UNLV Theses, Dissertations, Professional Papers, and Capstones

December 2017

The Impact of Economic Recession on the Health of Adult Nevadans

Ariana Goertz
University of Nevada, Las Vegas, arigoertz@gmail.com

Follow this and additional works at: https://digitalscholarship.unlv.edu/thesesdissertations

Part of the Biostatistics Commons, and the Epidemiology Commons

THE IMPACT OF ECONOMIC RECESSION ON THE HEALTH OF ADULT NEVADANS

BY

Ariana D. Goertz

Bachelor of Arts in American Studies
University of New Mexico
2009

Bachelor of Science in Anthropology
University of New Mexico
2011

A thesis submitted in partial fulfillment
of the requirements for the

Master of Public Health

Thesis Approval

The Graduate College
The University of Nevada, Las Vegas

May 3, 2017

This thesis prepared by

Ariana D. Goertz

entitled

The Impact of Economic Recession on the Health of Adult Nevadans

is approved in partial fulfillment of the requirements for the degree of

Master of Public Health
Department of Environmental and Occupational Health

Sheniz Moonie, Ph.D.   Kathryn Hausbeck Korgan, Ph.D.
Examination Committee Chair   *Graduate College Interim Dean*

Timothy Bungum, Ph.D.
Examination Committee Member

Paulo Pinheiro, Ph.D.
Examination Committee Member

Alan Schlottmann, Ph.D.
Graduate College Faculty Representative

ABSTRACT

Recessions are generally considered to cause negative consequences, but recent studies have provided evidence that some health outcomes improve as the economy deteriorates. The relationship between economic downfalls and health is not straightforward; it is important to look at how health has been impacted in one of the areas hit hardest by the recession. Las Vegas, Nevada was previously considered recession-proof, seemingly unaffected by previous economic downturns exhibited by the rest of the country. However, during the Great Recession of 2007-2009, Las Vegas led the country in highest rates of unemployment and foreclosures. This was quite a collapse for a city that previously led the country in population and job growth for several decades.

Using data from Behavioral Risk Factor Surveillance System (BRFSS), this study examined the effect of unemployment rates on the health status for adults living in Las Vegas, Nevada. This study aimed to contribute to the understanding of how recessions impact health by evaluating BRFSS data that proceeds, coincides, and follows the Great Recession (2006-2011). Multiple logistic regression analysis was used to understand to what extent health status has been impacted for groups based on employment and health insurance status, as well as several demographic factors. Results show that employment status was associated with fair to poor health before and after, but not during the recession. Individual level of education was the biggest risk factor of fair to poor health while younger age was protective against fair to poor health. These findings are important in future work to improve health by considering economic and demographic implications that may reduce those suffering from poor health.

TABLE OF CONTENTS

LIST OF TABLES

INTRODUCTION

The Great Recession of 2007-2009 caused numerous macroeconomic problems including home foreclosures, unequal income distribution, and high unemployment. Proceeded by a period of steady economic growth, the recession was particularly severe throughout business and labor markets. In the United States, median household incomes fell 6.4 percent from 2007 to 2010, and poverty rates reached 15 percent—the highest since the early 1990s (DeNavas-Walt, Proctor, & Smith, 2012). The average household lost approximately $50,000 in wealth and as of 2011, the typical home in America was 50 percent its 2003 value (Pfeffer, Danziger, & Schoeni, 2013). Throughout the country, high rates of unemployment resulted in decreased spending and increased financial burden. The pre-recession unemployment rate of 4.4 percent in the United States more than doubled to 10 percent in October 2009 (Bureau of Labor Statistics [BLS], 2012). In response to the crisis, The American Recovery and Reinvestment Act of 2009 was signed as an effort to save and create jobs. However, in Fall 2014, there were 9.6 million people looking for work, and only 4.8 million job openings (Center on Budget and Policy Priorities [CBPP], 2014).

Employment losses and decreased wages led to reliance on government programs to supplement income from those who may not have needed support before. The amount paid in Unemployment Insurance (UI) increased 23.6 percent, or $97 billion from 2007 to 2009 (Oh & Reis, 2012). Upwards of 2.5 million people signed up to receive benefits from the Supplemental Nutrition Assistance Program (SNAP), increasing the amount of benefits paid from $37 billion in 2008 to $54 billion in 2009 (Jenkins, Brandolini, Micklewright, & Nolan, 2012). Economic stress and instability not only leads to increased reliance on governmental support but also impacts family structure and function. Worsening economic conditions during the Great Recession

increased partner violence among married couples, with the highest increases among whites and those with a college education (Schneider, Harknett, & McLanahan, 2014). Fertility declined 9 to 11 percent during this period, and the highest declines were in states with higher unemployment (Cherlin, Cumberworth, Morgan, & Wimer, 2013).

Since economic downturns affect various aspects of life, it is important to study if health has been impacted and to what extent. Aggregate-level research on how recession impacts health frequently shows that physical health declines when economic conditions begin to deteriorate. Wage inequality and high unemployment rates raise economic insecurity during a recession, which leads to enhanced psychological stress, rises in alcohol consumption, and violent mortality (Blouin, Chopra, & Hoeven, 2009). Being unemployed is associated with higher rates of overall mortality and death due to heart disease or suicide (Jin, Shah, & Svoboda, 1995). Finding a relationship between unemployment and poor health is difficult since neither is ultimately decided to be the cause or effect.

Nevertheless, other research has found connections between economic stress and health outcomes that suggest a counterintuitive relationship. In an innovative study, Ruhm (2000) provides evidence that death rates fall and health outcomes improve as economies deteriorate. Measuring death rates is an important indicator of health since mortality represents the most negative health outcome. Further studies by Ruhm and others have provided evidence that economic deterioration changes behaviors and reduces specific causes of mortality. Lower death rates are in part due to reductions in risky behaviors, including smoking, obesity, physical inactivity, and alcohol consumption (Ruhm & Black 2002; Ruhm, 2005). Many mechanisms explain why economic growth causes negative health effects, including increasing work demands,

more motor vehicle and workplace accidents (Ruhm & Black, 2002), and higher alcohol and tobacco consumption (Ruhm, 2000). These studies provide evidence for pro-cyclical fluctuation - that economic expansion is positively associated with increased mortality, and have been measured at the state (Ruhm, 2000), national (Granados, 2005; Gerdtham & Ruhm, 2006) and metropolitan levels (Charles & DeCicca, 2008). A business-cyclical relationship has been suggested as contributing to these findings in (1) more time to commit to healthier behaviors; (2) decreased workplace stress and injuries; and (3) reduced injuries and deaths from external sources, such as car accidents and air pollution.

Since the relationship between economic deterioration and health is not straightforward, it is important to look at how health has been impacted in one of the areas hit hardest by the recession. Las Vegas, Nevada was hit especially hard by the recession because of the local economic profile and several unique characteristics. During the recession, Las Vegas led the country in highest rates of unemployment and foreclosure, while population growth and building development halted. This was quite a shock for the city that was seemingly immune to previous economic swings, including the "shallow recession" of 2001 where gaming revenues increased due to people with enough disposable income trying to "strike it rich" (Repetti & Jung, 2014). The city grew rapidly due to the expanding Las Vegas gambling industry and had previously been at the top of the list for population, job, and construction growth for several decades. Unemployment peaked in Las Vegas post-recession at 15 percent in July 2010, while the average rate in the United States previously peaked in October 2009 at 10 percent and continued to fall to 9.7 percent in July 2010 (BLS, 2014). Fluctuations like this proved that Las Vegas was not resistant to recessions, and had become more vulnerable to them than the rest of the country.

Background

A known tourist destination, Las Vegas provides excessive consumption in the forms of gambling, shopping, and nightlife. As the gambling capital of the world, the economy of Las Vegas is highly dependent on the gambling industry for revenue and jobs. From 1990 to 2000, Las Vegas experienced its biggest boom in economic growth. Most of the growth during this decade was due to rapid expansion in the economy, job opportunities, and affordable cost of living and housing. Las Vegas had been the fastest-growing city in the U.S in the post-war era, growing 85 percent between 1990 and 2000 (Glaeser & Shapiro, 2001).

The Las Vegas population reached 1.5 million in 2000 after more than 71,000 people moved into the Las Vegas Metropolitan Area each year since 1990 (U.S. Census Bureau, American Factfinder, 2010). Las Vegas had high rates of job growth with an average of 34,050 jobs added each year between 1990 and 2000, which kept the average unemployment rate at 5.4 percent (United States Department of Housing and Urban Development [HUD], 2006). The largest sector of the Las Vegas economy, hotel, gaming, and recreation, was responsible for nearly 25 percent of jobs added each year (HUD, 2003). Visitor volume grew drastically during this period increasing from 20.9 million tourists in 1990 to 35.8 million tourists in 2000 and accounted for approximately $37 billion dollars in gaming revenue (Las Vegas Convention & Visitors Authority [LVCVA], 2014). By 2000, approximately 90 percent of the largest hotels in the world were in Las Vegas; the 124,270 hotel rooms averaged 92.5 percent hotel occupancy versus the national average of 68 percent (Douglass & Raento, 2004). Steady population growth and low unemployment led to a strong demand for housing during this decade. Growth in the Las Vegas housing market grew drastically as casino development and population increased. A boom in

4

residential construction increased household growth by approximately 22,500 units per year: 15,400 owner units and 7,100 rental units per year (HUD, 2003).

