Unemployment and Health

(Final Report Submitted to SCAQMD)

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December 2015

Executive Summary

The literature on the relationship between unemployment and health can be divided into two main groups. The studies in the first group emphasize the impact of an individual's own job loss on health, and those in the second group consider the impact of local unemployment, most typically measured at the state level. With respect to the first group of research, the evidence strongly indicates that individuals who lose their jobs are at increased risk of a range of health problems including mortality. The likely explanations offered for this finding include material factors influenced by unemployment (e.g., loss of health insurance) and the psychosocial effects of unemployment (e.g., increased stress and depression).

With respect to the second group of research, the seminal work by Ruhm (2000) and the subsequent research conducted by him and others indicates that health improves and the rate of mortality declines during times of high unemployment. Many researchers including Ruhm raised the possibility of changes in certain health behaviors as a potential explanation for this relationship, arguing that several negative health behaviors such as cigarette and alcohol consumption might decrease during recessions due to reduced income available to purchase them. However, recent studies discovered that the relationship between health and local unemployment was primarily driven by individuals who are at the low and the high ends of the age distribution rather than adults of prime-working age. These studies interpreted this finding as evidence against the role of changes in health behaviors associated with unemployment. Instead they emphasized the role of external factors associated with decreased economic activity, e.g., environmental pollution, as a potentially more credible explanation. However, there remain clear gaps in

the literature, particularly related to role of these external factors. More analysis, especially with richer data, is needed in order to better understand the relative influences of various channels including external factors as well as individual behaviors in explaining the unemployment and health relationship.

Finally, we used individual level data from the Behavioral Risk and Surveillance System (BRFSS) to examine the relationship between unemployment and health in California. Our results indicate that the relationship between local unemployment measured at the county level and health and health behaviors is too small to have any meaningful implications. This pattern appears to be true for both the state of California as a whole and for the SCAQMD counties including Los Angeles, Orange, Riverside, and San Bernardino. When we measure unemployment at the individual level however, the relationship appears to be negative for both physical and mental health. In particular, both the short-term (being unemployed for less than one year) and long-term (being unemployed for longer than one year) have negative impacts on self-reported measures of physical and mental health. Taken together, these results indicate that county unemployment rate itself has no impact on health, while unemployed individuals have worse health than those who are employed regardless of county unemployment rate. It is important to note that the estimate of the impact of own unemployment on health is likely to be overestimated to the extent that unemployed and employed individuals differ from each other in many respects, which may be associated with health. Some of these differences are accounted for by the analysis conducted in this study. However, given the non-experimental nature of our data, there is always the possibility of remaining omitted omitted characteristics in an analysis. Finally, we conducted a similar analysis for the

mortality rate using data from the U.S. Vital Statistics. The results from this analysis reveal that mortality is procyclical in California and the SCAQMD counties, i.e., the mortality rate increases as unemployment decreases.

Based on these findings, we conclude that fluctuations in the local unemployment rate are unlikely to be associated with health and health behaviors in any meaningful manner, at least for the state of California. The results of this study are largely in line with the accumulated evidence produced by the large literature on this subject. However, caution should be exercised in making specific policy formulations using the results of this study since this is still the first empirical analysis of the relationship between unemployment and health that is explicitly focused on the state of California and the SCAQMD counties.

I. Literature on the Relationship between Unemployment and Health

1. Introduction

There is a substantial literature examining the relationship between unemployment and health that spans across multiple disciplines including economics and epidemiology. The studies in this literature vary on a range of dimensions including the

- choice of datasets (e.g., survey data versus administrative records)
- measures of health (e.g., mortality, measures of physical and mental health, and health behaviors) and unemployment (e.g., individual experience of job loss versus average unemployment measured at the local labor market level)
- time periods (e.g., one-time events like a mass layoff or an establishment closing versus panels of time series) and geographic levels of analysis (e.g., a single country or state versus multiple countries) considered
- methodological approaches (e.g., cross-sectional versus panel data methods).

