.5% urban and 51.9% rural did not meet the minimum recommended requirement for moderate exercise. A chi-square analysis did not find this significant.

The survey participants were asked if they did vigorous activities for at least 10 minutes at a time (such as running, aerobics, heavy yard work, etc.). The urban people reported that 43.2% they did and 41.6% of rural did vigorous exercise also. A follow-up

question asked how many days per week did they do these vigorous. The Centers for Disease Control and Prevention and the American College of Sports Medicine (2007) recommend adults should engage in vigorous-intensity physical activities for at least 20 minutes on 3 or more days of the week. Survey respondents that engaged in vigorous activities for 3 or more days per week were urban 59.3% and rural 62.7%. The remaining did not exercise enough to achieve the recommended physical activities.

Another follow-up question asked how many minutes per day did they do these vigorous activities. The recommended time is for at least 20 minutes a day. 83.1% of urban and 48.1% of rural people did meet the requirements. The remaining, 16.9% urban and 16.6% rural did not meet the minimum recommended requirement for vigorous exercise. For ideal health benefits and especially for weight loss, more vigorous activities such as aerobics are ideal. A large percentage, 35% more urban people in the survey do vigorous activities than people in rural areas.

### *Chronic Disease Conditions*

The fourth research objective examined how urban and rural areas of Pennsylvania compare with chronic disease conditions. Seven questions from the BRFSS 2005 survey are measured for this research question. The first question for analysis is:

- Have you ever been told by a doctor that you have diabetes?

The BRFSS survey question on if ever told by a doctor that you have diabetes was conducted with 13,378 rural and urban citizens of Pennsylvania. The research compared the two groups (rural and urban) and their response to the diabetes question. The survey participants were categorized by their location into the following groups: rural and

urban. The survey respondents utilized a yes, yes but pregnant, no, no but pre-diabetes/borderline, and don't know scale for the variable. Additionally, missing responses (such as refusing to answer the question) for the variable were listed under the name 'missing'.

SPSS was used to perform a chi square analysis of the responses to determine the chi-square value, the level of significance, and the degrees of freedom. For comparison, an accepted alpha of .05 was used for each variable as a basis for the rejection or maintenance of the null hypothesis. The column totals and percentages were also calculated.

A table of observed frequencies and column percentage for urban and rural geographic location and ever told by a doctor that you have diabetes of respondents is in table 20. Table 20 shows that of a total of 13,378 survey participants, 1,374 (10.3%) have been told by a doctor that they have diabetes, 120 (0.9%) yes to diabetes but only during pregnancy, 11,729 (87.7%) have not been told by a doctor that they have diabetes, and 139 (1.0%) are pre-diabetes or borderline. Of the 8,790 urban participants 878 (9.9%) have been told by a doctor that they have diabetes, 80 (0.9%) yes to diabetes but only during pregnancy, 7,734 (87.9%) have not been told by a doctor that they have diabetes, and 87 (0.9%) are pre-diabetes or borderline. Of the 4,588 rural participants 496 (10.8%) have been told by a doctor that they have diabetes, 40 (0.9%) yes to diabetes but only during pregnancy, 3,995 (87.1%) have not been told by a doctor that they have diabetes, and 52 (1.1%) are pre-diabetes or borderline. The remaining responses refused to answer or did not know if a doctor has told them if they have diabetes.

Table 20

*Urban and Rural Geographic Location/ Diabetes of Respondents*

Diabetes	Geographic Location		
	Urban n(%)	Rural n(%)	Total n(%)
Yes	878(9.9)	496(10.8)	1374(10.3)
Yes, but pregnant	80(0.9)	40(0.9)	120(0.9)
No	7734(87.9)	3995(87.1)	11729(87.7)
No, pre-diabetes/borderline	87(0.9)	52(1.1)	139(1.0)
Don't know	10(0.2)	1(0.1)	11(0.1)
Missing	1(0.1)	4(0.1)	5(0.1)
Total	8790(100.0)	4588(100.0)	13378(100.0)

Notes:  $X^2 = 10.65$ ,  $df = 5$ ,  $p = .059$

A chi-square analysis of the responses of the six groups of the variable 'ever told by a doctor that you have diabetes' provided an  $X^2$  value of 10.65, a degree of freedom of 5. The  $X^2$  value was a non-significant ( $p = .059$ ). This means that the null hypothesis is accepted. Therefore, there is not a significant difference in responses among the geographic location groups and their answers towards diabetes.

The second survey question analyzed on how urban and rural areas of Pennsylvania compare with chronic disease conditions is:

- Has a doctor, nurse, or other health professional ever told you, you had a heart attack, also called a myocardial infarction?

The BRFSS survey question on health care coverage was conducted with 13,378 rural and urban citizens of Pennsylvania. The research compared the two groups (rural

and urban) and their response to the ever told by a doctor you have had a myocardial infarction question. The survey participants were categorized by their location into the following groups: rural and urban. The survey respondents utilized a yes, no, and don't know scale for the variable. Additionally, missing responses (such as refusing to answer the question) for the variable were listed under the name 'missing'.

SPSS was used to perform a chi square analysis of the responses to determine the chi-square value, the level of significance, and the degrees of freedom. For comparison, an accepted alpha of .05 was used for each variable as a basis for the rejection or maintenance of the null hypothesis. The column totals and percentages were also calculated.

A table of observed frequencies and column percentage for urban and rural geographic location and myocardial infarction of respondents is in table 21. Table 21 shows that of a total of 13,378 survey participants, 718 (5.4%) have been told by a doctor that they have had a myocardial infarction and 12,545 (93.8%) have not had a myocardial infarction. Of the 8,790 urban participants 498 (5.7%) have been told by a doctor that they have had myocardial infarction and 8,226 (93.6%) have not had a myocardial infarction. Of the 4,588 rural participants 220 (4.8%) have been told by a doctor that they have had a myocardial infarction and 4,319 (94.1%) have not had a myocardial infarction. The remaining responses refused to answer or did not know if a doctor has told them if they have had a myocardial infarction.

Table 21

*Urban and Rural Geographic Location/ Myocardial Infarction of Respondents*

Heart Attack	Geographic Location		
	Urban n(%)	Rural n(%)	Total n(%)
Yes	498(5.7)	220(4.8)	718(5.4)
No	8226(93.6)	4319(94.1)	12545(93.8)
Don't know	61(0.7)	46(1.0)	107(0.8)
Missing	5(0.1)	3(0.1)	8(0.1)
Total	8790(100.0)	4588(100.0)	13378(100.0)

Notes:  $X^2 = 7.98$ ,  $df = 3$ ,  $p = .046^*$

A chi-square analysis of the responses of the four groups of the variable 'myocardial infarction' provided an  $X^2$  value of 7.98, a degree of freedom of 3. The  $X^2$  value was significant ( $p = .046$ ). This means that the null hypothesis is rejected in favor of the alternative hypothesis. Therefore, there is a significant difference in responses to the number of heart attacks. There is no significant difference with regard to geographic location groups and their answers towards myocardial infarction.

As shown in table 21, when comparing the values in each category, 498 (5.7%) of urban and 220 (4.8%) of rural have had a myocardial infarction. About 5% have had a heart attack for both urban and rural geographic groups. Also, as shown in table 21, when comparing the values in each category, 8,226 (93.6%) of urban and 4,319 (94.1%) of rural have not had a myocardial infarction. Majority of them (over 90%) have not had a heart attack.

The third survey question analyzed on how urban and rural areas of Pennsylvania compare with chronic disease conditions is:

- Has a doctor, nurse, or other health professional ever told you, you had angina or coronary heart disease?

The BRFSS survey question on if ever told you have coronary heart disease was conducted with 13,378 rural and urban citizens of Pennsylvania. The research compared the two groups (rural and urban) and their response to the coronary heart disease question. The survey participants were categorized by their location into the following groups: rural and urban. The survey respondents utilized a yes, no, and don't know scale for the variable. Additionally, missing responses (such as refusing to answer the question) for the variable were listed under the name 'missing'.

SPSS was used to perform a chi square analysis of the responses to determine the chi-square value, the level of significance, and the degrees of freedom. For comparison, an accepted alpha of .05 was used for each variable as a basis for the rejection or maintenance of the null hypothesis. The column totals and percentages were also calculated.

A table of observed frequencies and column percentage for urban and rural geographic location and coronary heart disease of respondents is in table 22. Table 22 shows that of a total of 13,378 survey participants, 797 (6.0%) have been told by a doctor that they have angina or coronary heart disease and 12,442 (93.0%) do not. Of the 8,790 urban participants 518 (5.9%) have been told by a doctor that they have angina or coronary heart disease and 8,185 (93.1%) have not been told by a doctor that they have angina or coronary heart disease. Of the 4,588 rural participants 279 (6.1%) have been

told by a doctor that they have angina or coronary heart disease and 4,257 (92.8%) have not had angina or coronary heart disease. The remaining responses refused to answer or did not know if a doctor has told them if they have angina or coronary heart disease.

Table 22

*Urban and Rural Geographic Location/ Angina/Coronary Heart Disease of Respondents*

Heart Disease	Geographic Location		
	Urban n(%)	Rural n(%)	Total n(%)
Yes	518(5.9)	279(6.1)	797(6.0)
No	8185(93.1)	4257(92.8)	12442(93.0)
Don't know	85(0.9)	48(1.0)	133(0.9)
Missing	2(0.1)	4(0.1)	8(0.1)
Total	8790(100.0)	4588(100.0)	13378(100.0)

Notes:  $X^2 = 3.19$ ,  $df = 3$ ,  $p = .363$

A chi-square analysis of the responses of the four groups of the variable 'coronary heart disease' provided an  $X^2$  value of 3.19, a degree of freedom of 3. The  $X^2$  value was a non-significant ( $p = .363$ ). This means that the null hypothesis is accepted. Therefore, there is not a significant difference in responses among the geographic location groups and their answers towards their coronary heart disease.

The fourth survey question analyzed on how urban and rural areas of Pennsylvania compare with chronic disease conditions is:

- Has a doctor, nurse, or other health professional ever told you, you had a stroke?

The BRFSS survey question on frequency of days now smoking was conducted with 13,378 rural and urban citizens of Pennsylvania. The research compared the two groups (rural and urban) and their responses to the ever told have had a stroke question. The survey participants were categorized by their location into the following groups: rural and urban. The survey respondents utilized a yes, no, and don't know scale for the variable. Additionally, missing responses (such as refusing to answer the question) for the variable were listed under the name 'missing'.

SPSS was used to perform a chi square analysis of the responses to determine the chi-square value, the level of significance, and the degrees of freedom. For comparison, an accepted alpha of .05 was used for each variable as a basis for the rejection or maintenance of the null hypothesis. The column totals and percentages were also calculated.

A table of observed frequencies and column percentage for urban and rural geographic location and frequency of stroke of respondents is in table 23. Table 23 shows that of a total of 13,378 survey participants, 450 (3.4%) have been told by a doctor that they have had a stroke and 12,883 (96.3%) have not had a stroke. Of the 8,790 urban participants 228 (2.6%) have been told by a doctor that they have had a stroke and 8,476 (96.4%) have not been told by a doctor that they have angina not had a stroke. Of the 4,588 rural participants 162 (3.5%) have been told by a doctor that they have had a stroke and 4,407 (96.1%) have not been told by a doctor that they have had a stroke. The remaining responses refused to answer or did not know if a doctor has told them if they have had a stroke.

Table 23

*Urban and Rural Geographic Location/ Stroke of Respondents*

Stroke	Geographic Location		
	Urban n(%)	Rural n(%)	Total n(%)
Yes	228(2.6)	162(3.5)	450(3.4)
No	8476(96.4)	4407(96.1)	12883(96.3)
Don't know	24(0.3)	17(0.4)	41(0.3)
Missing	2(0.1)	2(0.1)	4(0.1)
Total	8790(100.0)	4588(100.0)	13378(100.0)

Notes:  $X^2 = 1.99$ ,  $df = 3$ ,  $p = .573$

A chi-square analysis of the responses of the four groups of the variable 'stroke' provided an  $X^2$  value of 1.99, a degree of freedom of 3. The  $X^2$  value was a non-significant ( $p = .573$ ). This means that the null hypothesis is accepted. Therefore, there is not a significant difference in responses among the geographic location groups and their answers towards ever told they have had a stroke.