Development and economic investment into Las Vegas boomed throughout the 1990s and into the 2000s. The population continued to grow steadily from 2000 to 2007, adding approximately 75,000 new residents a year from in Clark County, with the majority settling in the Las Vegas Metro Area (Hardcastle, 2012). Annual jobs added continued to increase in the 2000s and peaked at 58,900 jobs added in 2005, which lowered the unemployment rate to 3.7 percent, the lowest point since 1990 (HUD, 2006). Demand for housing led to increased rates of homeownership and housing prices. The U.S. Department of Housing and Urban Development (2013) notes that despite median family income only increasing 3 percent since 1999, average house prices doubled and reached a peak of $379,400 in 2007.

The Great Recession impacted cities in the United States differently and Las Vegas was among the hardest hit. The start of the recession in late-2007 was accompanied by decreases in local employment, tourism, and residential and business construction. By mid-2010, Las Vegas had a combination of land and financial burden with the highest foreclosure, bankruptcy, and unemployment rates in the country (Hsu, 2014). The annual unemployment rate increased from 4.7 percent in 2007 to 14.1 in 2010, peaking in July 2010 at 14.5 percent (Nevada Workforce Informer, 2014). The largest employer in Las Vegas, the casino, and gaming industry, went from 114,454 employees in 2008 to 98,711 in 2009 (Schwartz & Rajnoor, 2014). Gaming revenues in Las Vegas fell approximately 20 percent from 2007 to 2010 after a steady growth period from 1990 to 2007 (Eadington, 2011). Rapid housing development and increases in homeownership in previous years led to the highest foreclosure rates in the country. The number of houses

foreclosures peaked at more than twice the national average in 2010 (HUD, 2014). Average house prices decreased nearly 20 percent during the great recession, meaning that a house priced at $379,400 in 2007 was priced at $290,000 in 2009 (HUD, 2013).

The effects of the Great Recession have continued past its official 2009 end date due to a slow and weak recovery. Although the economic recovery has been strong, the current unemployment rate in Las Vegas remains above the national average. With the Great Recession having a substantial impact on the economy in Las Vegas, it prompts an important question: Has the unemployment rate impacted the health of Las Vegas residents, and to what extent? Numerous studies draw connections between individual unemployment and health, but often do not consider the local unemployment rate as a factor in health status. At the local level, the unemployment rate has the strongest impact on the health of those most vulnerable to local economic factors, such as those currently unemployed and without a college education (Turner, 1995). Although research has shown that economic deterioration impacts health, most of these studies were conducted before the Great Recession.

LITERATURE REVIEW

Physical Health

Understanding the effect of macroeconomics on health has been studied extensively with most research concluding that job loss and unemployment worsens health. According to the Jahoda (1981) latent deprivation model, employment provides five important functions beyond income: collective purpose, time structure, activity, social identity, and social contact. Unemployment and job loss can lead to not only insufficient income, but also physical and mental distress because of the sudden withdraws of these functions. Employment is positively correlated with better health, slower declines in physical functioning and perceived health for those with full-time employment (Ross & Mirowsky, 1995), while unemployment leads to an increase in symptoms of physical illness (Gore, 1978) and health complaints (Schwarzer, Jerusalem, & Hahn, 1994). Decreases in health among the unemployed are due to several psychological stressors, which increase cholesterol and reduced immunity (y, 1994). Aggregate studies show that unemployed persons have higher blood pressure, gastrointestinal, liver, and respiratory illness (Rasky, Stronegger & Freidl, 1996). Decreased fruit and vegetable consumption during the recession was associated with a one-point increase in state unemployment rates (Dave & Kelly, 2012). Risky behaviors such as higher alcohol and tobacco consumption, and illicit drug use are higher among unemployed populations (Kessler, Turner, & House, 1988; Rasky et al., 1996). A community study by Rasky et al. (1996) found physical and behavioral differences between employed and unemployed adults: the unemployed were more likely to suffer from anxiety and

sleeping disorders, consume sleeping pills and sedatives, experience lack of appetite, and had more visits to a general practitioner or specialist.

Further research has shown that job loss is not entirely to blame for poor health and behavioral choices among the unemployed. Lifestyle and addictive behaviors before job loss have been found to be more accurate predictors of long-term unemployment than health variables (Leino-Arjas, P., Liira, J., Mutanen, Malmivaara, & Matikainen, 1999). Other research indicates that physical health decreases higher among those with job insecurity and possible job loss. An analysis of Michigan residents shows that when compared to secure workers and the unemployed, those with perceived job insecurity were more likely to report having poor/fair health, be African American, have children under age 18, and be financially strained (Burgard, Kalousova, & Seefeldt, 2012).

Although research has found that an increasing unemployment rate worsens population physical health and lifestyle behaviors, evidence has shown that recessionary periods aren't always detrimental to physical health. Ruhm's (2000) initial analysis provided evidence at the state level that total mortality and 80 percent of specific causes of death decrease as the economy deteriorates. Several other studies have highlighted various reasons to why recessions led to better population health outcomes among children and adults. Direct impacts include: fewer cars on the road lead to reduced air pollution which decreases the infant mortality rate by limiting exposure in pregnancy (Chay & Greenstone, 1999), and reductions in risky behaviors, such as alcohol and tobacco consumption (Leino-Arjas et al., 1999). Increasing unemployment rates may be associated with higher rates of healthy behaviors and habits since unemployment leads to a reduction in time constraints. Recreational exercise and willingness to exercise has

been found to increase as unemployment levels rise (Colman & Dave, 2013). Using BRFSS data, Ruhm (2005) indicates that one-point increases in state unemployment rate reduces severe obesity by 2.2% and physical inactivity by 1.5% among employed people. Exercise and healthy eating habits are associated with reductions in breast, colon, and prostate cancers (Ruhm, 2000). Studying non-recessionary and recessionary periods, Xu (2013) found that economic expansion leads to increases in smoking, and decreases in physical activity and physician visits.

The ability for population-level physical health to change during economic downturns may be through changes in individual behavior. Charles and DeCicca (2008) highlight two reasons why fluctuations in local labor markets affect health. First, a behavioral explanation that implies as unemployment rates increase, individuals have increased time for non-market activities, including spending more time partaking in activities to improve health. Secondly, a structural explanation where a weak economy with high unemployment leads to behavioral changes in individuals, such as increased stress due to reduced income.

Health Insurance Coverage

Reduced income and job loss often leads to lower rates of individuals and families with health insurance coverage during recessions. Those lacking health insurance have restricted access to care and are more likely to forgo care due to cost (Kaiser Family Foundation, 2010). Regardless of employment status, adults without health insurance are more likely to have fair to poor health, suffer psychological stress, experience delayed medical care, and not obtain prescription drugs (Centers for Disease Control [CDC], 2012). National BRFSS data has found the highest uninsured rates are among younger adults, males, blacks and Hispanics, those with low

incomes, and individuals with less education (Ayanian, Weissman, Schneider, & Zaslavsky, 2010).

Numerous longitudinal and observational studies have confirmed that the uninsured suffer from

more declines in health. Those who are intermittently uninsured were significantly more likely to

have major declines in health than those who were continuously insured (Baker,

Sudano, Albert, Borawski, & Dor, 2001). Moss and Carver (1998) found that babies of uninsured

mothers were at significantly higher odds of dying when compared to the babies of privately

insured mothers. Among those admitted to the hospital for acute myocardial infarction, the

uninsured were more likely to have longer hospital stays and die in the hospital when compared

to those with private insurance (Canto et al., 2000).

Having health insurance doesn't necessarily mean that individuals are protected from

poor health or high healthcare costs. Increasing costs of services are transferred to the individual

through high deductibles and out-of-pocket medical costs, which can deter insured and

uninsured from receiving care. Health care premiums for those with employee-sponsored

insurance have increased 212 percent, or four times as fast as wages, since 1999 (Kaiser Family

Foundation, 2014). A recent study found that Medicaid coverage led to self-reported

improvements in mental health but not physical health outcomes for previously uninsured adults

(Baicke et al., 2013).

The relationship between health insurance and health status is often complicated

because those with health insurance may not necessarily value health more than the uninsured.

Having insurance may not be as important as employment because both unemployed adults with

insurance and without insurance report having poorer physical health (CDC, 2012). A Kaiser

Family Foundation (2011) reports that health care coverage before and during the recession is

largely reflective of economic conditions. The report includes the uninsured rate during the recession of 2000 to 2004, which had increased nearly five million from 38.2 million to 43 million. Furthermore, the U.S had a moderate economic recovery, which lasted until 2007 where the uninsured rates only increased 2.1 million to 45 million. From the start of the Great recession in late 2007 to 2009, the number of uninsured increased 5 million to reach 50 million, or 19 percent uninsured (Kaiser, 2011, pp. 1-2). Of the 50 million uninsured, five million lost employee-sponsored health insurance due to job loss and reduced incomes (Holahan & Chen, 2011). Adverse health consequences led the U.S. Congress in 2009 to enact new benefits in the Consolidated Omnibus Budget Reconciliation Act of 1985 (COBRA) that extends health insurance benefits for those who lost their jobs. Those involuntarily terminated from their jobs were offered a 65 percent subsidy of the cost of COBRA continuation, and coverage was made available for a maximum of 15 months to those who lost jobs between May 2008 and May 2010 (Department of Labor [DOL], 2010).