As it is illustrated below, the choice of these factors influence both the strength and the direction of the relationship between unemployment and health estimated in the literature. However, there is also a considerable degree of agreement in the literature, at least along two dimensions. First, the studies that consider the relationship between an aggregate measure of unemployment (e.g., unemployment to population ratio in a person's area of residence) and health or health behaviors usually document a positive relationship between the two, i.e., measures of health and health behaviors tend to improve as the local unemployment increases or during recessions. This pattern also holds for mortality, which has been shown to decrease during periods of high unemployment. In contrast, the studies in the second group, which focus on the

relationship between an individual's own experience of job loss and health typically document a negative association between the two.

At first, these two general findings seem to contradict with each other. However, there are conceptual reasons why the individual and the local impacts of unemployment on health or health behaviors need not be parallel to each other. As it is explained below, the potential pathways through which an individual's own experience of job loss and the local unemployment could influence health are multi-faceted and often interacting with each other in complex ways that could result in contradictory effects. For example, at times of high unemployment, health may improve due to the influence of external factors (e.g., less air pollution associated with reduced industrial production) for all working age-adults regardless of whether they are employed or not as well as children and the elderly who would have weak labor market attachment. Furthermore, there may also be an increase in health-promoting behaviors (e.g., decreased smoking or problematic alcohol use) among people who become unemployed due to a loss of income. Similarly, decreased work hours may allow people to allocate more time towards health investment behaviors such as increased physical activity or cooking home meals. In contrast, an individual's own job loss may also result in worse health through material effects of unemployment such as the loss of health insurance and disruptions to the access of goods and services essential for good health as well as the psychosocial effects of unemployment such as stress. In this review, we discuss briefly some of these pathways and then move onto a summary of the scientific evidence on the relationship between unemployment and health. This review is not meant to be an exhaustive survey of the entire literature, but rather it is intended to represent a summary of a representative list of

contributions made primarily by economists and to a lesser extent epidemiologists while including some of the seminal work on the topic.

2. How can Unemployment Affect Health?

At the individual level, it has been typically conjectured that unemployment is a stressful life experience, and therefore it should have a negative effect on both physical and psychological health.[1] Stress, which serves as a mediating factor in this case, has been shown to affect health both by depressing the immune system and through the direct influence of "stress hormones" on factors including blood pressure and cardiovascular health. Furthermore, stress can also have harmful consequences on health through psychological responses such as depression.

Another primary channel through which individual experience of unemployment can lead to poor health is income. The association between income and health is well explored in the economic literature and there is consensus that the two are strongly and positively correlated (e.g., Ettner, 1996; Frijters et al., 2005; Lindahl, 2005; Pritchett and Summers, 1996; Schmitz, 2011; Smith, 1999).[2] The loss of income resulting from unemployment can cause poor health as individuals may decide to scale back their utilization of preventive medical care in an attempt to cut their overall expenses (e.g.,

[1] See for example Beland et al. (2002), Brenner (1979), Brenner and Mooney (1983), Burgard et al. (2007), Catalano and Dooley (1983), Cooper (2005), Goldberger and Breznitz (1993), Fenwick and Tausig (1994), Linn et al., (1985), McEwen (1998a, 1998b), and Schneiderman et al. (2005).

[2] This literature must confront two empirical challenges. First, low-income individuals may also have other characteristics besides having low income that contribute to their poor health, and failing to account for those other characteristics might lead to biased estimates of the impact of income on health. Second, ill health may cause low income. For example, the likelihood of becoming unemployed and therefore having reduced income is likely to be higher among workers with poorer health. In that case, a negative relationship between income and health might reflect spurious correlation rather than causality.
One way to address these problems is to identify events that create a random variation in income across individuals and then relate changes in income caused by those events to health outcomes. As examples, two recent studies exploit changes in income generated by increases in the Earned Income Tax Credit and show a positive impact of income on health (e.g., Evans and Garthwaite, 2010; Hoynes et al., 2012).

Feinstein, 1993; Lusardi et al., 2010; Williams and Collins, 1995). Furthermore, most Americans, especially those under age 65, rely on health insurance offered by their employers. In a recent study Cawley et al. (2011) estimated that 9.3 million adult Americans lost health insurance due to a higher unemployment rate during the most recent recession. For these individuals, the loss of a job could mean that they effectively have no health insurance. Lack of health insurance can then prevent them from accessing needed health services. To support this notion, Lusardi et al. (2010) showed that the use of routine non-emergency medical care not only decreased during the great recession in the United States, but it also decreased at a higher rate than it did in countries like Great Britain, Canada, France, and Germany, which all have universal health care systems.