The fifth survey question analyzed on how urban and rural areas of Pennsylvania compare with chronic disease conditions is:

- Have you ever been told by a doctor, nurse, or other health professional that you had asthma?

The BRFSS survey question on health care coverage was conducted with 13,378 rural and urban citizens of Pennsylvania. The research compared the two groups (rural and urban) and their response to the ever told have had asthma question. The survey participants were categorized by their location into the following groups: rural and

urban. The survey respondents utilized a yes, no, and don't know scale for the variable. Additionally, missing responses (such as refusing to answer the question) for the variable were listed under the name 'missing'.

SPSS was used to perform a chi square analysis of the responses to determine the chi-square value, the level of significance, and the degrees of freedom. For comparison, an accepted alpha of .05 was used for each variable as a basis for the rejection or maintenance of the null hypothesis. The column totals and percentages were also calculated.

A table of observed frequencies and column percentage for urban and rural geographic location and asthma of respondents is in table 24. Table 24 shows that of a total of 13,378 survey participants, 1,609 (12.0%) have been told by a doctor, nurse, or other health professional that they have asthma and 11,733 (87.7%) have not been told that they have asthma. Of the 8,790 urban participants 1,019(11.6%) have been told that they have asthma and 7,741(88.1%) have not been told they have asthma. Of the 4,588 rural participants 590 (12.9%) have been that they have asthma and 3,992 (87.0%) have not been told that they have asthma. The remaining responses refused to answer or did not know if a doctor, nurse, or other health professional has told them that they have asthma.

Table 24

*Urban and Rural Geographic Location/ Asthma of Respondents*

Asthma	Geographic Location		
	Urban n(%)	Rural n(%)	Total n(%)
Yes	1019(11.6)	590(12.9)	1609(12.0)
No	7741(88.1)	3992(87.0)	11733(87.7)
Don't know	30(0.3)	6(0.1)	36(0.3)
Missing	0(0.0)	0(0.0)	0(100.0)
Total	8790(100.0)	4588(100.0)	13378(100.0)

Notes:  $X^2 = 9.37$ ,  $df = 3$ ,  $p = .009^{**}$

A chi-square analysis of the responses of the four groups of the variable 'asthma' provided an  $X^2$  value of 9.37, a degree of freedom of 3. The  $X^2$  value was significant ( $p = .009$ ). This means that the null hypothesis is rejected in favor of the alternative hypothesis. Therefore, there is a significant difference in responses to the number of asthma.

There is no significant difference with regard to geographic location groups and their answers towards asthma.

As shown in table 24, when comparing the values in each category, 1,019 (11.6%) of urban and 590 (12.9%) of rural have had asthma. About 12% reported they have had asthma, a minority percentage of survey respondents. Also as shown in table 24, when comparing the values in each category, 7,741 (88.1%) of urban and 3,992 (87.0%) of rural have not had asthma. Majority of them (over 80%) do not have asthma.

The sixth survey question analyzed on how urban and rural areas of Pennsylvania compare with chronic disease conditions is:

- Have you ever been told by a doctor or other health professional that you have some form of arthritis, rheumatoid arthritis, gout, lupus, or fibromyalgia?

The BRFSS survey question on frequency of arthritis was conducted with 13,181 rural and urban citizens of Pennsylvania. The research compared the two groups (rural and urban) and their response to the arthritis question. The survey participants were categorized by their location into the following groups: rural and urban. The survey respondents utilized a yes, no, and don't know scale for the variable. Additionally, missing responses (such as refusing to answer the question) for the variable were listed under the name 'missing'.

SPSS was used to perform a chi square analysis of the responses to determine the chi-square value, the level of significance, and the degrees of freedom. For comparison, an accepted alpha of .05 was used for each variable as a basis for the rejection or maintenance of the null hypothesis. The column totals and percentages were also calculated.

A table of observed frequencies and column percentage for urban and rural geographic location and frequency of arthritis of respondents is in table 25. Table 25 shows that of a total of 13,181 survey participants, 5,010 (38.0%) have been told by a doctor, nurse, or other health professional that they have some form of arthritis, rheumatoid arthritis, gout, lupus, or fibromyalgia and 8,104 (61.5%) have not been told that they do not. Of the 8,662 urban participants 3,278 (37.8%) have been told that they have some form of arthritis, rheumatoid arthritis, gout, lupus, or fibromyalgia and

5,338(61.6%) have not been told they do not. Of the 4,519 rural participants 1,732 (38.3%) have been that they have some form of arthritis, rheumatoid arthritis, gout, lupus, or fibromyalgia and 2,766 (61.2%) have not been told that they do not. The remaining responses refused to answer or did not know if a doctor, nurse, or other health professional has told them that they have some form of arthritis, rheumatoid arthritis, gout, lupus, or fibromyalgia.

Table 25

*Urban and Rural Geographic Location/ Arthritis of Respondents*

Arthritis	Geographic Location		
	Urban n(%)	Rural n(%)	Total n(%)
Yes	3278(37.8)	1732(38.3)	5010(38.0)
No	5338(61.6)	2766(61.2)	8104(61.5)
Don't know	39(0.5)	21(0.5)	60(0.4)
Missing	7(0.1)	0(0.0)	7(0.1)
Total	8662(100.0)	4519(100.0)	13181(100.0)

Notes:  $X^2 = 3.93$ ,  $df = 3$ ,  $p = .269$

A chi-square analysis of the responses of the four groups of the variable 'arthritis' provided an  $X^2$  value of 3.93, a degree of freedom of 3. The  $X^2$  value was a non-significant ( $p = .269$ ). This means that the null hypothesis is accepted. Therefore, there is not a significant difference in responses among the geographic location groups and their answers towards their frequency of arthritis.

In summary, the fourth research question asked how urban and rural areas of Pennsylvania compare with chronic disease conditions. The rural survey participants had a consistent overall pattern of having more of the chronic disease than from people in urban areas. The survey asked if a doctor has said they have diabetes. The urban people reported 9.9% yes, 0.9% yes but, pregnant and 87.9% reported no. The rural people reported 10.8% yes, 0.9% yes but, pregnant and 87.1% reported no. Rural people in the survey report slightly more (0.2%) of having diabetes. The survey participants were also asked if a doctor has ever told them that they have had a myocardial infarction also known as a heart attack. The urban participants reported 5.7% have and rural 4.8% have. The urban people in the survey reported that nearly 1% more have had a heart attack.

Another heart health question asked was if they have had angina or coronary heart disease. The urban survey participants reported 5.9% yes and 6.1% rural, the remaining reported no. About 0.1% more rural people reported having angina or coronary heart disease. The survey respondents were also asked if they have ever had a stroke. The people reporting yes were 2.6% urban and 3.5% rural. Again, 0.1% more rural people reported having a stroke than urban people.

Interestingly, when the survey asked if they have asthma more people reported yes to this question a lot more than the other chronic disease questions mentioned in the survey. This could be possible due to the many governmental reports that poor environmental conditions and other household and community toxins are causing an increase in the incidence rate of asthma (CDC, 2006). The people reporting yes were 11.6% urban and 12.9% rural. The incidence of asthma is very significant in these populations and outlines a future health concern for all residents of Pennsylvania.

Finally, in regards to chronic disease conditions, the survey participants were asked if they have some form of arthritis, rheumatoid arthritis, gout, lupus, or fibromyalgia. The people reporting yes were 37.8% urban and 38.3% rural. This was the number one most reported chronic disease in the survey. More rural people reported (0.5%) having have some form of arthritis, rheumatoid arthritis, gout, lupus, or fibromyalgia than people from urban areas. The incidence of arthritis, rheumatoid arthritis, gout, lupus, or fibromyalgia is the number one chronic health concern found in this study. This is also a future health concern for all residents of Pennsylvania.

### *Public Health Issues*

The fifth research question examined how urban and rural areas of Pennsylvania compare with selected public health issues. Seven questions from the BRFSS 2005 survey are measured for this research question. The first question for analysis is:

- A flu shot is an influenza vaccine injected into your arm. During the past 12 months, have you had a flu shot?

The BRFSS survey question on frequency of days now smoking was conducted 13,378 rural and urban citizens of Pennsylvania. The research compared the two groups (rural and urban) and their response to the flu shot question. The survey participants were categorized by their location into the following groups: rural and urban. The survey respondents utilized a yes, no, and don't know scale for the variable. Additionally, missing responses (such as refusing to answer the question) for the variable were listed under the name 'missing'.

SPSS was used to perform a chi square analysis of the responses to determine the chi-square value, the level of significance, and the degrees of freedom. For comparison, an accepted alpha of .05 was used for each variable as a basis for the rejection or maintenance of the null hypothesis. The column totals and percentages were also calculated.

A table of observed frequencies and column percentage for urban and rural geographic location and frequency of flu shots of respondents is in table 26. Table 26 shows that of a total of 13,378 survey participants, 3,793 (28.4%) during the past 12 months have had a flu shot and 9,534 (71.3%) have not had a flu shot. Of the 8,790 urban participants 2,527 (28.7%) have had a flu shot in the past 12 months and 6,232 (70.9%) have not had a flu shot. Of the 4,588 rural participants 1,266 (27.6%) have had a flu shot in the past 12 months and 3,302 (72.0%) have not had a flu shot. The remaining responses refused to answer or did not know if they have had a flu shot in the past 12 months.

Table 26

*Urban and Rural Geographic Location/ Influenza Vaccine of Respondents*

Vaccine	Geographic Location		
	Urban n(%)	Rural n(%)	Total n(%)
Yes	2527(28.7)	1266(27.6)	3793(28.4)
No	6232(70.9)	3302(72.0)	9534(71.3)
Don't know	26(0.3)	20(0.4)	46(0.3)
Missing	5(0.1)	0(0.0)	5(0.1)
Total	8790(100.0)	4588(100.0)	13378(100.0)

Notes:  $X^2 = 6.24$ ,  $df = 3$ ,  $p = .101$

A chi-square analysis of the responses of the four groups of the variable 'flu shot' provided an  $X^2$  value of 6.24, a degree of freedom of 3. The  $X^2$  value was a non-significant ( $p = .101$ ). This means that the null hypothesis is accepted. Therefore, there is not a significant difference in responses among the geographic location groups and their answers towards their frequency of flu shots.

The second survey question analyzed on how urban and rural areas of Pennsylvania compare with selected public health issues is:

- During the past 12 months, have you had a flu vaccine that was sprayed in your nose? The flu vaccine sprayed in the nose is also called FluMist.

The BRFSS survey question on frequency of flu vaccine was conducted with 13,378 rural and urban citizens of Pennsylvania. The research compared the two groups (rural and urban) and their response flu vaccine question. The survey participants were categorized by their location into the following groups: rural and urban. The survey

respondents utilized a yes, no, and don't know scale for the variable. Additionally, missing responses (such as refusing to answer the question) for the variable were listed under the name 'missing'.

SPSS was used to perform a chi square analysis of the responses to determine the chi-square value, the level of significance, and the degrees of freedom. For comparison, an accepted alpha of .05 was used for each variable as a basis for the rejection or maintenance of the null hypothesis. The column totals and percentages were also calculated.

A table of observed frequencies and column percentage for urban and rural geographic location and frequency of flu vaccine of respondents is in table 27. Table 27 shows that of a total of 13,378 survey participants, 87 (0.6%) during the past 12 months has had a flu vaccine that was sprayed in their nose (FluMist) and 13,271 (99.2%) have not. Of the 8,790 urban participants 52 (0.6%) has had a flu vaccine that was sprayed in their nose (FluMist) and 8,726 (99.3%) have not. Of the 4,588 rural participants 35 (0.7%) has had a flu vaccine that was sprayed in their nose (FluMist) in the past 12 months and 4,545 (99.1%) have not. The remaining responses refused to answer or did not know if they had a flu vaccine that was sprayed in their nose (FluMist) in the past 12 months.

Table 27

*Urban and Rural Geographic Location/ FluMist Vaccine of Respondents*

Vaccine	Geographic Location		
	Urban n(%)	Rural n(%)	Total n(%)
Yes	52(0.6)	35(0.7)	87(0.6)
No	8726(99.3)	4545(99.1)	13271(99.2)
Don't know	9(0.1)	7(0.1)	16(0.1)
Missing	3(0.1)	1(0.1)	4(0.1)
Total	8790(100.0)	4588(100.0)	13378(100.0)

Notes:  $X^2 = 2.16$ ,  $df = 3$ ,  $p = .540$

A chi-square analysis of the responses of the four groups of the variable 'flu vaccine' provided an  $X^2$  value of 2.16, a degree of freedom of 3. The  $X^2$  value was a non-significant ( $p = .540$ ). This means that the null hypothesis is accepted. Therefore, there is not a significant difference in responses among the geographic location groups and their answers towards their frequency of flu vaccine.