Nevada is frequently among the states with the highest uninsured rates in the country. The U.S. Census Bureau reports that the percent of adults age 18-64 without health insurance in Nevada climbed from 23 percent in 2007 to its peak of 28 percent in 2010 (Small Area Health Estimates, 2014). The only other states with higher uninsured rates in 2010 were Florida (25.3%) and Texas (26.3%). In Clark County, where more than 70 percent of the population of Nevada resides, the uninsured rate for adults age 18-64 was 23 percent in 2007 and peaked at 29 percent in 2010 (SAHIE, 2014). Including local uninsured rates is important since evidence has shown that those who obtain health insurance will seek more care (Finkelstein et al., 2011) which may lead to better health outcomes. The intricate association between physical health and health

insurance in the literature shows the need for more research, especially on vulnerable populations, to determine the depth and scope of a relationship.

Research Objectives

This study aims to understand how economic recession is associated with changes in health while controlling for several variables to assess where changes are the greatest. The goal of this study is to determine if a relationship exists between recession and health among working-age adults in Las Vegas, Nevada. This is an important area of study because health status may be influenced by other sources not necessarily within individual control. As economic conditions in Las Vegas slowly climb back to pre-recession levels, the need to understand how fluctuations in unemployment affect health becomes increasingly important. Health may be mediated by the local unemployment rate even for those who are economically stable. At least two reasons can be given for the association between the unemployment rate and changes in health: (1) economic downturns could affect both the health of the unemployed and those who remain employed and (2) individual health may cause unemployment instead of being caused by unemployment (Ruhm, 2000).

Research Questions

Research Question #1: Are employment and health insurance status associated with fair to poor health during the recession?

    Hypothesis:

    H_O = Employment and health insurance status is not associated with fair to poor health during the recession.

    H_A= Employment and health insurance status is associated with fair to poor health during the recession.

    Expected Outcome:

    Employment and health insurance status will not be significantly associated fair to poor health during the recession.

Research Question #2: Are employment and health insurance status associated with fair to poor health pre-and post-recession?

    Hypothesis:

    H_O = Employment and health insurance status is not associated with fair to poor health pre-and post-recession.

    H_A = Employment and health insurance status is associated with fair to poor health pre-and post-recession.

    Expected Outcome:

    Employment and health insurance status will be significantly associated with fair to poor health in the pre-and post-recession.

Research Question #3: Are demographic variables age, gender, income, race, marital status, education, and income associated with fair to poor health in each recessionary period and for the entire sample?

Hypothesis:

H_O = Demographic variables are not associated with fair to poor health in any of the recessionary periods.

H_A = Demographic variables are associated with fair to poor health in any of the recessionary periods.

Expected Outcome:

Demographic variables will be significantly associated with fair to poor health in each of the recessionary periods.

METHODOLOGY

Conceptual Model

One mechanism in which a weakened economy produces various health outcomes is the effect of aggregate unemployment on a population regardless of individual employment (Dooley, Fielding, & Levi, 1996). Several hypotheses provide evidence to why health may improve during a weakened economy. First, and most substantial, is more free time to commit to healthier behaviors and activities (Ruhm, 2000). It can be expected that increased leisure time associated with unemployment could be spent on activities that improve health. Rising unemployment makes it less costly to commit to time-intensive behaviors like exercising and preparing healthy meals. Furthermore, reduced income may eliminate more costly "self-medicating" activities like drinking and smoking (Ruhm, 2000). Increased time associated with rising unemployment rates also causes changes in other behaviors. Aguiar (2013) show that individuals invest more in medical and health care as leisure time increases, which may cause health improvements. Although, since health insurance coverage declined during the Great Recession, it is unlikely that individuals spent additional time utilizing services that require health insurance. Increased leisure time may explain some of the health benefits of changing behaviors, but may be mediated by income and health coverage and use.

Secondly, economic downfall has been associated with decreases in stress and injuries incurred at the workplace (Charles & DeCicca, 2008). This relationship would indicate there is a trade-off between being employed and health. While the unemployed may not experience workplace stress and injury, they may be prone to more stress and stress-related illness

associated with financial strain. Third, improved health may be associated external sources like fewer cars on the road, which cause fewer car accidents (Gerdtham & Ruhm, 2006) and reductions in air pollution (Chay & Greenstone, 1999), which can impact maternal and infant health. Lastly, the hypothesis to explain recession and health that follows the general thinking that recessions are detrimental to health. This is built on previous work that indicates the lack of economic stability, measured in high unemployment, is a stressor that has negative effects on population health (Brenner, 1979).

Data Sources and Sample

Data for this study spans the years 2006 to 2011 and draws from two sources. Data for the local unemployment rate comes from the Bureau of Labor Statistics (BLS). As an entity of the U.S. Department of Labor, the BLS measures labor market activity, working conditions, and economic price fluctuations while producing reports to support public and private decision-making (BLS, 2016). Data on health, employment, health insurance coverage and demographic information comes from the Behavioral Risk Factor Surveillance System (BRFSS). The BRFSS is a cross-sectional health-related survey that collects annual data in the United States. Data is collected in Nevada and designated into geographic boundaries. Nevada data is categorized in either the Reno-Sparks or Las Vegas-Paradise metropolitan area. The years 2006 through 2011 time frame that proceeds, coincides with, and follows the Great Recession. This time frame isolates the pre-recessionary period of strong economic performance and the recessionary and post-recessionary periods of weak performance and economic recovery.

This study focuses on local economic conditions and the health of the working-age adult population. The analysis includes adults aged 18-64 living in the Las Vegas Metropolitan Area, Nevada that completed a BRFSS telephone survey between 2006 and 2011. Those aged 65 and older are not included since 65 is the full retirement age in the U.S. Each survey responses includes the day, month, and year taken, this information was used to categorize responses into one of the recessionary periods.

Variables

The dependent variable in this study is health status in terms of self-reported health. Health status is measured using the BRFSS variable RFHLTH that categorizes the respondent's health as 'good or better' or 'fair to poor.' The variable GENHLTH asks respondents "would you say that in general your health is: excellent, very good, good, fair, poor, or don't know." 'Good or better' health consists of excellent, very good, or good responses. 'Fair to poor' health consists of fair to poor health responses.

The independent variable in this study is the local unemployment rate in the Las Vegas Metropolitan area from 2006 to 2011. Unemployment rates are used to measure business cycle expansions and economic conditions of a certain area. The unemployment rate is thought of as an economy's ability to fulfill the employment needs of a population (Dooley et al., 1996). Measuring the economic condition of Las Vegas was done using the average unemployment rate pre, during, and post-recession.

Each recessionary period is 24 consistent months totaling 72 months included in the analysis. Business cycles place the start of the recession in December 2007 and the end date in

the second quarter of 2009. The end date has been debated since the unemployment rate in the U.S. peaked at 10% in October 2009 and did not decrease again until January 2010 (9.8%). For this analysis, the time during the recession will be categorized as January 2008 through December 2009. The pre-and post-recessionary periods will be the 24 months preceding (January 2006-December 2007) and following (January 2010-December 2011) the recession. Responses were classified into a recessionary period by the month and year each survey was completed. The recessionary period is used to reference (1) the recessionary period in which the survey was administered and (2) the average unemployment rate during that period.

Pre-recession surveys were taken during the lowest local unemployment rates, while during and post-recession surveys were completed during higher local unemployment rates. The average Las Vegas area unemployment rate for each year and recessionary period is listed in Table 1. The pre-recession unemployment rate in Las Vegas was its lowest at 4.3%, and subsequently increased to 11.5% during the recession. The largest increase in the unemployment rate occurred during the recession from 6.6% in 2008 to 11.5% in 2009. For the first year of the recession, the average unemployment rate for Las Vegas increased slightly to 6.6%. It is important to note that the highest rate of unemployment in Las Vegas was in the post-recession. Unemployment rates averaged 13.6 percent and remained high for both years (13.8% and 13.3%) in the post-recession.

Table 1: Average Annual Unemployment Rate for Pre, During, and Post Recessionary Periods (2006-2011).

Recession	Years	Average annual unemployment rate (%)
Pre	2006-2007	4.3%
	2006	4.0%
	2007	4.5%
During	2008-2009	9.1%
	2008	6.6%
	2009	11.5%
Post	2010-2011	13.6%
	2010	13.8%
	2011	13.3%

Individual employment status is measured using the BRFSS question: "Are you currently: Employed for wages, self-employed, out of work for less than a year, out of work for more than a year, a homemaker, a student, retired, unable to work, retired, or refused." Employment status was categorized as 'employed for wages' or 'self-employed' as 'employed' and those out of work for less than/more than one year as 'unemployed.' Remaining options of homemaker, a student, retired, unable to work, retired, or refused were excluded from the analysis.

Health insurance coverage is included for two reasons: (1) lack of it can be an obstacle to obtaining medical care, or (2) improved health may lead declines in needing care. Health insurance coverage is defined using the BRFSS variable HLTHPLAN that asks, "Do you have any kind of health care coverage, including health insurance, prepaid plans such as HMOs, or government plans such as Medicare?" Responses on health insurance coverage are dichotomous as 'yes' or 'no'.

This analysis includes several demographic characteristics that are collected during the BRFSS survey. To control for individual characteristics, demographics were coded as ordinal and

range variables. This includes age (18-24, 25-34, 35-44, 45-54, and 55-64); race (white, black, Hispanic, multiracial, and other); education (less than high school, high school graduate, some college, and college graduate); gender (male or female); income (less than $15,000, $15,000-$24,999, $25,000-$34,999, $35,000-$49,999, or above $50,000); employment (employment or unemployed); and health insurance coverage (yes or no). The analysis will include unemployment effects for selected subgroups to highlight differences among groups.