Reduced income can also result in worse health by inducing individuals to engage in unhealthy behaviors such as increased consumption of calorie-dense and low-nutrient food such as pizza and fast food as compared to healthier, but relatively more costly food items, such as fruits and vegetables (e.g., Ásgeirsdóttir et al., 2014); Böckerman et al., 2007; Colman and Dave, 2014; Currie and Tekin, 2015; Wall et al., 2012).

Aside from an individual's own experience of job loss, aggregate unemployment, measured at the local or national level, can also have a negative impact on health. For example, deteriorating economic conditions expressed by rising unemployment can elevate stress and depressed mood among unemployed individuals as their prospects for re-employment diminish (e.g., Dooley et al., 1988, McKee-Ryan et al., 2005). Similarly, there could also be an adverse impact on the health of employed individuals as they may experience higher levels of stress due to fears of losing their own jobs (e.g., Dooley et al., 1988).

Additionally, an increase in unemployment can also deepen the budgetary challenges faced by local government organizations that provide services of public health. For example, local health departments perform many functions that are essential for community health such as preventing communicable disease outbreaks, ensuring the safety of food handling in schools and restaurants, preparing for and responding to natural disasters and other emergencies. The ability of these agencies to provide some of these critical and core public health services might be undermined during periods of high unemployment. To support these concerns, Willard et al. (2012) showed that 53 percent of local health departments experienced cuts to their funding streams during the most recent recession in the United States.

However, there is also a wide range of reasons why health may actually improve during times of high unemployment or temporary economic downturns. For example, it could be that recessions are times when the opportunity cost of time (i.e., the salary income that could have been earned from working) decreases. In other words, when people become unemployed, the relative cost of time-intensive activities may go down and people may find more time to spend on health-enhancing investments. For instance, individuals may be able to shift their allocation of time in a way to favor activities that are health-promoting for both themselves and those around them such as physical exercise, sleep, or preparing healthy meals, time spent on caring for others (e.g., Aguiar et al., 2011; Biddle and Hamermesh, 1990; Colman and Dave, 2013; Roth et al., 2013; Ruhm, 2000; 2003, 2005a; Tekin et al., 2013).

It has also been suggested that reduced hours of work or job-loss during economic downturns may protect people against negative mental and physical health effects

associated with work-related stress, physical exertion of employment, commuting time, and increased exposure to hazardous working conditions (e.g., Gerdtham and Ruhm, 2006; Ruhm, 2000; Tapia Granados et al., 2014). Relatedly, decreases in industrial production and transportation during periods of high unemployment might lead to fewer workplace injuries and fatalities as well as decreased environmental health risks such as air pollution (Karasek and Theorell, 1990; Sokejima and Kagamimori, 1998; Chay and Greenstone, 2003; Burgard et al., 2013; Tapia Granados et al., 2014; Liu et al, 2002; Davis et al., 2010). Finally, reduced income attributable to unemployment may prevent individuals from engaging in certain health-harming behaviors such as cigarette smoking, illicit drug use, excessive alcohol consumption, and high calorie/high fat restaurant meals (e.g., Ettner, 1996; Ruhm, 2000, 2005a; Ruhm and Black, 2002;).

3. Evidence on the Relationship between Health and Local Unemployment

Studies in this body of the literature relate fluctuations in the local unemployment rate, typically measured at the state level, to the outcomes of health and health behaviors of individuals. Most of these studies consider mortality as the primary measure of outcome for health and find that an increase in local unemployment is associated with a reduced rate of mortality, i.e., mortality is procyclical (e.g., Ruhm, 2000, 2005b, 2007; Tapia Granados et al. 2014). This paradoxical finding has been documented for other high- and middle- income countries including Canada (e.g., Ariizumi and Schirle, 2012), France (e.g., Buchmueller, et al., 2007), Germany (e.g., Neumayer, 2004), Japan (e.g., Tapia Granados, 2008), Mexico (e.g., Gonzalez and Quast, 2011), Spain (e.g., Tapia Granados, 2005), OECD countries in general (e.g., Gerdtham and Ruhm, 2006), and

Asia-Pacific-Asian nations (e.g., Lin, 2009).[3] One major exception to the finding of procyclical mortality is the number of deaths from suicide, which have been shown to increase during recessions (e.g., Nandi et al., 2012; Ruhm, 2000; Tapia Granados and Diez Roux, 2009).