The third survey question analyzed on how urban and rural areas of Pennsylvania compare with selected public health issues is:

- A pneumonia shot or pneumococcal vaccine is usually given only once or twice in a person's lifetime and is different from the flu shot. Have you ever had a pneumonia shot?

The BRFSS survey question on frequency of pneumococcal vaccine was conducted with 13,378 rural and urban citizens of Pennsylvania. The research compared the two groups (rural and urban) and their response to the pneumococcal vaccine

question. The survey participants were categorized by their location into the following groups: rural and urban. The survey respondents utilized a yes, no, and don't know scale for the variable. Additionally, missing responses (such as refusing to answer the question) for the variable were listed under the name 'missing'.

SPSS was used to perform a chi square analysis of the responses to determine the chi-square value, the level of significance, and the degrees of freedom. For comparison, an accepted alpha of .05 was used for each variable as a basis for the rejection or maintenance of the null hypothesis. The column totals and percentages were also calculated.

A table of observed frequencies and column percentage for urban and rural geographic location and frequency of pneumococcal vaccine of respondents is in table 28. Table 28 shows that of a total of 13,378 survey participants, 3,516 (26.3%) have had a pneumonia shot and 8,784 (65.6%) have not. Of the 8,790 urban participants 2,354 (26.8%) have had a pneumonia shot and 5,761 (65.5%) have not. Of the 4,588 rural participants 1,162 (25.3%) have had a pneumonia shot and 3,023 (65.9%) have not. The remaining responses refused to answer or did not know if they had a pneumonia shot.

Table 28

*Urban and Rural Geographic Location/ Pneumococcal Vaccine of Respondents*

Vaccine	Geographic Location		
	Urban n(%)	Rural n(%)	Total n(%)
Yes	2354(26.8)	1162(25.3)	3516(26.3)
No	5761(65.5)	3023(65.9)	8784(65.6)
Don't know	672(7.6)	401(8.7)	1073(8.0)
Missing	3(0.1)	2(0.1)	5(0.1)
Total	8790(100.0)	4588(100.0)	13378(100.0)

Notes:  $X^2 = 7.06$ ,  $df = 3$ ,  $p = .070$

A chi-square analysis of the responses of the four groups of the variable 'pneumococcal vaccine' provided an  $X^2$  value of 7.06, a degree of freedom of 3. The  $X^2$  value was a non-significant ( $p = .070$ ). This means that the null hypothesis is accepted. Therefore, there is not a significant difference in responses among the geographic location groups and their answers towards their frequency of pneumococcal vaccine.

The fourth survey question analyzed on how urban and rural areas of Pennsylvania compare with selected public health issues is:

- Have you ever been tested for HIV? Do not count tests you may have had as part of a blood donation. Include testing fluid from your mouth.

The BRFSS survey question on HIV test was conducted with 9,433 rural and urban citizens of Pennsylvania. The research compared the two groups (rural and urban) and their response to the HIV test question. The survey participants were categorized by their location into the following groups: rural and urban. The survey respondents utilized

a yes, no, and don't know scale for the variable. Additionally, missing responses (such as refusing to answer the question) for the variable were listed under the name 'missing'.

SPSS was used to perform a chi square analysis of the responses to determine the chi-square value, the level of significance, and the degrees of freedom. For comparison, an accepted alpha of .05 was used for each variable as a basis for the rejection or maintenance of the null hypothesis. The column totals and percentages were also calculated.

A table of observed frequencies and column percentage for urban and rural geographic location and HIV test of respondents is in table 29. Table 29 shows that of a total of 9,433 survey participants, 3,031 (32.2%) have been tested for Human Immunodeficiency Virus (HIV) and 6,245 (66.2%) have not. Of the 6,158 urban participants 1,781 (28.9%) have been tested for HIV and 4,272 (69.4%) have not. Of the 3,275 rural participants 1,250 (38.2%) have been tested for HIV and 1,973 (60.2%) have not. The remaining responses refused to answer or did not know if they had a HIV test.

Table 29

*Urban and Rural Geographic Location/ HIV Test of Respondents*

HIV Test	Geographic Location		
	Urban n(%)	Rural n(%)	Total n(%)
Yes	1781(28.9)	1250(38.2)	3031(32.2)
No	4272(69.4)	1973(60.2)	6245(66.2)
Don't know	100(1.6)	43(0.1)	143(1.5)
Missing	5(0.1)	9(0.1)	14(0.1)
Total	6158(100.0)	3275(100.0)	9433(100.0)

Notes:  $X^2 = 90.56$ ,  $df = 3$ ,  $p \leq .000***$

A chi-square analysis of the responses of the four groups of the variable 'HIV test' provided an  $X^2$  value of 90.56, a degree of freedom of 3. The  $X^2$  value was significant ( $p \leq .000$ ). This means that the null hypothesis is rejected in favor of the alternative hypothesis. Therefore, there is a significant difference in responses to the number of HIV tests.

As shown in table 29, when comparing the values in each category, 1,781 (28.9%) of urban and 1,250 (38.2%) of rural have had a HIV test. There is a difference (over 10% more urban have had an HIV test) with regard to geographic location groups and their answers towards having had an HIV test. Also as shown in table 29, when comparing the values in each category, 4,272 (69.4%) of urban and 1,973 (60.2%) of rural have not had a HIV test. Majority of them (over 60%) have not had an HIV test.

In summary, the fifth research question asked how urban and rural areas of Pennsylvania compare with selected public health issues. The overall pattern found that urban residents' demonstrated more preventive health behaviors than people in rural areas and that the FluMist vaccine is still a vaccination that is not widespread in the state. The survey respondents were asked if they have received a flu shot in the past 12 months. 28.7% of urban reported yes and 27.6% reported yes, leaving the majority to not having a flu shot a large percentage: 70.9% urban and 72.0% rural. About 1.1% of urban people reported having the flu shot more than people from rural areas in the state. The CDC (2006) reports that the best way to prevent the flu or lessen its effects is to get a flu shot and the majority of survey participants have not had a flu shot. A follow-up question asked if they have had the FluMist vaccine. The urban survey participants reported only 0.6% have had the vaccine and rural 0.7% have had it also. The vast majority of the survey participants have not had the FluMist vaccine and this indicates that this vaccination is not a widespread means of flu prevention in the state.

The survey participants were asked if they have had the pneumococcal vaccine. The urban survey participants reported 26.8% yes and rural 25.3% yes. The remaining did not have the vaccine. Finally, the survey participants were asked if they have had a HIV test. The urban survey participants reported 28.9% have had the test and rural 38.2% have also had the HIV test. The findings of this question broke from the overall pattern with 9.3% of more rural people have had an HIV test than from people in urban areas.

### *Section 1 Summary*

The comparison of urban and rural residents of Pennsylvania in the 2005 BRFSS survey did not yield any significant differences among the groups. However, a pattern emerged in the analysis that found comparable results to the survey questions for both groups as described below for each research objective in the study.

The urban and rural areas of Pennsylvania were a similar comparison in regards to health access and utilization. Approximately 90% of Pennsylvanians do have health care coverage and 80% do have a primary care physician.

The comparisons of health risk factors for urban and rural areas were very similar. For both groups, 50% of the people have smoked at least 100 cigarettes in their lifetime with 45% smoking everyday or some days of the week. Another health risk factor analyzed was alcoholic drinking habits. The majority of both groups (60%) have drunk 1 to 10 days in the past 30 days from answering the survey. Additionally, 91% of them have had 1 to 5 drinks during the 30 days. When asked about heavy drinking, identified as 5 or more drinks on an occasion, 21% of both groups did drink heavy. Also, 16% have received advice from a health professional to lose weight.

The contrast of the groups for preventive risk behavior questions also identified parallel results. The majority (over 40%) consume fruit 1 to 5 times a day or 1 to 5 times a week. Also, the majority (over 60%) have one to five servings of vegetables per day. A percentage (over 30%) did moderate activities seven days per week and over 50% did moderate activities three to five days per week. Also, the majority of them (over 40%) do vigorous physical activity only 2 or 3 days per week.

When the BRFSS survey asked questions concerning chronic diseases, the majority of the respondents did not have any of them. However, the most prominent diseases in the survey group were diabetes, arthritis, and asthma. The majority of them (over 80%) do not have diabetes, over 90% have not had a heart attack, over 90% have not had coronary heart disease, over 90% have not had a stroke, over 80% do not have asthma, and over 60% do not have arthritis.

The final health questions in the survey identified that over 70% have not had an influenza vaccine, over 99% have not had a nasal influenza vaccine, over 60% have not had a pneumococcal vaccine, and over 60% have not had an HIV test.

The patterns identified in the data analysis represent health gains and disparities shared by both urban and rural residents of Pennsylvania.

## Section 2: Health Policy Analysis

The second section is a comprehensive health policy analysis and health policy recommendations for rural and urban areas of Pennsylvania. The focus of this report is a description on (a) the history of health policy concerning health access and utilization, health risk factors, preventive health behaviors, chronic disease conditions, and selected public health issues, and (b) reasons for changes to health policies for improved health in rural and urban areas of Pennsylvania.

### *History of Health Policy for Rural and Urban Areas of Pennsylvania*

Health care policy in Pennsylvania is shaped by a number of factors, including an aging population, a high rate of employer-sponsored insurance, and strong competition

among managed care plans and hospitals. Pennsylvania's efforts to increase health insurance coverage, unlike those of many states, have bypassed major Medicaid expansions and—until it was required by federal law—reform of the private insurance market (Birnbaum, 1998). Instead, the state has funded its own health insurance program for children, now supported with federal Children's Health Insurance Program (CHIP) funds; insurers have supported smaller expansion programs with private funds; and Blue Cross Blue Shield (BCBS) has served as an insurer of last resort. Both CHIP and Medicaid enroll a majority of beneficiaries in managed care, and Pennsylvania is one of the few states that operate managed care programs for elderly and disabled Medicaid beneficiaries.

The Medicare and Medicaid programs were created by Congress in 1965 as Title XIX to the Social Security Act. The Medicare program in Pennsylvania is a federal program operated by the United States Department of Health and Human Services' Center for Medicare and Medicaid Services (CMS). The Medicaid program is operated by both the Pennsylvania Department of Health and the CMS. The CMS is the governmental body responsible for regulation and enrollment of the programs. For this study, the CMS policy documents and regulations for the Medicare and Medicaid programs were analyzed to define the document context and define the document features and relationships to the survey results in this study from the 2005 Pennsylvania BRFSS. The complete health policies of the 2007 Medicare and Medicaid programs can be found online at <http://www.cms.hhs.gov>.

The Medicare program was established to serve people age 65 or older, people under age 65 with certain disabilities, and people of all ages with End-Stage Renal

Disease (permanent kidney failure requiring dialysis or a kidney transplant) (Center for Medicare and Medicaid Services, 2007). Medicare consists of three parts, hospital insurance (helps cover inpatient care in hospitals, including critical access hospitals, and skilled nursing facilities that are not long-term care), medical insurance (helps cover doctors' services and outpatient care) and prescription drug coverage (most people pay a monthly premium for this service). The prescription drug coverage on January 1, 2006 was made available to everyone with Medicare. Beneficiaries choose the drug plan and pay a monthly premium (Center for Medicare and Medicaid Services, 2007).

The Medicaid program is available only to certain low-income individuals and families who fit into an eligibility group that is recognized by federal and state law. In order to be eligible for the program, individuals must: fit into a specified coverage group, meet the income requirements for that specific coverage group (these income limits are usually specified in terms of a certain percentage of the federal poverty level, meet the asset requirements for that specific coverage group, be a United States citizen or a qualified lawful alien, and be a Pennsylvania resident (Center for Medicare and Medicaid Services, 2007). Adults and children with low-incomes, pregnant women, disabled adults, and workers age 16 to 64 with a documented disability may be eligible for the Medicaid program.