Weighing the Sample

BRFSS metropolitan and micropolitan statistical area (MMSA) data is created from the state-wide dataset to provide localized information demographics and prevalence rates for certain diseases and behaviors. New analysis weights are for MMSA data sets and are designed to correspond to the population estimates for a particular year.

Statistical Analysis

SPSS v.20 with Complex Samples was used to analyze data from the 2006-2011 BRFSS. A sample plan was created before analysis to account for weighting using strata (_STSTR), cluster (_PSU), and weight (MMSAWT) variables. Frequencies and cross tab analysis with a Rao-Scott adjustment were conducted. The Rao-Scott adjustment accounts for weighted frequencies and determines if the independent variable distributes equally in the dependent variable. The stepwise method was used during analysis to determine significant variables for each recessionary period. With fair to poor health as the outcome variable, the stepwise method uses variable 'blocks' for independent variables. This analysis includes an employment and health

insurance block, and a demographic block that is applied to the multiple logistic regression analysis for each recessionary period.

Multivariate logistic regression was used to determine if a relationship between the independent and dependent variables was present and to what extent. Logistic regression was conducted for each recessionary period to determine any differences in the independent variables associated with health. A final logistic regression model was performed to examine health throughout the entire period (2006-2011). The significance level was set at $p<0.05$ and confidence intervals at 95% for multiple logistic regression.

RESULTS

Demographics

A total 4,284 cases met independent variable requirements and were included in the study. Unweighted frequencies and weighted percentages for independent and dependent variables are listed on Table 2. For employment status, 3,800 were employed with a weighted 86.8% and 484 were unemployed with a weighted 13.2%. Those with health insurance totaled 3,473 with a weighted 76.3% and those without insurance totaled 811 with a weighted 23.7%.

Table 2: Descriptive Characteristics of independent and dependent variables in Las Vegas MMSA, BRFSS 2006-2011 (N=4,284)

Variable		Unweighted (n)	Weighted %
Employment	Employed	3800	86.8
	Unemployed	484	13.2
Insurance	Has insurance	3473	76.3
	No insurance	811	23.7
Recession	Pre	1306	30.6
	During	1373	35.8
	Post	1605	33.6
Health	Good or better	3738	87.0
	Fair to poor	546	13.0
Employed	Has insurance	3234	70.7
	No insurance	566	16.1
Unemployed	Has insurance	239	5.6
	No insurance	245	7.6

Approximately one-third of responses came from each recessionary period with weighted percentages of 30.6%, 35.8%, and 33.6%. Good or better health responses totaled a weighted 87.0% and fair to poor health totaled the remaining 13.0%. Those employed with insurance totaled a weighted 70.7% of responses, and those employed without insurance totaled 16.1%.

For the unemployed respondents, a weighted 5.6% had insurance while 7.6% did not have insurance.

Unweighted frequencies and weighted percentages for gender, age, race, marital status, education, and income were calculated to describe the sample demographics (Table 3). Among the participants, 2,058 were male with a weighted 58.8%, while 2,226 were female with a weighted 41.2%. Age groups 25-34, 35-44, and 45-54 totaled approximately 77% of weighted participants. Those categorized in the youngest (18-24) and oldest (55-64) age groups accounted for the smallest number of participants with a weighted adjustment of 9.6% and 13.1%. The majority of respondents were white (55.3%), followed by Hispanic (25.3%), while those identifying as black, multiracial or other accounted for a combined weighted 19.4%.

The majority of responses came from those who were married (56.7%), followed by those who had never married (27.6%), whereas those divorced, widowed, or separated accounted for a combined weighted 15.8%. Most respondents had either attended college (30.6%), graduated from college (31.8%), or graduated from high school (27.1%). More than half (54.2%) had an annual income of 50k or more, followed only by those with incomes of 35k to 50k (14.5%) and 15k to 25k (14.2%).

Table 3: Demographic characteristics of included subjects in Las Vegas MMSA, BRFSS 2006-2011 (N=4,284)

Variable		Unweighted (n)	Weighted %
Gender			
	Male	2058	58.8%
	Female	2226	41.2%
Age			
	18-24	225	9.6%
	25-34	770	27.0%
	35-44	1129	27.9%
	45-54	1183	22.4%
	55-64	947	13.1%
Race			
	White	2676	55.3%
	Black	315	6.8%
	Hispanic	783	25.3%
	Other	293	8.4%
	Multiracial	217	4.2%
Marital			
	Married	2258	56.7%
	Divorced	783	11.8%
	Widowed	124	1.6%
	Separated	122	2.4%
	Never Married	997	27.6%
Education			
	Did not graduate high school	331	10.5%
	Graduated high school	1053	27.1%
	Attended College	1333	30.6%
	Graduated from College	1567	31.8%
Income			
	Less than 15K	232	6.2%
	15k to less than 25k	527	14.2%
	25k to less than 35k	450	11.0%
	35k to less than 50k	657	14.5%
	50k or more	2418	54.2%

The prevalence of independent and dependent variables for each recessionary period can be found on Table 4. Within the pre-recession, good or better health accounted for 86.6% of responses while fair to poor health accounted for 13.4% of responses. The employed totaled 93.4% of responses while the unemployed totaled 6.6% of responses. Those with insurance

accounted for 78.0% of the responses and the uninsured accounted for 22.0% of the responses in the pre-recession. During the recession, good or better health accounted for 87.2% of responses while fair to poor health accounted for 12.8% of responses. The employed totaled 84.2% of responses while the unemployed totaled 15.8% of responses. Those with insurance accounted for 76.7% of the responses and the uninsured accounted for 23.3% of the responses in the pre-recession. Within the post-recession, good or better health accounted for 87.2% of responses while fair to poor health accounted for 12.8% of responses. The employed totaled 83.5% of responses while the unemployed totaled 16.5% of responses. Those with insurance accounted for 74.3% of the responses and the uninsured accounted for 25.7% of the responses in the pre-recession.

Table 4: Prevalence of Independent and Dependent Variables Within Each Recessionary Period and Total (N=4,284)

Variable	Pre	During	Post
	N (weighted %)	N (weighted %)	N (weighted %)
Good or better	1133 (86.6%)	1191 (87.2%)	1414 (87.2%)
Fair to poor	173 (13.4%)	182 (12.8%)	191 (12.8%)
Employed	1226 (93.4%)	1202 (84.2%)	1372 (83.5%)
Unemployed	80 (6.6%)	171 (15.8%)	233 (16.5%)
Has insurance	1085 (78.0%)	1130 (76.7%)	1258 (74.3%)

Rao-Scott Statistic

The Rao-Scott statistic was used to examine the relationship between independent and demographic variables associated with fair to poor health for the entire sample (Table 5). Among the independent variables, employment and health insurance had statistically significant differences in proportion for those with fair to poor health. Among demographics, race, marital

status, education, and income had statistically significant differences in proportion. Recession (P=0.920), gender (P=0.507) and age (P=0.497) were not statistically significant in the proportion of those with fair to poor health.

Table 5: Rao-Scott Chi-Square for Fair to poor Health and Independent and Demographic Variables (N=4,284)

	χ^2		P-Value
Demographic variables			
Gender	.702	χ^2	0.507
Age	6.023	G^2	0.497
Race	68.315	G^2	0.000***
Marital	56.676	G^2	0.000***
Education	215.895	G^2	0.000***
Income	202.548	G^2	0.000***
Independent variables			
Employment	94.405	χ^2	0.000***
Health plan	117.948	χ^2	0.000***
Recession	.293	G^2	0.920
			***p<0.001

The Rao-Scott statistic also provides information on the estimated sample size and the percentage of each variable for those within each health status category. Information on each demographic variable and the percent within each health category for the entire sample are found on Table 6.

Demographic Factors Associated with Health

Among those with fair to poor health, 60.5% were male, and 39.5% were female (Table 6). The highest frequencies of fair to poor health were in the 35-44 age group at 27.2% and the 25-34 age group at 26.1%. For the remaining fair to poor health responses, 8.7% were 18-24, 21.6% were 45-54, and 16.4% were 55-64. Among race, 40.5% were white, 8.9% were black, 38.2% were Hispanic, 8.2% were other, and 4.3% were multiracial. Among marital status, 44.4%

were married, 18.1% were divorced, 1.7% were widowed, 5.3% were separated, and 30.5% had

never married. Among education, 27.6% did not finish high school, 31.2% graduated from high

school, 27.1% attended college, and 14.0% had graduated from college. Among income status,

11.7% had an annual income of less than 15k, 26.2% had an income of 15k to 25k, 17.6% had an

income of 25k to 335k, 16.9% had an income 35k to 50k, and 27.7% made 50k or more a year.