Arguably the most influential study in this literature is Ruhm (2000), which raised the surprising possibility that health and health behaviors could actually improve during recessions. Using aggregate data for a panel of the 50 states and the District of Columbia over the period of 1972 and 1991, Ruhm found that the mortality rate in the United States followed a procyclical pattern. More specifically, he showed that a one-percentage point increase in the state unemployment rate was on average associated with a 0.5 to 0.6 percent decrease in total mortality, translating into a reduction of appoximately 11,000 fatalities annually. Ruhm also obtained similar patterns for eight of the ten specific causes of mortality that he considered, including major cardiovascular diseases, pneumonia or influenza, chronic liver disease and cirrhosis of the liver, motor vehicle accidents, homicides, infant mortality (deaths within the first year), and neonatal mortality (deaths within the first 28 days). An important exception in his findings was suicide, which followed an opposite pattern, i.e., it was countercyclical, meaning that the number of deaths from suicide actually increased during economic downturns. The only other exception in his results was deaths from cancer, which showed no statistically significant pattern. Ruhm interpreted the inconsequential result on cancer deaths as an anticipated finding since cancer progression is unlikely to be significantly affected by conditions of

[3] The evidence of procyclical mortality is documented by the majority of studies in the literature, though there are also a few exceptions. These studies show either no relationship between unemployment and health or report that the relationship is rather counter-cyclical (e.g., Economou et al., 2007).

the local economy, at least in the short term.

Aside from its findings, Ruhm (2000) is also an important study in terms of representing the first careful attempt in the literature to account for the confounding factors that might be associated with both the fluctuations in unemployment and health. This issue is important because states differ from each other not only in their unemployment rate, but in so many other ways as well. Therefore, it is inconceivable to attribute the differences in health across states to differences in unemployment without appropriately accounting for those confounding factors. Ruhm did that by taking advantage of a panel dataset, which allowed him to relate within-state changes in unemployment to within-state changes in health, rather than comparing states with high unemployment rates to those with low unemployment rates. Studies prior to Ruhm (2000) mostly relied on national time series data and thus failed to account for the effect of those unobserved factors appropriately.

The evidence of procyclical mortality found in Ruhm (2000) has largely been substantiated in a series of follow up papers by Ruhm (e.g., Ruhm 2003, Ruhm 2005a, Ruhm 2007) and echoed by others as well. For example, Dehejia and Lleras-Muney (2004) showed that babies conceived in times of high unemployment had a reduced incidence of low and very low birth weight, fewer congenital malformations, and lower postneonatal mortality. The authors attributed these findings to improvements in health behaviors, increased use of prenatal care during recessions and due to selection bias i.e., changes in types of mothers who conceive babies during recessions. The Dehejia and Lleras-Muney (2004) is interesting not only in terms of its findings, but also for demonstrating that economic conditions could influence the health of individuals even

when they are in utero. Miller and Urdinola (2010) and Aparicio and Gonzales (2013 obtained similar results for Colombia and Spain, respectively, although there are also a few other studies, which documented opposite results for Argentina (e.g., Bozzoli and Quintana-Domeque, 2014) and India (e.g., Bhalotra, 2010). Therefore, more research is needed to better understand if unemployment plays a role in determining fetal health.

As mentioned above, most of the literature on unemployment and health consider mortality as the primary measure of health. One exception to this is another Ruhm study, which used data from the 1972–1981 National Health Interview Surveys (NHIS) to investigate how health status and medical care utilization fluctuated with state macroeconomic conditions measured by the state unemployment rate (Ruhm, 2003). According to this study, physical health improved during recessions and deteriorated during economic expansions, despite a protective health effect associated with increased income and a potential increase in access to medical care during periods of economic growth. This finding was especially pronounced for individuals of prime-working age, employed persons, and males.