The Medicare and Medicaid programs are extremely complicated programs created by the federal and state government to provide health coverage to families, people with disabilities, and the aged with low income. Health care costs continue to rise each year and at a faster rate than tax revenues causing the programs to become more expensive (Pennsylvania Medicaid Policy Center, 2007). Furthermore, in Pennsylvania

the increase in the cost of premiums for family health insurance coverage greatly outpaced inflation and median wage growth since 2000 (Pennsylvania Medicaid Policy Center, 2007). As health costs continue to raise it is more likely that people in Pennsylvania dropped their health insurance and turn to Medicaid for health care coverage.

President Bush's FY 2008 budget proposes reducing the Medicaid program nationally by almost \$26 billion over the next five years (Pennsylvania Medicaid Policy Center, 2007). This new budget in the state would shift the financial burden of the program to Pennsylvania taxpayers. To address these financial pressures, Pennsylvania may choose to: restrict eligibility, reduce benefits, look for potential inefficiencies in the program or shift funding from other programs (Pennsylvania Medicaid Policy Center, 2007).

Pennsylvania has the third largest elderly population in the country, in fact one in five residents is over the age of 60. The elderly use more medical assistance resources than any other and the services commonly used (such as long-term care facilities) are the most expensive (Pennsylvania Department of Public Welfare & Office of Medical Assistance Programs, 2006).

The Medicare and Medicaid programs support over 14% of Pennsylvania's population, including over 32% of children in the state (Pennsylvania Department of Public Welfare & Office of Medical Assistance Programs, 2006). The BRFSS survey results in this study document 10.1% percent of Pennsylvanians do not have health care coverage. As health care costs rise and the impact of medical assistance on the state budget increases, drastic changes to eligibility requirements and medical coverages may

change. This could cause an increase of uninsured Pennsylvanians and/or a reduction in covered services. As this study has discussed, rural areas already have a lack of hospitals and healthcare specialists. A reduction in these services could greatly negatively affect people in rural areas. This study recommends more attention is needed to how the Medicare and Medicaid programs can effectively meet its mission of providing health care coverage to some of the Commonwealth's most vulnerable citizens. Action groups and Pennsylvanian citizens need to understand the effects that the President's FY 2008 budget proposal could have on the Medicare and Medicaid programs.

Another major health policy initiative in Pennsylvania is the Children's Health Insurance Program (CHIP). The Balanced Budget Act of 1997 established the State Children's Health Insurance Program (SCHIP) as Title XXI of the Social Security Act 1 (Pennsylvania Medicaid Policy Center, 2007). In Pennsylvania, SCHIP is called the Children's Health Insurance Program (CHIP). CHIP with Medicaid, provides health insurance for low income children. To be eligible for CHIP, a child must be uninsured and ineligible for Medicaid.

The CHIP program in Pennsylvania is unique because it covers all children in the state with incomes above the Medicaid eligibility levels. In March 2007, following the passage of the Commonwealth's Cover All Kids legislation and CMS approval of an amended state plan reflecting the new legislation, Pennsylvania implemented this expanded CHIP program (Pennsylvania Medicaid Policy Center, 2007). The payment schedule for CHIP ranges from free, low-cost, to at-cost plans (based on income guidelines). CHIP is a comprehensive health care program that covers routine health examinations, immunizations, prescription drugs, emergency care, maternity care, mental

care, medical equipment, substance abuse treatment, lab tests, and dental, vision and hearing services (Pennsylvania Medicaid Policy Center, 2007).

CHIP is funded from federal and state dollars. According to the Pennsylvania Insurance Department, in FY 2006, expenditures on CHIP in Pennsylvania were \$240 million; of which \$75 million was state funds and \$164 million were federal funds (Pennsylvania Medicaid Policy Center, 2007).

This Pennsylvania Medicaid Policy Center study on CHIP has documented the lack of access of health care and the high costs associated with health insurance. In Pennsylvania 10.1% of citizens do not have health insurance. The CHIP program has doubled enrollment in the past 10 years by active outreach in the community and expanding the program to all children in the state. However, according to the Pennsylvania Medicaid Policy Center (2007) there are still many uninsured children in Pennsylvania. In 2006, Pennsylvania estimated that there were 133,589 uninsured children. Of those, 68% were eligible for either Medicaid or CHIP and 19% were not eligible for any public program.

The CHIP program has been successful with insuring thousands of children and providing services they may not have had. This study recommends that continued efforts of education and outreach of the program to enroll eligible children not receiving CHIP. Additionally, attention should be paid to the President's FY 2008 budget proposal which affects the Medicaid program could affect the CHIP program (since funds from Medicaid are used in funding CHIP). These programs address the demographic profile of the state and provide assistance in the prevention and treatment of chronic diseases.

Pennsylvania's socio-demographic profile of its urban and rural residents is a unique blend. The Commonwealth has two major urban areas: Philadelphia is the fifth-largest city in the United States and Pittsburgh ranks 45<sup>th</sup>. Under the Census Bureau's broader definition of a Metropolitan Statistical Area, Philadelphia has the sixth-largest population and Pittsburgh ranks 19<sup>th</sup> (Birnbaum, 1998; U.S. Census Bureau, 2001). A lower share of Pennsylvania's residents live in non-metropolitan areas (14.6%) compared to the nation as a whole (21.8%). However, because of its size and the relatively populous rural areas between Pittsburgh and Philadelphia, Pennsylvania has the largest rural population of any state in absolute terms (U.S. Census Bureau, 2001).

According to the national BRFSS data (2005) and state reports by Birnbaum (1998) the most major population health indicators in Pennsylvania are worse than the national average, suggesting that Pennsylvania's general affluence masks serious public health problems in some areas of healthcare. According to data, the heart disease death rate is nearly 30% higher than for the nation; the rate of cancer deaths is 22% higher; and the rate of diabetes deaths is 25% higher (Birnbaum, 1998; BRFSS 2005). Not all of the state's health indicators are worse than average. Pennsylvania's premature death rate (41.8 years of potential life lost before age 65 per 1,000 population) was lower than the national rate (46.7 years lost) and the state reported fewer AIDS cases per 100,000 compared to the United States overall (19.5 versus 25.2) (Birnbaum, 1998; U.S. Census Bureau, 2001).

Pennsylvania's health insurance market is characterized by extensive HMO penetration and stiff competition. 30% of state residents are enrolled in HMOs, compared with 24% for the United States (AARP, 2005). The dominate individual and group

insurance insurer in Pennsylvania is Blue Cross Blue Shield. Blue Cross of Western Pennsylvania is the largest plan in the state, holding an estimated 28% of the individual market's business and an estimated 24% of the group market (Birnbaum, 1998; BRFSS 2005). This may extend to why the majority of health education plans are found in Western Pennsylvania, which is discussed further in the following section on an analysis on health education in Pennsylvania.

Prior to the Health Insurance Portability and Accountability Act of 1996 (HIPAA), Pennsylvania had not pursued any insurance market reforms to increase access to coverage for Pennsylvanians (BCBS, 2005; Hing & Jensen, 1999). The state is dominated by the insurer Blue Cross Blue Shield which has offset policymakers' concerns about health insurance coverage by developing privately supported programs such as CHIP. Currently, Pennsylvania imposes no rate restrictions to group or individual market insurance (Birnbaum, 1998; Hing & Jensen, 1999). There is further speculation that the political conservatism and general avoidance to strong regulation of the health insurance industry in Pennsylvania are additional reasons for the lack of any insurance reform in the state.

According to the latest data collection, 13% of adult Pennsylvanians do not have health insurance (BRFSS, 2005). The reason for change to health policies concerning access and coverage involves the substantial percentage of Pennsylvanians that do not have health care coverage. Residents that are not covered with health insurance are more limited to the expensive care of medical providers. The socioeconomic status of an individual demonstrates the vast differences among the wealthy and poor in the commonwealth: 30% of adults with an income of less than \$15,000 did not have health

insurance, 29% of adults with an income of \$15,000 to \$24,999 did not have health insurance, 13% of adults with an income of \$25,000 to \$49,999 did not have health insurance, 5% of adults with an income of \$50,000 to \$74,999 and 4% of adults with an income of over \$75,000 did not have health insurance. This socioeconomic status characteristic of the state illustrates the need for health care reform in the commonwealth.

This study has discussed and documented the growing concern of chronic diseases in Pennsylvania. The availability and affordability of health insurance is a concern for the proper prevention and treatment of these diseases. However, as stated previously, Pennsylvania has not pursued any insurance market reforms to increase access to coverage for Pennsylvanians. When a resident encounters a drastic situation such as when on March 31, 2003, Bethlehem Steel announced that they would be terminating all retiree health care benefits it left thousands of Pennsylvanians seeking coverage for health care needs most could not afford on their own. The insurance options offered to these retirees included options that many could not afford or were not eligible for such as Medicaid, Medicare Managed Care, COBRA, (COBRA was created when Congress passed the Consolidated Omnibus Budget Reconciliation Act (COBRA) in 1986. COBRA allows for the continuation of group health benefits that would otherwise be terminated. However, the former Bethlehem Steel employee would be responsible for their and the group premiums.) or the retiree makes arrangements with their health care provider for a private fee for service plan.

This study recommends that health policies be reformed to cover more if not all adults similar to the achievements of the CHIP program. As the concept of health care reform continues to be debated, in the meantime counseling and education programs can

effectively communicate healthy behaviors and health care access options to adults in the state. The APPRISE Counseling Program in Pennsylvania is an example of a free program that provides information to Medicare participants. A statewide program similar to this that all adults could access for free to learn of their options and comparability of insurance programs has the potential to benefit both rural and urban citizens with health care needs.

A universal single payer health care coverage proposal backed by Pennsylvanians United for Single-payer Health Care (PUSH), a grass roots organization lobbying and advocating for single-payer health care and Pennsylvanians United for Reform in Health Care (PURHC). The mission of the Pennsylvanians United for Reform in Health Care (PUR Health Care) is to engage, educate and facilitate an informed debate about the health care delivery system with credible and timely information about health care in the greater Pittsburgh region and throughout Pennsylvania (Just-Healthcare, 2007). These lobbyist entities in the state government are educating the public and pushing legislators to enact health care reform in the method of universal health care coverage in the commonwealth. According to these groups, in most developed countries and many developing countries health care is provided to everyone regardless of their ability to pay (Just-Healthcare, 2007). This system of health care is not currently practiced in the United States and is the focus of growing attention to potential major health care reform.

The Pennsylvania Governor's Office of Health Care Reform (2007) states that every Pennsylvanian deserves access to affordable, quality health care. This study's recommendations agree with that statement. While universal health care may be a topic

of debate and investigation for some time to come, there are actions that can be implemented now to effectively distribute the services that Pennsylvania offers.

On July 20, 2007 Governor Rendell signed the first pieces of his Prescription for Pennsylvania health care reform plan into law. This bill permits advanced-practice nurses, physicians' assistants and dental hygienists to practice to the full extent of their education and training and to more aggressively attack and eliminate hospital acquired infections (Office of the Governor, 2007). This bill's goal is to address the increasing cost of health care by enabling cheaper alternatives to physicians for treatment such as trained nurse practitioners and physician assistants.

Health care reform is governmental policy changes to any existing healthcare system. Health care reform typically attempts to broaden the population covered by private or public health insurance, expand the array of health care providers consumers may choose among, improve the access to health care specialists, improve the quality of health care, decrease the cost of health care, and decrease the cost of health insurance (Goldman & McGlynn, 2005).

The findings on the CHIP program study on positive and negative aspects of the program illustrate possible policy changes for Pennsylvania health care that are not as large-scale as universal health care. While universal health care could provide medical care to all Pennsylvanian residents it has many obstacles and debates until a governmental agreement on the issue is achieved. A realistic set of goals for health programs and community medical outreach programs is to focus on factors that can positively and/or negatively affect the outcomes of providing medical care. These factors are listed below as found in the CHIP study.

*Reasons for Changes to Health Policies*

The reasons for changes to health policies for improved health in rural and urban areas of Pennsylvania can be visualized by the Center for Rural Pennsylvania's (2007) research study on to learn more about outreach and enrollment efforts of the CHIP program. The study found that factors that positively enhanced or influenced enrollment in CHIP were referrals from other human services agencies, sensitivity to individuals' religious beliefs, recognition of possible negative feelings associated with government "hand-out" programs, outreach to agencies who have contact with potential clients, and help with the application process and paper work.

The conditions that negatively affected the implementation and effectiveness of the CHIP outreach activities were lack of support from local school systems, difficult application process, enrollment guidelines, and stigma of a government program, religious conflicts, confidentiality issues, and lack of health education (Center for Rural Pennsylvania, 2007).