Table 6: Frequencies of Demographics among Health Status in Las Vegas MMSA, BRFSS 2006-2011 (N=4,284)

Variable		Fair to poor		Good or better	
		Weighted (n)	Weighted %	Weighted (n)	Weighted %
Gender					
	Male	264	60.5	1794	58.6
	Female	282	39.5	1944	41.4
Age					
	18-24	27	8.7	228	9.7
	25-34	86	26.1	684	27.1
	35-44	134	27.2	995	28.0
	45-54	146	21.6	1037	22.6
	55-64	153	16.4	794	12.6
Race					
	White	263	40.5	2413	57.5
	Black	62	8.9	253	6.5
	Hispanic	153	38.2	630	23.4
	Other	35	8.2	258	8.5
	Multiracial	33	4.3	184	4.2
Marital					
	Married	227	44.4	2031	58.5
	Divorced	126	18.1	657	10.8
	Widowed	21	1.7	103	1.6
	Separated	36	5.3	86	2.0
	Never Married	136	30.5	861	27.1
Education					
	Did not graduate HS	113	27.6	218	8.0
	Graduated HS	169	31.2	884	26.5
	Attended College	156	27.1	1177	31.1
	Graduated from College	108	14.0	1459	34.4
Income					
	Less than 15K	67	11.7	165	5.3
	15k to less than 25k	134	26.2	393	12.4
	25k to less than 35k	85	17.6	365	10.0
	35k to less than 50k	89	16.9	568	14.1
	50k or more	171	27.7	2274	58.2

Independent Variables Associated with Health

Continuing with the independent variables, Table 7 provides information for each recessionary period and the percent of fair to poor and good or better health within employment

and health insurance categories. The largest increase in good or better health among the employed and unemployed was during the recession, resulting in a subsequent decrease in fair to poor health. Across all recessionary periods, 77% (n=420) of fair to poor health responses came from the employed. For those with insurance, good or better health and fair to poor health was approximately equal for each recessionary period. Furthermore, 66% (n=360) of the total fair to poor health responses were from those with insurance. The uninsured and unemployed had the largest increase in good or better health from the pre-recession to during the recession. The unemployed and uninsured groups had the largest subsequent decreases in good or better health in the post-recession.

Table 7: Health Status by Recessionary Period Among Employment and Health Insurance Status (N=4,284)

Recession		Fair to poor		Good or better	
		N	%	N	%
Pre					
	Employed	146	12.2	1080	87.8
	Unemployed	27	30.0	53	70.0
	Has insurance	114	9.2	971	90.8
	No insurance	59	28.1	162	71.9
During					
	Employed	140	10.9	1062	89.1
	Unemployed	42	22.7	129	77.3
	Has insurance	128	10.8	1002	89.2
	No insurance	54	19.4	189	80.6
Post					
	Employed	134	9.9	1238	90.1
	Unemployed	57	27.3	176	72.7
	Has insurance	118	9.5	1140	90.5
	No insurance	73	22.4	274	77.6

In the pre-recession, 87.8% of the employed reported health as good or better and 12.2% reported health as fair to poor. Among the unemployed, 70.0% had good or better health and 30.0% had fair to poor health. Approximately 91% of those with health insurance and 72% of those without health insurance reported good or better health. The remaining 9.2% of the insured and 28.1% of the uninsured reported having fair to poor health.

During the recession, good or better health increased slightly in the employed to 89.1% and fair to poor health decreased to 10.9%. For the unemployed, good or better health increased nearly 7% to 77.3% and fair to poor health decreased to 22.7%. Those with insurance had minor changes in health with good to better health decreasing to 89.2% and fair to poor health increasing to 10.8%. For the uninsured, good or better health increased nearly 10% to 80.6 and fair to poor health decreased to 19.4%.

In the post-recession, the employed with good or better health remained increased slightly to 90.1% and fair to poor health decreased to 9.9%. Among the unemployed, good or better health decreased to 72.7% and fair to poor health increased to 27.3%. The insured approximately the same at 90.5% with good or better health and 9.5% with fair to poor health. The uninsured had minor decreases in good or better health at 77.6% and a subsequent increase in fair to poor health at 22.4%.

Although the variable 'recession' is not significant in the entire sample, different independent and demographic variables had significance in each recessionary period. The level of significance for each variable block in each recessionary period can be found on Table 8. Employment, age, education and income were found to be statistically significant associations for health in all recessionary periods. Health insurance was found to be significant in the pre-

recession only, race was significant during and post-recessions, and marital status was significant only during the recession.

Table 8: Multiple Logistic Regression for Significant Independent and Demographic Variables and Health for Each Recessionary Period (N=4,284)

Variable	Pre	During	Post
	Sig.	Sig.	Sig.
Employment	0.001***	0.027*	0.002**
Insurance	0.015**	0.868	0.069
Gender	0.525	0.119	0.195
Age	0.000***	0.003**	0.001***
Race	0.089	0.030*	0.015*
Marital	0.322	0.014*	0.750
Education	0.000***	0.000***	0.007*
Income	0.000***	0.000***	0.001**

*p<0.05
**p<0.005
***p<0.001

Final Significance Model

Complex samples multiple logistic regression was used to assess significance and odds ratios (OR) for significant variable blocks and fair to poor health for each recessionary period. Reference categories were based on the highest number of responses for each variable, except for age where the 55-64 age group was used. A total of five variables reached statistical significance at p<0.05, and each recessionary period had varying significant variables. Employment status was significant associated with fair to poor health in pre-and post-recessions, but not during the recession. Education, income, and age were significantly associated with fair to poor health in all three recessionary periods.

Table 9: Multiple Logistic Regression Summary of Significance Levels for Independent and Demographic Variables and Health for Each Recessionary Period (N=4,284)

Variable	Pre	During	Post
	Sig.	Sig.	Sig.
Employment	0.036*	0.117	0.006*
Insurance	0.001**	N/A	N/A
Gender	N/A	N/A	N/A
Age	0.015*	0.062	0.014*
Race	N/A	0.326	0.219
Marital	N/A	0.057	N/A
Education	0.000***	0.002**	0.002**
Income	0.003**	0.128	0.000***
			*p<0.05
			**p<0.005
			***p<0.001

Employment, health insurance, age, education, and income were all found to be significantly associated with fair to poor health in the pre-recession (Table 10). Reporting health as fair to poor was higher in the unemployed (OR=2.0, CI=1.049, 4.092, p <0.05) and uninsured (OR=2.3, CI=1.393, 3.824, p <0.05) when compared to the employed and insured. For age, each subgroup had lower odds of fair to poor health when compared to the 55-64 age subgroup. The age group 25-34 had 64% lower odds (OR=0.365, CI=0.185, 0.720, p <0.005) of reporting fair to poor health than those ages 55-64.

Other significant demographic variables in the pre-recession were education and income. For the variable 'education', those who did not graduate high school had 6.3 higher odds of reporting fair to poor health (CI=3.328, 11.954, p<0.001) when compared to college graduates. Those who graduated from high school had 2.5 higher odds (CI=1.401, 4.587, p<0.005) of reporting fair to poor health when compared to college graduates. Among the variable 'income',

those making between 35k and 50k a year were at higher odds (CI, 2.749, 4.931=, p<0.005) of

having fair to poor health when compared to those making more than 50k a year.

Table 10: Multiple Logistic Regression with Final Significance Factors and Fair to poor Health in the Pre-Recession (n=1,306)

Variable		OR	CI	P
Employment				0.036*
	Employed (ref.)			
	Unemployed	2.072	(1.049, 4.092)	
Insurance				0.001***
	Has insurance (ref.)			
	No insurance	2.308	(1.393, 3.824)	
Age				0.016*
	18-24	0.571	(0.232, 1.405)	
	25-34	0.365	(0.185, 0.720)	0.004**
	35-44	0.957	(0.544, 1.684)	
	45-54	0.891	(0.491, 1.615)	
	55-64 (ref.)			
Education				0.000***
	Did not graduate HS	6.307	(3.328, 11.954)	0.000***
	Graduated HS	2.535	(1.401, 4.587)	0.002**
	Attended College	1.001	(0.577, 1.798)	
	Graduated from College (ref.)			
Income				0.009*
	Less than 15K	1.145	(0.461, 2.845)	
	15k to less than 25k	1.472	(0.707, 3.066)	
	25k to less than 35k	1.849	(0.929, 3.683)	
	35k to less than 50k	2.749	(2.749, 4.931)	0.001***
	50k or more (ref.)			

*p<0.05
**p<0.005
***p<0.001

During the recession, education was found to be a significant (p<0.05) association with

fair to poor health in the pre-recession (Table 11). Both 'marital' and 'age' variables were close

to reaching statistical significance at p=0.064 and p=0.062. For the variable 'education', each

subgroup had produced higher odds of reporting fair to poor health when compared to college

graduates. Those who did not graduate high school had 3.7 higher odds of fair to poor health (CI=1.781, 7.924, p<0.001). Those who graduated from high school were 1.8 higher odds (CI=1.004, 3.357, p <0.05) of fair to poor health. And those who had attended college had slightly higher odds of fair to poor health (OR=2.0, CI=1.115, 3.656, p <0.05).

For the 'marital' variable, those who were divorced were nearly two times higher odds (OR=1.9, CI=1.140, 3.232, p <0.05) of reporting fair to poor health when compared to those married. Among age, those 25-34 had 57% lower odds of fair to poor health (OR=0.445, CI=0.231, 0.857, p <0.05) and those 35-44 had 56% lower odds (OR=0.533, CI=0.301, 0.943, p <0.05) when compared to the 55-64 age group.

Table 11: Multiple Logistic Regression with Final Significance Factors and Fair to poor Health During the Recession (n=1,373)

Variable		OR	CI	P
Employment				0.117
	Employed (ref.)			
	Unemployed	1.621	(0.886, 2.967)	
Age				0.062
	18-24	0.435	(0.177, 1.068)	
	25-34	0.445	(0.231, 0.857)	0.016*
	35-44	0.533	(0.301, 0.943)	0.031*
	45-54	0.625	(0.365, 1.067)	
	55-64 (ref.)			
Race				0.326
	White (ref.)			
	Black	1.412	(0.704, 2.833)	
	Hispanic	1.608	(0.942, 2.744)	
	Other	1.040	(0.336, 3.217)	
	Multiracial	1.944	(0.763, 4.953)	
Marital				0.064
	Married (ref.)			
	Divorced	1.919	(1.140, 3.232)	0.014*
	Widowed	0.745	(0.218, 2.552)	
	Separated	2.193	(0.885, 5.430)	
	Never Married	1.118	(0.594, 2.104)	
Education				0.002**
	Did not graduate HS	3.757	(1.781, 7.924)	0.001***
	Graduated HS	1.836	(1.004, 3.357)	0.049*
	Attended College	2.019	(1.115, 3.656)	0.020*
	Graduated from College (ref.)			
Income				0.128
	Less than 15K	2.091	(0.891, 4.908)	
	15k to less than 25k	2.034	(0.930, 4.453)	
	25k to less than 35k	2.007	(1.061, 3.796)	0.032*
	35k to less than 50k	1.343	(0.705, 2.557)	
	50k or more (ref.)			