Interestingly, Ruhm's analysis also showed mental health worsened during recessions. While the result on mental health appears to contradict that on physical health, it is consistent with the finding of a positive relationship between suicides and the unemployment rate, which was obtained by Ruhm (2000). Ruhm's finding that mental health worsens during times of high unemployment is generally supported by more recent studies as well (e.g., Charles and DeCicca, 2008; Davalos and French, 2011; Tefft, 2011).

3.A. The Role of Health Behaviors

Ruhm's initial publication in 2000 has spawned a large wave of research motivated by a goal to provide explanations for the estimated pattern of procyclical mortality. The main focus of this research was to investigate whether changes in health behaviors provided a potential mechanism for the mortality response obtained by Ruhm and others. The central hypotheses in this research are that (i) higher unemployment may allow people to spend more time for health investments (e.g., preparing home meals, increased physical exercise); (ii) reduced income caused by unemployment may prevent individuals from consuming health-harming goods such as alcohol, illicit drugs, and high calorie/high fat restaurant meals; (iii) reduced work and work hours may protect people against job-related strain and decrease the prevalence of stress-induced illnesses, both physical and mental.

Majority of these studies used data from the Behavioral Risk and Surveillance System (BRFSS), a dataset that is considered the most comprehensive source of information on the U.S. population with respects to individual health-related risk behaviors, chronic health conditions and use of preventive services.[4] There is a wide range of outcomes of health behaviors considered including smoking, alcohol consumption, physical exercise, and dietary behavior. The overall evidence obtained in this literature is one that is supportive of the above hypotheses, i.e., most health related behaviors improve during times of high unemployment. For example, in a series of studies Ruhm showed that excessive alcohol consumption, smoking, and excess weight

[4] The BRFSS is run by the Center for Disease Control and Prevention and is an on-going health survey system tracking health conditions and risk behaviors in the United States since 1984. Steadily expanding from 15 states in 1984, the BRFSS is a representative telephone survey that currently provides coverage of all 50 states and the District of Columbia. Over the course of each year, the BRFSS contacts over 200,000 individuals to create a repeated annual cross section.

declined in recessions using data from the BRFSS (Ruhm, 2000; 2005a Ruhm and Black, 2002).

Research employing data sources other than the BRFSS usually obtained` similar conclusions, although there appears to be less uniformity in these findings. For example, Ettner (1996) used data from the 1988 National Health Interview Survey (NHIS) and found that non-employment significantly reduced both alcohol consumption and dependence symptoms, possibly due to an income effect. Along similar lines, Charles and DeCicca (2008) used data from the NHIS for the years 1997-2001 to obtain evidence of a procyclical relationship for weight-related health and mental health among men. In an earlier study, Ruhm (2005) showed that alcohol-related traffic fatalities declined during periods of high unemployment.

There are also studies that focus on periods of recent economic crises suffered by several European countries. However, the evidence from these studies is rather mixed with no consensus. For example, Ásgeirsdóttir et al. (2014) examined the effect of the 2008 economic crisis in Iceland on a range of health behaviors and found that the crisis led to reductions in health-compromising behaviors, including smoking, heavy drinking, consumption of sugared soft drinks and fast food, and indoor tanning. Furthermore, the authors showed that the crisis reduced consumption of fruits and vegetables, but interestingly increased purchases of fish oil and the recommended hours of sleep per night. On the other hand, Böckerman et al. (2007) explored the relationship between weight and economic conditions using Finnish data from the period of 1978-2002 and found that improvements in economic conditions measured by regional unemployment rates resulted in a decrease in Body Mass Index (BMI).

Finally, there are two recent studies that deserve mention. In particular, Miller et al. (2009) and Stevens et al. (In press) explicitly call into question the evidence of procyclical mortality obtained by Ruhm and others by replicating this finding. But then they also attempt to explore the mechanisms that are most likely to contribute to procyclical mortality. In doing so, they place a heavy emphasis on distinguishing between the roles of health behaviors resulting from changes in an individual's own job-loss and those related to changes associated with the overall business cycle. To accomplish this, the authors focus on detailed mortality rate decompositions by age, sex, race, and cause of death, and investigate the relationship between a particular demographic group's mortality rate and the unemployment rate of that group relative to the unemployment rates of other demographic groups.