Pennsylvania is characterized as a slowly growing and rapidly aging population with a suburban expansion accompanied by declining older communities, and a sluggish economy (Brookings Institution Center, 2003). The Brookings Institution Center recommended changes to health policy in Pennsylvania to boost competitiveness by thinking and acting strategically, concentrating efforts on making the most of established practices, and fully utilizing its limited resources. Both rural and urban communities in the state are struggling with population declines and mounting fiscal distress. The traditional sources of rural employment and income have been lost (such as the closing coal mines and steel mills), and are unlikely to be replaced with jobs offering comparable

wages and benefit packages. In urban areas a lack of inter-municipal coordination and cooperation exist with an out-migration of young people that creates a changing employment and population base in these communities.

Pennsylvania is one of the most rural states in the nation and Pennsylvania's rural population grew slightly faster than urban areas during the 1990s. Among rural counties, Pike County had the largest increase in population (65.6 percent or 18,336 people), while Cambria County had the largest decline (-6.4 percent or 10,431 people) (Alter, Bridger, Findeis, Kelsey, Luloff, McLaughlin, & Shuffstall, 2007).

Rural and urban Pennsylvania are economically, environmentally, politically, and socially interdependent (Alter et. al., 2007). Effective policymaking and implementation requires that rural and urban Pennsylvania be viewed as interdependent parts of a larger system. Policy creation should be analyzed for their impacts on rural and urban areas and not assumed that the impact was similar to various populations in the state. Importantly, rural Pennsylvania must become as much a focus of public policy as are its urban and suburban counterparts (Alter et. al., 2007).

Most discussions of rural health policy overlook the key role that states play in crafting and delivering programs that directly affect the access, cost, or quality of health services to rural residents (McNamara, 2007). However, policies such as regulations embodied in medical practice acts, education programs, and funding for local public health programs are the subject of debate in state capitals (McNamara, 2007). For example, (as referred to earlier) Governor Rendell's Prescription for Pennsylvania universal healthcare plan currently is being debated in the Commonwealth.

Rural communities do face a wide gap in access, cost, and quality of care issues compared to urban areas. Policies should address the fact that rural areas face barriers such as lack of physicians, specialists, and cost of maintaining emergency room availability spread over a relatively small served population and the cost of travel effort for rural residents to obtain care in urban centers (Alter et. al., 2007; McNamara, 2007). As the data in the study of the BRFSS data showed, these populations also have increased onset of chronic diseases and lack of preventive health behaviors. Health education programs that are built as part of health policies for improvement of healthy lifestyles are an effective method of positive behavior modification for good wellbeing.

### *Section 2 Summary*

The history of health care policies for urban and rural Pennsylvania has been characterized as to address the needs of the elderly and children by increasing health care coverage for these populations. Pennsylvania has also effectively implemented expansion programs on the state-level targeted for low-income and disabled individuals. However, health care costs continue to rise each year and programs like Medicare and Medicaid will have to adjust their agenda to address financial pressures. The state may need to implement options such as to restrict eligibility, reduce the number of benefits, or shift funding from other programs to meet the needs of the participants.

This increase in health care costs also impacts other programs, including CHIP, and could cause an increase of the currently 10% of uninsured Pennsylvanians (BRFSS, 2005). Rural areas in particular already have a lack of hospitals and healthcare specialists,

a further reduction of services could greatly negatively impact the services available to these citizens.

The prominent policy recommendation for the state is insurance market reforms to increase access to coverage and lower insurance costs for Pennsylvanians. The state's rural and urban areas are economically interdependent and health policy creation should be analyzed for their impacts on both rural and urban areas. The increase of quality and access to healthcare for both populations can improve their wellbeing and extend to the improvement of lifestyles.

### Section 3: Document Analysis on Health Education Programs

The third and final section is a comprehensive health education report on existing health education programs in rural and urban areas in Pennsylvania. The focus of this report is a description on (a) the history of health education concerning health access and utilization, health risk factors, preventive health behaviors, chronic disease conditions, and selected public health issues, and (b) reasons for changes to current health education for improved health in rural and urban areas of Pennsylvania.

Health education is important in the treatment and prevention of chronic diseases and many other health concerns. As many chronic disease treatments become more complex and depend on self-management techniques, patient education is increasingly more important (Parker & Schwartzberg, 2001).

Patient education must be presented in realistic and understandable means for the intended audience. In the 2000s, we live in a world surround with media. While the media does a great service informing the public about advances in medicine, often the

images and messages may result in patients having unrealistic expectations about the potential benefits and risks of health treatments and preventive health behaviors (Mercy Health Plans, 2007). Unrealistic expectations are often the root cause of unsatisfied patients and failed preventive health education courses.

The organized patient education efforts in Pennsylvania consist primarily of programs offered by medical insurance companies and department of health organizations. These programs are structured to educate on chronic diseases and lifestyle changes for better health. The programs offered by insurance and health organizations in the state are increasing in number and availability to residents. Health education classes inside hospitals to inform patients of surgical procedures, chronic conditions, proper medication use, and support groups are also growing in the state. The media provides an accessible outlet to publicize these offerings and continue the development of new offerings.

The largest health insurance company in Pennsylvania is Blue Cross Blue Shield (BCBS) followed by others including Geisinger Health and UPMC Medical insurances. BCBS is the leader in providing wellness programs to their participants. These lifestyle programs are offered thru their member website, at workplaces, and in community and hospital locations. BCBS members have access to these programs when they are offered during the year. These programs focus on the individual taking action for their health thru a variety of programs that offer group meetings and supplemental handout materials and a method for people to track their progress. Patient self-efficacy for self-management of their diseases is the instructional approach of these sessions.

The health insurance companies offer several health education programs to their participants. Some examples of these programs in Pennsylvania (see table 30) include Blue Cross/Blue Shield's Silver Sneakers program, Dr. Dean Ornish Program for Reversing Heart Disease, Walk for a Healthy Community, HOPE program, and the annual Fun, Fit and Fabulous health conference for women of color (Highmark, 2006). All of these programs are exclusive to insurance participants. It is not uncommon that additional registration, a fee, or enrollment into the health education program is required. These programs are live, face-to-face offerings and offered only a few times a year at pre-established locations. This document analysis has found that for people in rural areas this type of educational program presents several challenges that could be overcome by implementing additional strategies of education. For example, people in rural areas may not have access to adequate transportation to attend an event or rural/urban people may have personal conflicts or work obligations that prevent them from participating. From reviewing when the programs are offered, the study recommends that additional sections of at least the more popular programs are offered and at additional sites. The programs could also be offered online to provide a distance education alternative to the on-location meetings.

The Department of Health has Pennsylvania Area Health Education Center Programs which are a network of seven region agencies that focus on increased access to primary health care services, improved access to quality of life, advanced access to health promotion and disease prevention and access to a health professions workforce through development, recruitment and retention efforts. Each of the seven regions is in operation with a participating medical school (PA-AHEC, 2007).

The Department of Health is increasing the number of educational programs and outreach initiatives to the public. These programs include written materials such as free pamphlets, online information, and informative seminars. The Pennsylvania Department of Health also hosts an information clearinghouse online of hundreds of publications for the public. This study has researched effective educational theories of behavior modification and recommends realigning of the state's educational programs with these theories for the most beneficial experience for participants of a program for improvement of health behavior.

For example, one of the most popular educational programs offered is the Quit Now smoking campaign (see table 30). The program offers a free hotline for Pennsylvanians to call for assistance with quitting tobacco use. The hotline provides counseling and structured assistance for individuals who are committed to quitting. The program then refers a person to a local tobacco cessation center for continued care or to an online guide such as the Department of Health's Smoke Free center at <http://www.smokefree.gov>. This study recommendation is to build the program's goals and objectives with the Transtheoretical Model of Health Behavior Change that empowers an individual with self-management techniques and self-efficacy to change a risky health behavior. A program that takes a step approach to change and recognizes the risk of withdrawal was more effective since it addresses the realization of attempting to modify a behavior.

Table 30

*Summary of Health Education Programs*

<b>Health Education Programs</b>	<b>Policy</b>
Silver Sneakers	<p><i>Who's eligible:</i></p> <ul style="list-style-type: none"> <li>• Medicare health plan member</li> </ul> <p><i>Description:</i></p> <ul style="list-style-type: none"> <li>• Free fitness center membership at a nearby participating location with access to conditioning classes, exercise equipment, pool, sauna and other available amenities</li> <li>• Customized classes designed for older adults to improve their strength, flexibility, balance and endurance</li> <li>• Health education seminars and other events that promote the benefits of a healthy lifestyle</li> <li>• A specially trained Senior Advisor to provide introductions to the program</li> </ul>
Dr. Dean Ornish Program for Reversing Heart Disease	<p><i>Who's eligible:</i></p> <ul style="list-style-type: none"> <li>• Highmark Blue Cross Blue Shield members</li> </ul> <p><i>Description:</i></p> <ul style="list-style-type: none"> <li>• Nutrition plan based on low-fat, whole foods</li> <li>• Moderate exercise, including strength training</li> <li>• Stress management techniques</li> <li>• Support group meetings</li> </ul>
Walk for a Healthy Community	<p><i>Who's eligible:</i></p> <ul style="list-style-type: none"> <li>• Highmark Blue Cross Blue Shield members</li> </ul> <p><i>Description:</i></p> <ul style="list-style-type: none"> <li>• Annual fundraiser that benefits local health and human service agencies in Western Pennsylvania</li> <li>• Walk is designed to encourage community members to become or stay physically active</li> </ul>

<p>HOPE Program (Highmark Osteoporosis Prevention and Education Program)</p>	<p><i>Who's eligible:</i></p> <ul style="list-style-type: none"> <li>• Highmark Blue Cross Blue Shield members</li> <li>• Non-members may participate for a fee</li> </ul> <p><i>Description:</i></p> <ul style="list-style-type: none"> <li>• Focuses on healthy choices to prevent or manage osteoporosis</li> <li>• 6-week lifestyle improvement and exercise program for osteoporosis prevention, management and education</li> </ul>
<p>Fun, Fit, and Fabulous Health Conference</p>	<p><i>Who's eligible:</i></p> <ul style="list-style-type: none"> <li>• Persons registered for event (Hershey, PA)</li> </ul> <p><i>Description:</i></p> <ul style="list-style-type: none"> <li>• Conference for women of color</li> <li>• Focus on health disparities or differences of health conditions due to race and ethnicity</li> </ul>
<p>Quit Now Smoking Campaign</p>	<p><i>Who's eligible:</i></p> <ul style="list-style-type: none"> <li>• Any U.S. citizen</li> </ul> <p><i>Description:</i></p> <ul style="list-style-type: none"> <li>• Toll-free smoking cessation hotline</li> <li>• Free online resources, stop smoking guides, and encouragement</li> <li>• Access to print resources and research studies</li> <li>• National Cancer Institute smoking cessation counselors available for coaching and questions</li> </ul>

## Summary

This study focused on the problem of poor health as it affects rural and urban areas of Pennsylvania. The data that emerged from the study was that urban areas of Pennsylvania have better health access and utilization, lower health risk factors, higher preventive health behaviors, and less chronic disease conditions than residents in rural areas of Pennsylvania. The data permitted a greater understanding of the health access and utilization, health risk and preventive behaviors, chronic diseases, and selected public health issues for rural and urban residents of Pennsylvania.

Only by examining these factors of health can policy makers and health providers make connections and understand the recommendations of implementing health education to prevent the onset of chronic diseases (Smith, 2004). It is not enough to recognize the data alone but to relate them to each other and use the data to design educational programs to avert poor health.

Critical public advocacy and research are components of a successful approach to this problem. It is time for individual physicians to consider how patients' health literacy affects their overall health and healthcare experiences (Cutilli, 2005; Speros, 2005; Parker & Schwartzberg, 2001).

The next chapter drew conclusions and recommendations on the study and proposed recommendations for further study.

## CHAPTER FIVE

### CONCLUSIONS, RECOMMENDATIONS

#### Introduction

The summary of the research findings, educational implications, recommendations and conclusions are presented in this chapter. The purpose of this study was to determine if there was a significant difference among rural and urban residents of Pennsylvania in regards to health access and utilization, health behaviors, chronic diseases, and other health issues. The analysis of this data identified emerging health risks in rural and urban residents of Pennsylvania and assisted in the identification of forecasting future health concerns for the Commonwealth. Specifically, this study examined the following research questions:

1. How do urban and rural areas of Pennsylvania compare with health access and utilization?
2. How do urban and rural areas of Pennsylvania compare with health risk factors?
3. How do urban and rural areas of Pennsylvania compare with preventive health behaviors?
4. How do urban and rural areas of Pennsylvania compare with chronic disease conditions?
5. How do urban and rural areas of Pennsylvania compare with selected public health issues?
6. What are the educational implications of implementation of effective preventive health education for urban and rural areas of Pennsylvania?