*p<0.05
**p<0.005
***p<0.001

Employment, age, education, and income were all found to be significantly associated

with fair to poor health in the post-recession (Table 12). Those unemployed were at two times

higher odds of reporting having fair to poor health when compared to the employed (OR=2.1, CI=1.254, 3.751, p <0.05). For age, each subgroup had lower odds of fair to poor health when compared to the 55-64 age subgroup. The age group 18-24 had 82% lower odds (OR=2.1, CI=0.055, 0.564, p <0.005) of reporting fair to poor health than those ages 55-64.

Other significant demographic variables in the post-recession were education and income. For the variable 'education', those who did not graduate high school had 3.7 higher odds of reporting fair to poor health (CI=1.764, 8.052, p <0.001). Both those who graduated from high school (CI=1.000, 3.525, p <0.05) and those who attended college (CI=1.062, 3.352, p <0.05) had 1.8 higher odds to report fair to poor health when compared to college graduates. Among the variable 'income', those making between 15k and 25k a year had 3.3 higher odds (CI=1.815, 6.017, p <0.001) in reporting fair to poor health, and those making 25k to 35k a year had 2.5 higher odds (CI=1.329, 4.974, p <0.005) when compared to those making more than 50k a year.

Table 12: Multiple Logistic Regression with Final Significance Factors and Fair to poor Health in the Post-Recession (n=1,605)

Variable		OR	CI	P
Employment				0.006*
	Employed (ref.)			
	Unemployed	2.169	(1.254, 3.751)	
Age				0.014*
	18-24	0.176	(0.055, 0.564)	0.003**
	25-34	0.624	(0.329, 1.183)	
	35-44	0.587	(0.318. 1.084)	
	45-54	0.548	0.294, 1.024)	
	55-64 (ref.)			
Race				0.219
	White (ref.)			
	Black	1.711	(0.863, 3.391)	
	Hispanic	1.124	(0.638, 1.981)	
	Other	1.235	(0.594, 2.566)	
	Multiracial	2.768	(0.980, 7.821)	
Education				0.002**
	Did not graduate HS	3.769	(1.764, 8.052)	0.001***
	Graduated HS	1.878	(1.000, 3.525)	0.05*
	Attended College	1.887	(1.062, 3.352)	0.030*
	Graduated from College (ref.)			
Income				0.000***
	Less than 15K	1.835	(0.786, 4.284)	
	15k to less than 25k	3.305	(1.815, 6.017)	0.000***
	25k to less than 35k	2.571	(1.329, 4.974)	0.005**
	35k to less than 50k	1.597	(0.858, 2.971)	
	50k or more (ref.)			
				*p<0.05
				**p<0.005
				***p<0.001

DISCUSSION

The purpose of this thesis was to examine how economic recession is associated with health among certain demographic groups by evaluating pre, during, and post recessionary periods. The goals of this study where to determine: 1) if fair to poor physical health responses are associated with economic recession, 2) if fair to poor health responses are associated with employment and health insurance status, and 3) which demographic factors are associated with fair to poor health. Results show that the percentage of fair to poor health responses declined during the Great Recession and subsequently, good or better health responses increased. The largest decreases in fair to poor health during the recession were among the unemployed and uninsured groups. At peak unemployment rates in the post-recession, good or better health continued to increase approximately 1% for the employed and insured while decreasing approximately 5% for the unemployed and uninsured.

The analysis uncovered statistically significant associations between rising unemployment rates and health that was often specific to each recessionary period. After conducting a final multiple logistic regression analysis, employment and insurance significance levels during the recession were above cutoff values, and therefore, we fail to reject the null hypothesis. This indicates that employment and health insurance status were not found to be significantly associated with health status during the recession. The null hypothesis was rejected for the remaining research questions since employment and health insurance status were found to be significant associations with health in the pre- and post-recessions, while demographic characteristics were found to be significant during all recessionary periods. The most important finding may be that employment status was not associated with health during the recession, but

was associated at the pre-and post-recessions when the unemployment rate was at its lowest and highest points. This finding may offer support to the reallocation of time hypothesis described by Ruhm (2005) that unemployed persons often reallocate time into physical activity, and that costly habits such as smoking and drinking decline due to restricted monetary resources. Another crucial finding was that education was the only demographic variable to be significant for all recessionary periods, and that those who did not graduate from high school were the most vulnerable in suffering from fair to poor health. Low educational attainment has been tied to poor health, and that those unemployed may experience increased mental distress (Egan et al., 2016) and those employed frequently suffer from decreased productivity and excessive absences (Fletcher, 2013). Education is a complex issue as it is usually tied to income, which was significant during pre-and post-recessions only. This finding may indicate that greater importance should be placed on education- not income, to have better health outcomes since more education often leads to more job stability and opportunities for growth.

Summary of Findings

Research question #1 asked, "is employment and health insurance status associated with fair to poor health during the recession?" The analysis found that employment status and health insurance were not statistically significant associations with fair to poor health during the recession. During the recession, good or better health responses increased from their pre-recession values regardless of employment and health insurance status. This includes an increase of 7% in good or better health responses among the unemployed and a 9% increase among the uninsured.

For both pre-and post-recessions, employment status was a significant association fair to poor health while health insurance was statistically significant in the pre-recession only. In the pre-recession, the odds of reporting fair to poor health among the unemployed and uninsured was approximately two times higher when compared to the employed and insured. The null is rejected for research question #2 since the hypothesis stated that employment and health insurance would not be significant during periods of lower unemployment rates.

Research question #3 addressed demographic variables associated with fair to poor health in each recessionary period and for the entire sample. For both pre-and post-recessions, age, education, education, and income were statistically significant in predicting fair to poor health. Younger age was found to be protective against fair to poor health when compared to the 55-64 age group in all recessionary periods. During the recession, age groups commonly associated with young professionals, had 56% (25-34) and 55% (35-44) lower odds in having fair to poor health. While the unemployment rate peaked at 13.6% in the post-recession, college-aged adults (18-24) had 82% lower odds to have fair to poor health.

When examining those with fair to poor health among the entire sample, 77% were employed and 66% had health insurance. Furthermore, 40.5% were white, 60.5% were males, and 44.4% indicated they were married. Income levels of 50k or more and 15k to 25k had a combined approximate total of 50% of the fair to poor health responses. Younger age was found to be protective against fair to poor health when compared to the 55-64 age group for the entire sample. Education was the only demographic variable found to have a statistically significant association with fair to poor health across all recessionary periods. Those who did not graduate

high school had the largest odds ratios in reporting fair to poor health when compared to college graduates.

Strengths and Limitations

The major strengths of this study include using the BRFSS, a large dataset and a population-based study design that is representative of the population of interest. As a national survey, BRFSS core questions can be compared across cities and states. SPSS Complex Samples weighting provides increased accuracy and study validity to generalize results to the Las Vegas metropolitan area population.

It is important to note that the findings here do not are not indicative of a causal relationship and that further exploration into the variables would be necessary to determine casual factors. One limitation of the study is the validity of self-reported information collected through the BRFSS. The sensitive and personal nature of many questions may increase the likelihood of recall or response bias. Participants may be more inclined to respond with answers that they believe invoke the least amount of judgment or may not be as comfortable with divulging personal information to telephone interviewers.

When asking about objective measures, such as health status, participants often report on individual perceptions of their health and not data obtained from a clinical assessment. Non-definitive measures such as income may not account for recent pay raises, and responses may vary based on if the participant is reporting gross or net amounts. This analysis did not include household size that is an important characteristic that may provide better estimates resource allocation and accumulated wealth. The BRFSS data collected years 2006 through 2010 when cell

phones were not included in the pool of telephone numbers. The BRFSS may exclude data from persons that have fewer landline phones, including lower socioeconomic status groups and young adults, and may focus on those with landlines such as, those with a business phone at home and older adults.

Another limitation of this study is the time component and what is considered the official beginning and end of the Great Recession. This analysis included the entire year 2009 as the period during the recession, which may be considered as post-recession. Business cycles place the start of the recession in December 2007 and the end date in the second quarter of 2009. The end date has been a topic of debate since it does not coincide peak unemployment rates, which were reached in October 2009 did not decrease again until January 2010.

Recommendations for Public Health Policy and Future Research

Health care and disease prevention is a constant matter of national concern. It is currently thought to contribute to 7 of every 10 deaths and in 2013 alone 86% of health care costs ($2.9 trillion) accounted for chronic disease- of which many are preventable (CDC, 2016). The study illustrates the importance for further work into the association between individual health and economic health within certain metropolitan areas.