Miller et al. (2009) started with replicating Ruhm's original analysis in his seminal paper in 2000, which was based on data from 1972–1991, and then built on his work by extending the analysis through 2004. One of the main conclusions of their analysis is that the primary causes of death contributing to procyclical mortality variation among working-age adults mostly stems from additional motor vehicle accidents rather than stress or health behaviors. This indicates that changes in individuals' own employment status or health behaviors are unlikely to be the key determinants of aggregate mortality changes associated with business cycle fluctuations. Decompositions by age further revealed that the elderly contributed to overall procyclical mortality fluctuations more than those individuals at prime-working age. Again this observation is consistent with the notion that individuals' own experience of job loss is unlikely be a key mechanism behind procyclical mortality. The authors concluded that external factors

associated with business cycle fluctuations such as reduced pollution and traffic accidents were likely to be the primary factors responsible for generating procyclical mortality.

These findings are largely echoed in another investigation by Stevens et al. (In press), which showed that factors related to individuals' own behavior contributed very little to procyclical mortality. Similar to Miller et al. (2009), Stevens et al (In press) started with reproducing the results of Ruhm (2000) and then extended his analysis by showing that most of the additional deaths that occured during times of economic expansion were among the elderly, particularly the elderly women, a demographic group with a particularly weak labor force attachment. The authors then posited that the fluctuations in the quality of health care might be a more plausible explanation for the procyclical mortality among the elderly. To test this hypothesis, they demonstrated that the negative relationship between unemployment and mortality was especially strong for deaths occurring in nursing homes, and was even stronger in states where a higher proportion of the elderly lived in nursing homes. Then they referred to evidence indicating that nursing homes experienced severe shortages of skilled nursing aides during times of strong economic growth and that these staffing shortages caused restrictions on the volume and the quality of business at these facilities. Taken together, the authors interpreted these findings as an important clue for the mechanism explaining the higher mortality among the elderly during times of low unemployment.

Additionally, both Miller et al. (2009) and Stevens et al. (In press) explicitly mentioned that pollution might likely play an important role in explaining the procyclical mortality rate and emphasized the need for a thorough investigation of this channel. The only study to consider the potential role of pollution in this context is a recent working

paper by Heutel and Ruhm (2013). In this study, the authors gathered state-level data on overall, cause- and age-specific mortality rates with state-level measures of ambient concentrations of three types of pollutants - carbon monoxide (CO), particulate matter (PM10), and ozone (O3) - and the unemployment rate. Then they used these data to explore the extent to which the relationship between mortality and the unemployment rate is moderated by these measures of air pollution. Their analysis showed that controlling for CO, PM10, and O3 alleviated the relationship between overall mortality and the unemployment rate by about 30 percent. However, this finding should be viewed with caution for a number of reasons, which are also acknowledged by the authors of the study. First, any attenuation of the estimated unemployment effect occurring when pollution measures are accounted for might just reflect a spurious correlation between emissions and unobserved factors rather than a causal relationship. Failing to account for such factors might lead to an overstatement of the role that pollution might play in influencing the relationship between unemployment and health. Second, the data requirements for a reliable analysis in this case are particularly demanding since the effects of air pollution depend not only on the level of concentrations, but also on the duration of exposure. Yet the pollution measures that the authors used contained considerable measurement error and came from a limited number of stations within each state. Finally, the authors found the estimates to be quite sensitive to alternative specifications and measures of macroeconomic conditions. Therefore, Heutel and Ruhm (2013) should be interpreted as preliminary and suggestive rather than definitive until further research is done to replicate these findings. Until then, air pollution would remain as a theoretically plausible explanation for the procyclical fluctuations in mortality found

by the previous literature.

3.B. Is the Relationship between Local Unemployment and Health Weakening?