This study also addressed health policies and health education programs for rural and urban areas of Pennsylvania.

The second section of this chapter focuses on recommendations and suggestions for future studies. The third section presents conclusions and offers reflections on the complex issues of the role that health education plays in rural and urban areas in Pennsylvania.

### Summary of Research Findings

The data researched in this study, was the study of the BRFSS pre-existing data. This data can assist medical providers and health plans to better understand the health demographics and behaviors of the people that they serve. Specifically, the health risk and preventive behaviors for rural and urban areas in Pennsylvania were compared to determine any statistical significance. This information, which is summarized in the next section, gave solid reasons for the implementation of effective preventive health education for Pennsylvanians based on educational theories proven effective by other research to improve healthy behaviors. Additionally, a summary of theoretical perspectives of linking the data results with instructional learning theories discussed in chapter two and how the findings in this study are different from previous studies is discussed. This summary of research findings concludes that the hypothesis in the study is not supported.

A summary of the data analysis findings from chapter four can be found in the table below. The table outlines each of the research objectives and a synopsis of the results. There was no significant difference between urban and rural areas in the survey questions

studied. However, the study of the survey questions identified several health deficiencies in both rural and urban Pennsylvania. While there was no difference with regards to the geographic location and their answers towards the survey questions in the BRFSS. There were some significant differences among the answers that identified wide gaps with both rural and urban citizens of Pennsylvania. For example, 10% of Pennsylvanians do not have health care coverage and 20% do not have a primary care physician.

The comparisons of health risk factors for urban and rural areas were very similar. For both groups, 50% of the people have smoked at least 100 cigarettes in their lifetime with 45% smoking everyday or some days of the week. Another health risk factor analyzed was alcoholic drinking habits. The majority of both groups (60%) have drunk 1 to 10 days in the past 30 days from answering the survey. Additionally, 91% of them have had 1 to 5 drinks during the 30 days. When asked about heavy drinking, identified as 5 or more drinks on an occasion, 21% of both groups did drink heavy. Also, 16% have received advice from a health professional to lose weight.

The preventive risk behavior questions also identified wide gaps. The majority (over 40%) consume fruit 1 to 5 times a day or 1 to 5 times a week. Also, the majority (over 60%) have one to five servings of vegetables per day. Both of these are under the daily recommended servings of fruit and vegetables (CDC, 2007). A percentage (over 30%) did moderate activities seven days per week and over 50% did moderate activities three to five days per week. Also, the majority of them (over 40%) do vigorous physical activity only 2 or 3 days per week. However, this too is under the daily-recommended minimum for exercise (CDC, 2007).

When the BRFSS survey asked questions concerning chronic diseases, the majority of the respondents did not have any. However, the most prominent diseases in the survey group were diabetes, arthritis, and asthma. All of these diseases are preventable and require a high-degree of self-maintenance on behalf of the patient.

The majority of them (over 80%) do not have diabetes, over 90% have not had a heart attack, over 90% have not had coronary heart disease, over 90% have not had a stroke, over 80% do not have asthma, and over 60% do not have arthritis.

The final health questions in the BRFSS survey identified that over 70% have not had an influenza vaccine, over 99% have not had a nasal influenza vaccine, over 60% have not had a pneumococcal vaccine, and over 60% have not had an HIV test.

These health deficiencies can be addressed by implementing effective health education programs for patients. Health education programs have the potential to inform and reinforce positive health behaviors. Especially on the importance of receiving vaccinations and diagnostic testing that can prevent serious illness.

Table 31

*Summary of Research Objectives and BRFSS Data*

<b>Research Objective</b>	<b>BRFSS Data Summary</b>	
How do urban and rural areas of Pennsylvania compare with health access and utilization?	<i>health care coverage:</i> majority of both groups have coverage (about 10% do not)	
	<i>health care provider:</i> majority of both groups have one (about 10% do not)	
How do urban and rural areas of Pennsylvania compare with health risk factors?	<i>smoked at least 100 cigarettes:</i> both groups about 50% yes and 50% no	
	<i>frequency of smoking:</i> both groups similar: 55% not at all, 45% everyday or some days	
	<i>frequency of alcoholic drink:</i> both groups majority 1 to 10 days in past 30 days (60%)	
	<i>average number of drinks in past 30 days:</i> both groups 1 to 5 drinks (91%)	
	<i>5 or more drinks on occasion:</i> majority of both groups none (74%); 1 to 5 occasions 21%	
	<i>weight advice:</i> majority of both groups none (80%); lose weight 16%	
	How do urban and rural areas of Pennsylvania compare with preventive health behaviors?	<i>frequency of eating fruit:</i> (44%) majority of both groups 1 to 5 times a day & 38% 1 to 5 times a week
		<i>frequency of eating vegetables:</i> (64%) majority of both groups 1 to 5 times a day
<i>moderate activities for at least 10 minutes:</i> majority of both groups do (84%)		
<i>days per week of moderate activities:</i> majority of both groups 7 days a week (32%)		

	<p><i>time per day of moderate activities:</i></p> <p>majority of both groups do 21-30 minutes/day (27%)</p> <p><i>vigorous activities for at least 10 minutes:</i></p> <p>majority of both groups do not (56%)</p> <p><i>days per week of vigorous activities:</i></p> <p>majority of both groups do 3 days/week (26%)</p> <p><i>time per day of vigorous activities:</i></p> <p>majority of both groups 100 to 150 minutes (30%)</p>
How do urban and rural areas of Pennsylvania compare with chronic disease conditions?	<p><i>diabetes:</i></p> <p>majority of both groups: no (88%)</p> <p><i>myocardial infarction:</i></p> <p>majority of both groups: no (94%)</p> <p><i>coronary heart disease:</i></p> <p>majority of both groups: no (93%)</p> <p><i>stroke:</i></p> <p>majority of both groups: no (96%)</p> <p><i>asthma:</i></p> <p>majority of both groups: no (88%)</p> <p><i>arthritis:</i></p> <p>majority of both groups: no (61%)</p>
How do urban and rural areas of Pennsylvania compare with selected public health issues?	<p><i>influenza vaccine:</i></p> <p>majority of both groups: no (71%)</p> <p><i>FluMist vaccine:</i></p> <p>majority of both groups: no (99%)</p> <p><i>pneumococcal vaccine:</i></p> <p>majority of both groups: no (66%)</p> <p><i>HIV test:</i></p> <p>majority of both groups: no (66%)</p>

The table 31 illustrates a comparison between the findings of the BRFSS survey analysis and the findings of the literature review studies in chapter two. This summary of differences highlights some significant findings for both urban and rural areas of Pennsylvania. The NCHS 2005 report found that 17% of the U.S. population does not have health care coverage and the BRFSS 2005 report found that 10% of urban and rural Pennsylvanians do not have health care coverage. According to these results, Pennsylvania is 7% above the national average for not having health care coverage.

Several differences were found in the comparison of the study results to the literature when pertaining to preventive health behaviors. In the study it was found that 44% of urban and rural Pennsylvanians consumed 5 or more servings of fruits and vegetables per day while in the BRFSS 2003 report it was found that 24.7% of Pennsylvanians reported consuming 5 or more servings of fruits and vegetables per day. The residents of Pennsylvania increased their fruit consumption by 19.3% since 2003.

Another preventive health behavior is exercise. In the study, 32% of urban and rural Pennsylvanians engaged in regular moderate activity. While in the NCHS 2003 report stated that 30% of the U.S. population engaged in regular physical activity. Pennsylvania is 2% above the national average for people that engage in physical activity. Another study that analyzed physical activity was the BRFSS 2003 report that stated that 22.6% of Pennsylvanians did not participate in any leisure time physical activity. The BRFSS 2005 report found that 16% of urban and rural Pennsylvanians did not participate in moderate physical activities. Pennsylvanians have increased with 6.6% more participating in physical activity since this data was last collected in 2003.

There were also significant differences when comparing risk health behaviors from the study with the literature. In the study, 16% of urban and rural Pennsylvanians have been advised to lose weight. While the NHANES 2006 report found that 65% of the U.S. population is overweight. This epidemic in the nation points at that more specific data in Pennsylvania is needed since the BRFSS only identifies who has been advised to lose weight. There could be more overweight people in the study but only 16% have been identified by a health professional as overweight.

In the study, 50% of urban and rural Pennsylvanians reported that they smoke cigarettes. The NCHS 2005 report documents that 43% of the U.S. population smokes. According to the literature, Pennsylvania is 7% above the national average for people that smoke. More Pennsylvanians smoke cigarettes than of the average in the nation.

The comparison of chronic diseases in the table below found some interesting differences between the study and the literature. In the study it was found that 7% of urban and rural Pennsylvanians have heart disease. The CDC 2005 report found that heart disease is the leading cause of death in Pennsylvania, accounting for 30% of the state's deaths in 2002 (the most recent year for which data are available). Heart disease was the second leading chronic disease reported (behind asthma) in the BRFSS 2005 survey, similar to the findings of the CDC report.

Another chronic disease is stroke; in the study 4% of urban and rural Pennsylvanians reported that they have had a stroke. According to the CDC 2005 report, stroke is the third leading cause of death in Pennsylvania accounting for 7% of the state's deaths in 2002(the most recent year for which data are available). Stroke was the third leading chronic disease reported in the BRFSS 2005 survey, similar to the CDC report.

In the study, 12% of urban and rural Pennsylvanians reported that they have diabetes. In the BRFSS 2003 report found that 8% of Pennsylvanians reported that they have diabetes. There has been an increase of 4% more Pennsylvanians that have diabetes since 2003.

Table 32

*Summary of Significant Differences between Study Findings and Literature Review*

<b>BRFSS 2005 Report Study Finding</b>	<b>Findings in Literature Review</b>	<b>Differences</b>
10% of urban and rural Pennsylvanians do not have health care coverage	17% of U.S. population do not have health care coverage  (NCHS 2005 Report)	Pennsylvania is 7% above the national average for not having health care coverage
44% of urban and rural Pennsylvanians consuming 5 or more servings of fruits and vegetables per day	24.7% of Pennsylvanians reported consuming 5 or more servings of fruits and vegetables per day  (BRFSS 2003 Report)	Pennsylvania increased 19.3% for consuming fruit since 2003
32% urban and rural Pennsylvanians engaged in regular moderate activity	30% of U.S. population engaged in regular physical activity  (NCHS 2003 Report)	Pennsylvania is 2% above the national average for people that engage in physical activity
16% of urban and rural Pennsylvanians did not participate in moderate physical activities	22.6% of Pennsylvanians did not participate in any leisure time physical activity  (BRFSS 2003 Report)	Pennsylvanians increased with 6.6% more participating in physical activity since 2003
16% of urban and rural Pennsylvanians have been advised to lose weight	65% of U.S. population are overweight  (NHANES 2006 Report)	**Better data in Pennsylvania is needed, BRFSS only identifies who has been advised to lose weight
50% of urban and rural	43% of U.S. population	Pennsylvania is 7% above

Pennsylvanians smoke	smoke  (NCHS 2005 Report)	the national average for people that smoke
7% of urban and rural Pennsylvanians have heart disease	Heart disease is the leading cause of death in Pennsylvania  30% of the state's deaths in 2002 ( <i>the most recent year for which data are available</i> )  (CDC 2005 Report)	Heart disease was the second leading chronic disease reported (behind asthma) in the BRFSS 2005 survey, similar to CDC report
4% of urban and rural Pennsylvanians have had a stroke	Stroke is the third leading cause of death in Pennsylvania  7% of the state's deaths in 2002( <i>the most recent year for which data are available</i> )  (CDC 2005 Report)	Stroke was the third leading chronic disease reported in the BRFSS 2005 survey, similar to CDC report
12% of urban and rural Pennsylvanians have diabetes	8% of Pennsylvanians have diabetes  (BRFSS 2003 Report)	4% more Pennsylvanians have diabetes since 2003

As discussed in chapter two, the study of the BRFSS data sought to identify if there is a relationship among preventive and risk health behaviors, onset of chronic diseases, and access to healthcare among rural and urban areas in Pennsylvania. Health behaviors of an individual with a chronic disease can greatly influence the possibility of complications and the quality of life experienced by the person. For example, the risk of complications of diabetes can be reduced by proper adherence; patient non-adherence to treatment recommendations is often frustrating for diabetes health care professionals because the complications of diabetes can be very severe (Delamater, 2006; Malone, Shilliday, Ives, & Pignone, 2007).