This study provides support for demographic-based health considerations throughout times of economic up and downswings. The relationship between level of education and self-reported health since those without a high school diploma were constantly worse off than any other demographic group. Although education and income usually coincide, first and foremost, emphasis should be placed on education with efforts made to increase high school graduation

and college-enrollment rates. Age was shown to be a protective factor against fair to poor health for each recessionary period. More national attention would be helpful in addressing health needs of baby boomers and the older workforce. Public policy can be shaped to more effectively address specific demographic considerations for health, especially for groups that are vulnerable regardless of economic recession.

Further research is necessary to understand the differences between employment status and health during economic boom and bust. Specifically, exploring why the employed are not more likely to report fair to poor health during recession. Previous findings have linked unemployment to an increased health due to more free time to commit to physical activity and healthier behaviors. It seems an indication that the employed would have a subsequent decrease in health because of less free time and increased work burden.

CONCLUSION

While the cyclical patterns of economic conditions and health have been well-studied and documented, the effects of the Great Recession on the previously 'recession-proof' Las Vegas have not been explored due to the novelty of the negative impacts on the city. This study examined the impact of economic recession on health by looking at pre, during, and post-recessionary periods and the local unemployment rate associated with each.

These results indicate that during the Great Recession, neither employment or health insurance status were associated with poor or fair health. Findings from this study lead to other important conclusions about Las Vegas and economic recession. First, being unemployed in the pre-and post-recession was associated with fair to poor health. Secondly, when compared to the oldest participants of the study, being in a younger age group was protective against fair to poor health in each recession. Lastly, specific age and income groups were significant associations for fair to poor health in each recession, while the level of education was the most significant demographic variable across all recessionary periods.

Appendix A: Health and Demographic Questions from BRFSS

Section 1: Health Status

1.1 Would you say that in general your health is—

Please read:

1   Excellent
2   Very good
3   Good
4   Fair

Or

5   Poor

Do not read:

7   Don't know / Not sure
9   Refused

1.1 Calculated Variables Variable Name: _RFHLTH Description: Adults with good or better health		
Good or Better Health	1	Notes: GENHLTH = 1 or 2 or 3
Fair to poor Health	2	Notes: GENHLTH = 4 or 5
Don't know/Not Sure	9	Notes: GENHLTH = 7 or 9 or Missing

Section 3: Health Care Access

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

1   Yes
2   No
7   Don't know / Not sure

9 Refused

Section 8: Demographics

12.1 What is your age?

  _ _ Code age in years
  0 7 Don't know / Not sure
  0 9 Refused

12.2 Are you Hispanic, Latino/a, or Spanish origin?

  If yes, ask: Are you…

  1 Mexican, Mexican American, Chicano/a
  2 Puerto Rican
  3 Cuban
  4 Another Hispanic, Latino/a, or Spanish origin

12.3 Which one or more of the following would you say is your race?
  Please read:

  10 **White**

  20 **Black or African American**

  30 **American Indian or Alaska Native**

  40 **Asian**

  50 **Pacific Islander**

12.6 Are you…?
  Please read:

  1 Married
  2 Divorced
  3 Widowed

4   Separated
5   Never married

Or

6   A member of an unmarried couple

12.8   What is the highest grade or year of school you completed?

Read only if necessary:

1   Never attended school or only attended kindergarten
2   Grades 1 through 8 (Elementary)
3   Grades 9 through 11 (Some high school)
4   Grade 12 or GED (High school graduate)
5   College 1 year to 3 years (Some college or technical school)
6   College 4 years or more (College graduate)

Do not read:

9   Refused

12.9   Are you currently…?
        Please read:

1   Employed for wages
2   Self-employed
3   Out of work for 1 year or more
4   Out of work for less than 1 year
5   A Homemaker
6   A Student
7   Retired

Or

8   Unable to work

12.10   Is your annual household income from all sources—

        If respondent refuses at ANY income level, code '99' (Refused)

Read only if necessary:

0 4   Less than $25,000   **If "no," ask 05; if "yes," ask 03**
       ($20,000 to less than $25,000)

0 3   Less than $20,000   **If "no," code 04; if "yes," ask 02**
       ($15,000 to less than $20,000)

0 2   Less than $15,000   **If "no," code 03; if "yes," ask 01**
       ($10,000 to less than $15,000)

0 1   Less than $10,000   **If "no," code 02**

0 5   Less than $35,000   **If "no," ask 06**
       ($25,000 to less than $35,000)

0 6   Less than $50,000   **If "no," ask 07**
       ($35,000 to less than $50,000)

0 7   Less than $75,000   **If "no," code 08**
       ($50,000 to less than $75,000)

0 8 $75,000 or more

Do not read:

7 7   Don't know / Not sure
9   9   Refused

12.22 Calculated Variables Variable Name: _INCOMG Description: Income categories		
Less than $15,000	1	Notes: INCOME2 = 1 or 2
$15,000 to less than $25,000	2	Notes: INCOME2 = 3 or 4
$25,000 to less than $35,000	3	Notes: INCOME2 = 5
$35,000 to less than $50,000	4	Notes: INCOME2 = 6
$50,000 or more	5	Notes: INCOME2 = 7 or 8

12.13   What county do you live in?

        _ _ _   ANSI County Code
7 7 7   Don't know / Not sure
9 9 9   Refused

12.21   Indicate sex of respondent. **Ask only if necessary.**

1   Male
2   Female

Appendix B: List of Acronyms

BRFSS	Behavioral Risk Factor Surveillance System
CDC	Centers for Disease Control
CI	Confidence Interval
DV	Dependent Variable
GDP	Gross Domestic Product
IV	Independent Variable
OR	Odds Ratio
SPSS	Statistical Package for the Social Sciences
UNLV	University of Nevada, Las Vegas
UR	Unemployment Rate

Appendix C: BRFSS Weights Table

Weighting Variables Included in the BRFSS Dataset	
_STSTR	Sample Design Stratification Variable
_PSU	Primary Sampling Unit
_MMSAWT	MMSA-level weight used when generating MMSA-level estimates for variables in the data set.

REFERENCES

Aguiar, M., Hurst, E., & Karabarbounis, L. (2013). Time use during the great recession. *The American Economic Review*, *103*(5), 1664-1696

Ayanian, J. Z., Weissman, J. S., Schneider, E. C., Ginsburg, J. A., & Zaslavsky, A. M. (2000). Unmet health needs of uninsured adults in the United States. *Jama*, *284*(16), 2061-2069.

Baicker, K., Taubman, S. L., Allen, H. L., Bernstein, M., Gruber, J. H., Newhouse, J. P., ... & Finkelstein, A. N. (2013). The Oregon experiment—effects of Medicaid on clinical outcomes. *New England Journal of Medicine*,*368*(18), 1713-1722.

Baker, D.W., J.J. Sudano, J.M. Albert, E.A. Borawski, and A. Dor. (2001). Lack of Health Insurance and Decline in Overall Health in Late Middle Age. *New England Journal of Medicine* 345(15):1106–12.

Bartley, M. (1994). Unemployment and ill health: understanding the relationship. *Journal of Epidemiology and Community Health*, *48*(4), 333-337.

Brenner, M. H. (1979). Mortality and the national economy. *The Lancet*, *314*(8142), 568-573.

Bureau of Labor Statistics (BLS), (2012). Spotlight on Statistics. "The Recession of 2007-2009" Retrieved 23 September 2014 from http://www.bls.gov/spotlight/2012/recession/pdf/recession_bls_spotlight.pdf

Bureau of Labor Statistics (BLS), (2016). About BLS : U.S. Bureau of Labor Statistics. Retrieved from 10 March 2017 from https://www.bls.gov/bls/infohome.htm

Bureau of Labor Statistics (BLS), (2014)_. Unemployment Rates for Metropolitan Areas. Retrieved 20 September 2014 from http://www.bls.gov/web/metro/laummtrk.htm

Blouin, C., Chopra, M., & van der Hoeven, R. (2009). Trade and social determinants of health. *The Lancet*, *373*(9662), 502-507.

Burgard, S. A., Kalousova, L., & Seefeldt, K. S. (2012). Perceived job insecurity and health: the Michigan Recession and Recovery Study. *Journal of Occupational and Environmental Medicine*, *54*(9), 1101-1106.

Burke-Miller, J. K., Cook, J. A., Grey, D. D., Razzano, L. A., Blyler, C. R., Leff, H. S., ... & Hoppe, S. K. (2006). Demographic characteristics and employment among people with severe mental illness in a multisite study. *Community mental health journal*, *42*(2), 143-159.

Canto, J. G., Rogers, W. J., French, W. J., Gore, J. M., Chandra, N. C., & Barron, H. V. (2000). Payer status and the utilization of hospital resources in acute myocardial infarction: a report from the National Registry of Myocardial Infarction 2. *Archives of Internal Medicine*, *160*(6), 817-823.

Centers for Disease Control (CDC), (2012) "Health and Access to Care Among Employed and Unemployed Adults: United States, 2009–2010."Available at: http://www.cdc.gov/nchs/data/databriefs/db83.pdf

Centers for Disease Control (CDC), (2016) "At A Glance 2015 National Center for Chronic Disease Prevention and Health Promotion." Available at: https://www.cdc.gov/chronicdisease/resources/publications/aag/pdf/2015/nccdphp-aag.pdf

Center on Budget and Policy Priorities (CBPP) (October 7, 2014) retrieved 10 October 2014 from http://www.cbpp.org/cms/index.cfm?fa=view&id=3252

Charles, K. K., & DeCicca, P. (2008). Local labor market fluctuations and health: is there a connection and for whom?. *Journal of health economics*, *27*(6), 1532-1550.