The table below outlines how the study findings link to the literature from the theoretical perspective of the learning theories discussed in chapter two: transtheoretical model of health behavior change, self-management of chronic illness, and self-efficacy. According to the literature, the overall health of the nation continues to improve from ongoing funding to public health programs, research, health care, and health education (CDC, 2005). This focus and development of public education campaigns emphasizing a healthy lifestyle can be applied in Pennsylvania to achieve healthier citizens.

The Transtheoretical Model is a model of intentional change. It is a model that focuses on the decision making of the individual (Dunsmore & Goodson, 2006; Edwards, Jones & Belton, 1999). Many of the chronic diseases studied in the BRFSS data are choices made by the individual. 36.1% of rural and 33.5% of urban Pennsylvanians smoke everyday and 28.4% of rural and 27.4% of urban people had at least one drink in the past 1 to 10 days of completing the BRFSS survey. Smoking and drinking are choices of the individual to participate in and relate to other chronic diseases discussed such as asthma. Educational interventions that capitalize on the benefits of the media to broadcast their message of healthy lifestyles combined with effective plans that are personalized for the individual, develop into a realistic plan of good living.

The self-management of chronic illness is when a patient takes responsibility for doing what it takes to manage their illness effectively (Norris, Engelgau & Narayan, 2001). Self-management is important because if a person does not become responsible for their health, the treatment recommendations by a health professional cannot be effective (Holistic Health Education Program, 2006). This partnership between the patient and health professional especially begins when a chronic disease has been

identified. In the BRFSS data, the two most prominent chronic diseases were diabetes: 9.9% urban and 10.8% rural and asthma: 11.6% urban and 12.9% rural citizens of Pennsylvania. According to the American Cancer Society (2007) and the CDC (2006), the patient's self-management of these diseases is very important. The self-management strategies that a person conducts affect their quality of life and to the extent how several other possible side-effects could develop. A holistic management plan created by educational specialists and medical providers that addresses the person's environment experiences, social experiences, and personal experiences with the chronic disease at the center is an effective plan.

Finally, as the concept of Albert Bandura's (1977) self-efficacy is demonstrated by when people have control over their thoughts, feelings and actions. In the BRFSS data when evaluating rural and urban people's participation in healthy lifestyles it was evident in their preventive health behaviors. Self-efficacy in healthcare is the belief in one's capabilities to organize and execute the courses of action required to produce given attainments (such as a person improving their dietary habits to lower cholesterol).

The BRFSS survey items that are linked with self-efficacy include the questions asking about vaccinations and diagnostic testing. Specifically, asking if they have had had an influenza vaccine, a nasal influenza vaccine, a pneumococcal vaccine, and an HIV test. The majority of the survey respondents have not had any of these vaccines or tests. All of these vaccines and tests have the ability to prevent or provide an early diagnosis for the patient. However, they all require self-efficacy on behalf of the person to get the vaccines and take the health tests. A person must execute the courses of action required to

receive the vaccines and test which can increase or sustain the quality of life for an individual.

Another example of self-efficacy in the survey is the preventative health behavior questions. The majorities of the survey respondents do not consume enough fruits and vegetables to meet the daily recommended minimum and do not do enough moderate or vigorous physical activity to meet the daily recommended minimum set forth by the CDC (2007). Proper diet and exercise is dependent on the self-efficacy of the person to execute the courses of action required to sustain a healthy lifestyle that can prevent chronic diseases or increase the quality of life for persons living with one or several chronic diseases.

Table 33

*Summary of Study Findings and Link to Literature Review*

<b>BRFSS 2005 Study Finding</b>	<b>Literature Link</b>	<b>Theoretical Perspective</b>
36.1% of rural and 33.5% of urban smoke everyday	Smoking and drinking are choices of the individual to participate in and relate to other chronic diseases such as asthma and heart disease.  (CDC 2005 Report)	Transtheoretical Model of Health Behavior Change
28.4% of rural and 27.4% of urban people had at least one drink in the past 1 to 10 days		
diabetes: 9.9% urban and 10.8% rural	* two most prominent chronic diseases	Self-Management of Chronic Illness
asthma: 11.6% urban and 12.9% rural	According to the American Cancer Society (2007) and the CDC (2006), the patient's self-management of these diseases is very important. The self-management strategies that a person conducts affect their quality of life and to the extent how several other possible side-effects could develop.	
majority of both groups have not had the following preventive measures:  influenza vaccine, nasal influenza vaccine, pneumococcal vaccine, HIV test	All of these vaccines and tests have the ability to prevent or provide an early diagnosis for the patient. However, they all require self-efficacy on behalf of the person to get the vaccines and take the health tests.  (CDC 2005 Report)	Self-Efficacy
The majorities of the survey respondents do not consume enough fruits and vegetables to meet the daily recommended minimum and do not do enough moderate or vigorous physical activity to meet the	Proper diet and exercise is dependent on the self-efficacy of the person to execute the courses of action required to sustain a healthy lifestyle that can prevent chronic diseases or increase the quality of life	

daily recommended minimum set forth by the CDC (2007).	for persons living with one or several chronic diseases. (CDC 2005 Report)	
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The hypothesis in this study is not supported since there are not significant differences between the urban and rural groups in Pennsylvania according to the chi square analysis in chapter four. The responses to the survey questions in the 2005 BRFSS were similar for both urban and rural groups in Pennsylvania. As discussed in the summary of research findings section, the only noteworthy differences are found in the comparison of the study results with the literature and other health studies conducted in the nation.

This comparison with the literature found that Pennsylvania is improving in more people having health care coverage and an increase in preventive health behaviors such as eating fruits and vegetables and exercise. However, Pennsylvania also lags behind the nation according to the literature. Such as, a higher percentage of people smoke and a growing number of people in the commonwealth have diabetes.

The educational theories discussed should be implemented to improve the overall health in Pennsylvania as it did for the nation in other health studies (CDC, 2005).

### Implications

This study analyzed the 2005 BRFSS health survey data that monitors risk behaviors related to chronic diseases, injuries, and death. The study contributed to the field of medical and educational literature by examining the BRFSS data to analyze and report the findings of the health access and utilization, health behaviors, chronic diseases, and other health issues for rural and urban residents of Pennsylvania. The analysis of this

data identified emerging health risks in rural and urban residents of Pennsylvania and assisted in the identification of forecasting future health concerns for the Commonwealth.

The implications of this study include understanding how the findings can help understand the issue of the health condition of residents of Pennsylvania. Also, addressed in this section is how effective patient education that implements the learning theories discussed in the study can impact with positive health results and address the need for policy reform which is supported from the study findings. Finally, key ideas are addressed to the important issue of access and affordability of healthcare for urban and rural residents of Pennsylvania.

The first area to address is how the study findings can help understand the research objectives of the study. While the comparisons of the 2005 BRFSS data for urban and rural areas of Pennsylvania in chapter four do not indicate any significant differences between the groups, there are implications from the research that address a lack of health care and a lack of healthy behaviors. There is room for improvement for the health of Pennsylvania citizens. Both populations are in need of patient education measures and health policy reform to improve the quality of health in the state. A summary that focuses on the poor health conditions and percentages is presented below. This synopsis supports the recommendations later in the section to address the implications of the research.

The first issue researched was the comparison of health access and utilization for urban and rural areas of Pennsylvania. This comparison did not yield any significant findings in comparison of the groups. However, there were similar percentages of both groups that lacked health care coverage and usage. Approximately, 10% of both urban

and rural residents of Pennsylvania do not have health care coverage and 10% do not have a health care provider such as a physician.

The second issue researched was the comparison of health risk factors for urban and rural areas of Pennsylvania. This comparison did not yield any significant findings in comparison of the groups. However, there were similar percentages of both groups that had poor health behaviors. Approximately, 50% of both urban and rural residents of Pennsylvania have smoked at least 100 cigarettes and 45% smoke everyday or some days of the week. Additionally, 60% drink alcohol with 91% having had 1 to 5 drinks in the past month of completing the survey and 21% drinking more heavily (5 or more drinks on occasion). Finally, 16% of both groups have been advised to lose weight.

The third issue researched was the comparison of preventive health behaviors for urban and rural areas of Pennsylvania. This comparison did not yield any significant findings in comparison of the groups. However, there were similar percentages of both groups that did not exhibit good preventive health behaviors. Approximately, 38% do not eat enough fruit and 36% do not eat enough vegetables to meet the daily recommend minimum set forth by the CDC's food pyramid. Also, 56% of the people don't exercise enough to meet the daily recommend minimum set forth by the CDC's fitness guidelines.

The fourth issue researched was the comparison of chronic disease conditions for urban and rural areas of Pennsylvania. This comparison did not yield any significant findings in comparison of the groups. However, there were similar percentages of both groups that had one or more chronic diseases. Approximately, 39% had arthritis, 12% had diabetes, 12% had asthma, 7% had heart disease, 6% had a heart attack, and 4% had a stroke.

The fifth issue researched was the comparison of selected public health issues for urban and rural areas of Pennsylvania. This comparison did not yield any significant findings in comparison of the groups. However, there were similar percentages of both groups that had poor health issues. Approximately, 71% have not had an influenza vaccine, 99% have not had a nasal influenza vaccine, 66% have not had a pneumococcal vaccine, and 66% have not had a HIV test.

It is suggested that because there appears to be a relationship between health behaviors and chronic diseases based on the research in chapter two, efforts should be made to continue to enhance patient medical education programs. Programs that help patients establish an understanding of a disease and reasons for behavioral change lead to enhancing their self-management techniques of caring for their disease. Patient health education programs with a focus on medical education and information management can be effective healthcare performance tools to prevent disease progression and restore good health. Patients make better lifestyle choices by gaining knowledge and building wisdom in these programs. Healthier healthcare consumers can lead to better health care quality at a lower cost.

The implications of reducing the incidence rate of health risk behaviors found in the 2005 BRFSS can lead to healthier citizens in urban and rural Pennsylvania. For example, in the BRFSS it was found that 50% of the people smoke cigarettes with 45% that smoke everyday or some days of the week. Also, asthma, a condition that can worsen with risk health behavior like smoking cigarettes, was found to be the second highest chronic disease in the data analysis.

Instructional measures that assist patients to identify this relationship and guide them to modify their behaviors can lead to a better quality of life and decreased healthcare expenses. The construct of motivation is a powerful tool to establish preventive health behaviors in individuals. However, this health behavior change can only be established by achieving an educated health instruction workforce that understands and teaches self-improvement programs using the methods described in chapter two.

The understanding of specific health behaviors, the motivation to change, and a well-planned health intervention can transform a person's wellbeing into a healthier one. Healthy lifestyles programs that are designed with the concepts of self-efficacy and self-management in the instructional materials have the strongest potential for creating lasting and positive change for patients. The establishment of health education programs can have implications to reducing the high percentage (45%) of frequent smokers in the state and increase preventive health behaviors from the 56% of Pennsylvanians that do not get enough exercise. These health behaviors have lasting effects on to the instance of chronic diseases and quality of life.

Another implication of this study is the policy reform recommendations; they address the issue of access and affordability of healthcare for urban and rural residents of Pennsylvania. There are several interest groups in healthcare that have varying stakes and influence including consumer advocates, healthcare providers, insurance companies, pharmaceutical and medical supply companies, and policy makers. Healthcare costs are a complex issue at both the national and state legislature.

According to research by Shields, Davis, Halvorson, Sheer, & Hessert (2007) they determined three effective recommendations to increase access and lower the costs of healthcare. The first is that the government (Pennsylvania General Assembly) should consider establishing a quasi-governmental independent non-profit agency to act as an unbiased broker of insurance benefit plans. This agency could mediate and answer questions concerning types of policies available and the difference between a PPO and an HMO, and more complex questions, such as how to evaluate and select plans with differing coverages, co-pays and deductibles.

Another recommendation for the government is to consider providing funds and incentives to rural and urban employment places to form cooperatives in order to provide purchasing power in numbers for rural and urban citizens of Pennsylvania. Then smaller groups of employees could benefit from the same economies of scale, purchasing clout, and administrative efficiencies provided to larger companies and unions. These insurance packages should not contain scaled-back versions of coverage while still maintain the current consumer protections provided by current state and federal legislation.

Finally, the government should encourage businesses in rural and urban areas to offer insurance coverages that attract and retain the workforce.

Along with these recommendations, the study of the BRFSS data and recommendations for policy reform can assist medical providers and health plans to better understand the health demographics and behaviors of the people that they serve. This information gave solid reasons for the implementation of effective preventive health education for Pennsylvanians based on educational theories proven effective by research to implement behavior modification techniques to improve healthy behaviors.

For example, in the BRFSS data it was determined that 9.2% of urban and 11.7% of rural residents in Pennsylvania does not have any kind of health insurance. The majority of health education programs are a part of group health insurance plans like Blue Cross Blue Shield. This study recommends that health education programs be evident in the commonwealth outside of health insurance groups. For example, state-based programs that is open for the communities that are held in convenient locations for rural and urban citizens of Pennsylvania. Educational programs for behavior modification that is constructed on the educational principals of self-efficacy and self management of a disease spawned success for the individual.

Health education programs that advocate self-management for new outbreaks of disease can also enhance health education programs for epidemics of poor health in Pennsylvania as illustrated in the BRFSS survey analysis. The overall health condition of residents in Pennsylvania can be characterized of not consuming enough healthy foods and exercise while supporting a good percentage of individuals inflicted with a chronic disease. Chronic diseases are lifelong health conditions that self-management is essential to control and wellbeing. Health education programs offered to individuals with the disease and not based on if they can afford health care coverage directly helped those who need it.

The findings of this study can help improve the health condition of rural and urban residents of Pennsylvania. The literature review in chapter two in combination of the analysis of the 2005 BRFSS highlights several key indicators of needed improvements in healthcare and health education for rural and urban residents.

This study differs from any previous studies because it examines Pennsylvania by rural and urban geographic location. The 2005 BRFSS was the first time that it collected data in reference to geographic location. This study is also different from previous studies because it combines the data analysis of the 2005 BRFSS with instructional learning theories that focus on behavior modification to increase the quality of life of patients and maintain better control of chronic diseases. Along with these elements, this study also presents a literature review of previous studies and significant statistical and literary descriptions of rural and remote areas. A summary of important areas for Pennsylvania healthcare, educators, and policy makers is listed below, along with recommendations on how current practices can address these areas of greatest needs (Agency for Healthcare Research and Quality, 2007).

The access to quality medical care for rural areas is increasingly lacking. Several rural hospitals are closing their doors as services move to more centralized and urban locations. An example of this in Pennsylvania is the closing of several rural clinics as services are moved to outpatient centers located in hospitals. The closing down of these facilities extends to the already occurring problem of resources and transportation barriers for rural populations. This study recommends that this problem be addressed by healthcare return to supporting rural clinics and policy makers providing funding and support to open and sustain rural health clinics. The health promotion and disease prevention of rural populations can only occur with efforts to remove barriers to access and use of clinical preventive services.

Along with this managed care trend of centralized services is the decrease of physicians and other health care providers in rural areas. The supply of these health

professionals is decreasing since clinics and rural doctor offices are closing. It is financially beneficial for them to join in with the trend of centralized managed care organizations. However, this limits access for rural residents, especially with access to health specialists and health education offerings. A growing trend of alcoholism and drug abuse in rural areas is occurring while less than one in five rural hospitals has treatment services and educational prevention programs for these problems.

This study recommends that communities and healthcare work to attract medical professionals to setup offices in their neighborhood. Possible examples include financial benefits with tax breaks, collaborations with neighboring medical centers, and supporting medical education efforts. So, community members are more aware of the importance of having these health specialists in their towns.

Another initiative that educational offerings can improve the quality of care for patients is the training and support of emergency medical personnel. Traumatic injuries are more common in rural areas due to prevalent dangerous activities of farming, hunting, and recreational vehicle use. Due to transportation and communication problems in rural and remote areas, this population is at risk for higher incidence of death than urban patients. This study recommends advanced life support training for emergency medical personnel and application of technology advancements for communication in rural areas.

Technology is developing efficient and effective applications in healthcare. However, rural areas are very vulnerable for not having access to application of these technologies. These diagnostic and treatment equipment can often be limited for urban areas as well. This technology has the ability to revolutionize the way doctors practice medicine and can improve the patient experience in medical care. However, adoption of

these technologies is one of the toughest obstacles due to financial constraints. This study recommends a multi-sponsor solution to purchasing technology that several health plans or physicians monetarily support and use in their practices. While still placed in locations that are reachable for all involved. All that partake can benefit by increased operating efficiencies and being able to provide better care for patients.

The identification and action towards these areas of greatest need in the Commonwealth can assist medical personnel and educators to provide the best possible healthcare to patients. It is also beneficial for policy makers to focus funding and projects on the areas of greatest need as indentified in this study and summarized above. The prevention of life-threatening chronic diseases like diabetes and coronary heart disease begins with the understanding of the prevalence and most effective methods of health education to instruct patients that is presented in this study. The fields of medicine and education can combine to provide best methods for the prevention and treatment of rural and urban patients.

#### Recommendation for Further Study

The purpose of this study was to determine if there was a significant difference among urban and rural residents of Pennsylvania in regards to health access and utilization, health behaviors, chronic diseases, and other health issues. It was determined that a significant difference does not exist and both urban and rural residents of Pennsylvania share similar results in the 2005 BRFSS. Yet it is important for future research to occur to further understand the similarities and differences among urban and rural residents of Pennsylvania. There are a number of issues and additional questions

that surfaced as a result of conducting the study. These questions for further study are based on findings from the data analysis and experiences in conducting the research on behavior risk factors for chronic disease risk in urban and rural Pennsylvania.

This link between the research presented here and the suggestions for future investigation are based in posing research questions that build upon the findings of the 2005 BRFSS data in this study.

The BRFSS study presented very little demographic data to capture the uniqueness of the survey population. It was determined who came from urban and rural areas but additional demographic information could provide a better description of the populations. Such as what are the demographic patient characteristics of the urban and rural groups studied and what implications could these findings have on to the study of health among rural and urban areas in Pennsylvania. This information could extend to understanding the uniqueness within each urban and rural group. Such as one geographic group may have a significantly higher ethnic population and an associated higher incidence of a chronic disease or risk health behavior.

Additionally, what will be the disease prevalence and impact of the groups that displayed healthy and risk type health behaviors and what is the comparative effectiveness and value of alternative treatments in medicine for these patients in these areas.

An inclusion of additional questions in the BRFSS survey that address types of treatments patients with chronic diseases choose may provide insight on to possible trends in healthcare. The majority of these conditions for urban and rural residents in Pennsylvania consist of 20% have diabetes, 10% have had a heart attack, 10% have

coronary heart disease, 10% have had a stroke, 20% have asthma, and over 40% have arthritis. The continued study of these diseases can establish trends of onset and prevalence to further understand the incidence rate in the state. Additionally, collecting data pertaining to the treatment of these diseases can identify the cost associated with the chronic ailments and provide additional rationale for implementing effective health education programs to encourage healthy behaviors and prevent chronic diseases.

Another is the forecasting of trends towards alternative health treatments or types of services like outpatient management. Looking into the future, will self-efficacy health education programs of the future decrease cost of treatments and increase medication adherence rates and what would be the result of a similar study conducted with multiple states using the BRFSS data.

To learn more about the impact of emerging health trends and behavior risk factors for chronic disease risk in urban and rural Pennsylvania and implications for health education the following recommendations for further study are suggested.

The first recommendation would be to conduct a longitudinal study of the health behaviors of urban and rural populations in Pennsylvania over a period of ten years, a timeframe that may present interesting results. There were several new questions asked in the 2005 BRFSS that posed interesting results that a longitudinal analysis may provide insight to the nature of health and preventive measures in the state. It was identified in the BRFSS 2005 survey that over 70% have not had an influenza vaccine, over 99% have not had a nasal influenza vaccine, over 60% have not had a pneumococcal vaccine, and over 60% have not had an HIV test.

This type of study may provide additional insight into the impact of healthy and risk type of behaviors and the prevalence of chronic diseases in this population. The study of the BRFSS data can be followed in the urban and rural populations of Pennsylvania for ten years and conduct additional interviews at the conclusion of each research year; it would be interesting to see if the healthy and risk behaviors remain consistent or similar to the data analyzed here in this study.

Another potential area for future research is to conduct focus groups with urban and rural patients in Pennsylvania. This analysis would serve to more clearly address how risk health behaviors impact their health. Such as it was found in the analysis of the 2005 BRFSS that 38% do not eat enough fruits, 36% do not eat enough vegetables, and 44% do not do enough exercise to meet the minimum requirements set forth by the CDC (2005). The results from the focus groups could provide insights about their reasons for these actions and behaviors. Identifying such underlying principles could help in the development of medical education programs that could be employed with other groups.

Another study for future research would be of the trends in obesity research and results of behavioral health data collected from urban and rural patients in Pennsylvania. In the BRFSS 2005 survey it was found that 16% were advised by a health care professional to lose weight but no data was collected to determine obesity conditions. It would be interesting to research if there is an association between obesity rates and health behaviors in the Commonwealth. The research could find implications for the current trends in the nation, as noted in chapter two that 65% of the nation is overweight.

Future studies could also follow the emergence of physician and patient education efforts to teach patients the importance of healthy behaviors and assistance with patients

changing risk type health behaviors. The implications of the health education programs and instructional strategies of self-management techniques and principles of self-efficacy presented in this study could be applied in a future study to analyze and identify their effectiveness. Identifying such successful programs could study the self-efficacy and self-management beliefs of urban and rural Pennsylvanians.

Finally, a study on multiple states; the states studied should be diverse relative to urban and rural populations and study the research questions posed here that concern chronic diseases and health behaviors. While the sample size in the BRFSS 2005 data was over 13,000 people a larger sample of the nation could provide a larger number of participants to provide insight onto the relationship between national urban and rural areas and instance of chronic diseases and types of health behaviors. This larger data set could provide more in-depth information and elaborate on the limitations found in the study.

A limitation of this study is the BRFSS relies on information reported directly by the respondent who must be over 18 and is a non-institutionalized civilian. As such, this self-reported data may be subject to a number of sources of possible error. How questions are worded can elicit responses in a certain way and can result in measurement error. Similarly, the ability of individuals to accurately recall details is subject to response error.

Because the questionnaire is asked in English and Spanish in Pennsylvania, adults who cannot be interviewed in English or Spanish are not included in the sample. Also, individuals without telephones are not contacted, so some populations including the homeless and persons with disabilities that use TDD communication systems are excluded from the survey. As a result, BRFSS findings can only be generalized to

English-speaking and Spanish-speaking adults living in households with telephones. Also, indicators of SES and acculturation available in the BRFSS are limited and lack specificity.

### Conclusions

The 2005 BRFSS data collection was the first time that Pennsylvania collected this data along with geographic data to determine urban and rural areas. If the findings of this study can be replicated using future BRFSS data with geographical determining data, the results may be of significant importance to the study of health in urban and rural areas of Pennsylvania. This study provides evidence that there is no significant difference among health access and utilization, health behaviors, chronic diseases, and other health issues in urban and rural areas of Pennsylvania. It shows that urban and rural areas both have similar concerns of access to healthcare, chronic diseases, and healthy behaviors.

This study supports the view that both urban and rural Pennsylvania residents have barriers to greater access to healthcare and also have instance of chronic diseases similar to national rates. It supports the view that the health differences between urban and rural areas may not be as great as some would think and that both urban and rural residents in Pennsylvania need educational experiences, encouragement, and learning opportunities to have good healthy behaviors.

Finally, this study supports the growing body of evidence that calls for health education that is based on researched educational theories that are patient-centered and assist in effectively changing behaviors for lifelong goals of better health and/or treating chronic diseases. By using theories of self-efficacy, self-management, and the Transtheoretical Model of Health Behavior Change healthcare workers can begin to offer

effective medical education seminars and treatments to increase healthy behaviors in their patients.

Perhaps, most importantly health education programs can address issues of increasing access and information to health care and health insurance for urban and rural residents of Pennsylvania. This critical issue of healthcare access may assist residents to be able to travel to medical offices and locate resourceful healthiness programs.

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