Chay, K. Y., & Greenstone, M. (2003). The impact of air pollution on infant mortality: evidence from geographic variation in pollution shocks induced by a recession. *The quarterly journal of economics*, *118*(3), 1121-1167.

Cherlin, A., Cumberworth, E., Morgan, S. P., & Wimer, C. (2013). The Effects of the Great Recession on Family Structure and Fertility. *The ANNALS of the American Academy of Political and Social Science*, *650*(1), 214-231.

Colman, G., & Dave, D. (2013). Exercise, physical activity, and exertion over the business cycle. *Social Science & Medicine*, *93*, 11-20.

DeNavas-Walt C, Proctor BD, Smith JC. *Income, poverty, and health insurance coverage in the United States: 2011* (2012). Washington, DC: Government Printing Office, 2012.

Dave, D. M., & Kelly, I. R. (2012). "How does the business cycle affect eating habits?" *Social Science & Medicine*, *74*(2), 254-262.

Dooley, D., Catalano, R., & Rook, K. S. (1988). Personal and aggregate unemployment and psychological symptoms. *Journal of Social Issues*, *44*(4), 107-123.

Dooley, D., Fielding, J., & Levi, L. (1996). Health and unemployment. *Annual review of public health*, *17*(1), 449-465.

Douglass, W. A., & Raento, P. (2004). The tradition of invention: conceiving Las Vegas. *Annals of Tourism Research*, *31*(1), 7-23.

Eadington, W. R. (2011), After the Great Recession: The future of Casino Gaming in America and Europe. Economic Affairs, 31: 27–33. doi: 10.1111/j.1468-0270.2010.02044.x

Egan, M., Daly, M., & Delaney, L. (2016). Adolescent psychological distress, unemployment, and the Great Recession: Evidence from the National Longitudinal Study of Youth 1997. *Social Science & Medicine*, *156*, 98-105.

Finkelstein, A., Taubman, S., Wright, B., Bernstein, M., Gruber, J., Newhouse, J. P., ... & Baicker, K. (2011). *The Oregon health insurance experiment: evidence from the first year* (No. w17190). National Bureau of Economic Research.

Fletcher, J. (2013). Adolescent depression and adult labor market outcomes. *Southern Economic Journal,* 80(1), 26-49.

French, M. T., & Davalos, M. E. (2011). This recession is wearing me out! Health-related quality of life and economic downturns. *Journal of Mental Health Policy and Economics*, *14*, 61-72.

Gerdtham, Ulf-G, and Christopher J. Ruhm. (2006). "Deaths Rise in Good Economic Times: Evidence from the OECD." *Economics and Human Biology*, 4(3): 298-316.

Glaeser, E. L., & Shapiro, J. M. (2001). *City growth and the 2000 census: Which places grew, and why*. Brookings Institution, Center on Urban and Metropolitan Policy.

Gore, S. (1978). The effect of social support in moderating the health consequences of unemployment. *Journal of health and social behavior*, 157-165.

Granados, J. A. T. (2005). Increasing mortality during the expansions of the US economy, 1900–1996. *International Journal of Epidemiology*, *34*(6), 1194-1202.

Hardcastle, J. (2012). Nevada County Certified Population Estimates July 1, 2000 to July 1, 2012. Includes Cities and Towns. Retrieved September 7, 2014.

Jahoda, M. (1981). Work, employment, and unemployment: Values, theories, and approaches in social research. *American psychologist*, *36*(2), 184.

Jenkins, S. P., Brandolini, A., Micklewright, J., & Nolan, B. (Eds.). (2012). *The Great Recession and the distribution of household income*. Oxford University Press.

Jin, R. L., Shah, C. P., & Svoboda, T. J. (1995). The impact of unemployment on health: a review of the evidence. *CMAJ: Canadian Medical Association journal*, *153*(5), 529.

Kaiser Family Foundation. (2010). "The Uninsured: A Primer." Available at: http://www.kff.org/uninsured/upload/7451-06.pdf.

Kaiser Family Foundation. (2011). "Costs Of Employer Insurance Plans Surge in 2011"Retrieved 15 October2014 from http://kaiserhealthnews.org/news/employer-health-coverage-survey-shows-employer-spending-spike/

Kaiser Family Foundation. (2014). "Employer-Sponsored Family Health Premiums Rise 3 Percent in 2014." Retrieved 15 October2014 from http://kff.org/health-costs/press-release/employer-sponsored-family-health-premiums-rise-3-percent-in-2014/

Kessler, R. C., Turner, J. B., & House, J. S. (1988). Effects of unemployment on health in a community survey: Main, modifying, and mediating effects. *Journal of social issues*, *44*(4), 69-85.

Las Vegas Convention & Visitors Authority. (2014) Historical Las Vegas Visitor Statistics 1970-2013. Retrieved 10 August 2014 from http://www.lvcva.com/includes/content/images/media/docs/Historical-1970-to-2013.pdf

Leino-Arjas, P., Liira, J., Mutanen, P., Malmivaara, A., & Matikainen, E. (1999). Predictors and consequences of unemployment among construction workers: prospective cohort study. *BMJ*, *319*(7210), 600-605.

Moss, N., & Carver, K. (1998). The effect of WIC and Medicaid on infant mortality in the United States. *American journal of public health*, *88*(9), 1354-1361.

Nevada Workforce Informer. Labor Force 2007-2012. Retrieved on 10 August 2014 from

      http://www.nevadaworkforce.com/cgi/dataanalysis/labForceReport.asp?menuchoice=L

      ABFORCE

Pfeffer, F. T., Danziger, S., & Schoeni, R. F. (2013). Wealth Disparities before and after the Great

      Recession. *The ANNALS of the American Academy of Political and Social Science*, 650(1),

      98-123.

Oh, H., & Reis, R. (2012). Targeted transfers and the fiscal response to the great

      recession. *Journal of Monetary Economics*, *59*, S50-S64.

Rasky, E., Stronegger, W., & Freidl, W. (1996). Employment status and its health-related effects

      in rural Styria, Austria. *Preventive Medicine: An International Journal Devoted to Practice*

      and Theory, 25, 757–763.

Repetti, T., & Jung, S. (2014). Cross-border competition and the recession effect on Atlantic

      City's gaming volumes. UNLV Gaming Research & Review Journal, 18(2), 23-38.

Ross, C. E., & Mirowsky, J. (1995). Does employment affect health?. *Journal of Health and Social*

      Behavior, 230-243.

Ruhm, Christopher. (2000). "Are Recessions Good for Your Health?" *Quarterly Journal of*

      Economics, 115(2): 617-50.

Ruhm, Christopher. (2005). Healthy living in hard times. *Journal of health economics*, *24*(2), 341-

      363.

Ruhm, Christopher and William E. Black. (2002). "Does Drinking Really Decrease in Bad Times?"

      Journal of Health Economics, 21(4): 659-78.

Schneider, D., Harknett, K., & McLanahan, S. (2014). Intimate Partner Violence in the Great

      Recession.

Schwartz, David G., and Rajnoor, Alexis (2014). Las Vegas Strip Casino Employment:

      Productivity, Revenues and Payrolls, a Statistical Study, 1990-2013. Las Vegas: Center for

      Gaming Research, University Libraries, University of Nevada Las Vegas.

Schwarzer, R., Jerusalem, M., & Hahn, A. (1994). Unemployment, social support and health

      complaints: A longitudinal study of stress in East German refugees. *Journal of*

      Community & Applied Social Psychology, *4*(1), 31-45.

Suhrcke, M., & Stuckler, D. (2012). Will the recession be bad for our health? It depends. *Social science & medicine*, *74*(5), 647-653.

Turner, J. B. (1995). Economic context and the health effects of unemployment. *Journal of Health and Social Behavior*, 213-229.

U.S. Census Bureau, American Factfinder, Profile of General Population and Housing Characteristics: 2010 Demographic Profile Data (DP-1): Las Vegas city, Nevada". U.S. Census Bureau, American Factfinder. Retrieved July 9, 2014.

U.S. Census Bureau; (SAHIE) Small Area Health Insurance Estimates; Nevada. Retrieved 11 September 2014. Available at: http://www.census.gov/did/www/sahie/data/interactive/#view=data&utilBtn=&yLB=3 &stLB=29&aLB=0&sLB=0&iLB=0&rLB=0&countyCBSelected=true&insuredRBG=pu_&mul tiYearSelected=false&multiYearAlertFlag=false

U.S. Dept. of Housing and Urban Development (HUD) (2003). Analysis of the Las Vegas, Nevada Housing Market as of January 1, 2003. Retrieved 1 October 2014 from http://www.huduser.org/publications/pdf/CMAR_Las_Vegas.pdf

U.S. Dept. of Housing and Urban Development (HUD) (2014). Housing Market Profiles: Las Vegas, Nevada. Retrieved 1 October 2014 from http://www.huduser.org/portal/periodicals/USHMC/reg/LasVegasNV_HMP_Feb14.pdf

U.S. Dept of Labor (DOL) (2010) COBRA Insurance Coverage Since the Recovery Act: Results From New Survey Data. Available at: http://www.treasury.gov/resource-center/economic-policy/Documents/cobra%20final%20report.pdf

Xu, X. (2013). The business cycle and health behaviors. Social Science & Medicine, 77, 126-136.

CURRICULUM VITAE

Ariana D. Goertz

Email: arigoertz@gmail.com

Education

University of Nevada, Las Vegas
MPH, Epidemiology and Biostatistics, December 2017

University of New Mexico
B.S., Anthropology, May 2011
B.A., American Studies, May 2009