Several recent studies showed evidence that the procyclical relationship between macroeconomic conditions and mortality obtained throughout the literature might be weakening or even reversed in recent years. For example, Ruhm (2015) revisited the aggregate mortality and unemployment relationship using data from multiple sources over the period between 1976 and 2009. His main conclusion is that mortality has shifted over time from being strongly procyclical to being largely unrelated to unemployment.

In another recent study, McInerney and Mellor (2012) examined the relationship between recessions and seniors' health and health behaviors using data from the Medicare Beneficiary Survey. The authors found that the relationship between unemployment and mortality of the elderly was negative for the period of 1976-1991, but then became positive if the analysis focused on the period between 1994 and 2008.

Consistent with Ruhm (2015) and McInerney and Mellor (2012), Tekin et al. (2013) found that the relationship between unemployment and health behaviors became inconsequential during the recent recession using data from the BRFSS between 2005 and 2013. Although the evidence from these studies points to a weakening in the relationship between unemployment and health in recent years, it largely remains a mystery why this might be happening.

4. Evidence on the Relationship between Health and Individual's Own Job-loss

Studies in this body of literature assesses the relationship between an individual's own experience of job loss and a range of health outcomes including physical and mental health, mortality risk, and health behaviors such as smoking, alcohol consumption,

physical activity, and dietary behavior. The earlier investigations in this literature usually made inferences about the health impact of job loss by comparing employed persons with unemployed ones (e.g., Dooley et al., 1988 Janlert et al., 1992; Moser et al., 1984; Peirce et al., 1994). The estimates obtained from these studies are unlikely to be reliable because of at least two statistical problems. First, there may be unobserved individual (e.g., pre-existing health problems or illicit drug use) and contextual factors (e.g., neighborhood crime and poverty) that could be associated with a person's likelihood of being unemployed and health. If not accounted for, these factors may interfere with the causal relationship between unemployment and health, resulting in biased estimates. Most of the recent studies recognize this problem and attempt to address it by employing panel data methods or assessing people's health following events like mass layoffs or plant closings in which the experience of unemployment is unlikely to be related to these confounding factors. Second, the direction of causality may go from health to unemployment since persons with poor health or a higher risk of mortality may also face a higher likelihood of becoming unemployed. Therefore, it may appear in the data as if there is a negative relationship between unemployment and health, but this relationship could only be interpreted as correlation and not as a causal effect. The studies that deal with this problem usually do so by using lagged values of unemployment in the analyses.

Unlike the literature on the impact of aggregate measures of unemployment, which mostly rely on data from the BRFSS, there is more diversity in the datasets employed by the studies of individual experience of unemployment. These studies use a variety of sources including the National Health Interview Survey (NHIS), the Current Population Survey (CPS), the Panel Study of Income Dynamics (PSID) and the National

Longitudinal Survey of Youth 1979 (NLSY79), the Medical Expenditure Panel Survey (MEP), and administrative records of health and unemployment.

The consensus finding in this literature is that an individual's own experience of job loss is associated with a higher likelihood of poor health, both mental and physical, as well as a higher risk of death (Burgard et al., 2007; Noelke and Beckfield, 2014; Strully, 2009; Sullivan and Wachter, 2009; Tapia Granados et al., 2014).

4.A. Mass-Layoffs and Plant Closings

Events like mass-layoffs and plant closings provide a valuable opportunity for researchers to assess the health impact of job loss in a credible manner. This is because these events constitute natural experiments in the sense that the factors leading to job loss are outside the control of the individual employers and importantly unrelated to their health. Therefore, any changes in the health outcomes of displaced workers following a layoff could be attributed to the experience of becoming unemployed, and not to factors related to their health and other personal circumstances or neighborhood characteristics. As summarized below, the evidence from the studies using this approach is largely supportive of the notion that individual job loss has negative impacts on health.

In a well-known and widely cited study, Sullivan and Wachter (2009) used administrative data on the employment and earnings of Pennsylvanian workers in the 1970s and 1980s matched to Social Security Administration death records covering 1980–2006 and estimated the effects of job displacement on mortality. The authors found that the rate of mortality in the year following displacement was between 50–100 percent higher than would otherwise have been expected. Although the effect of job-loss on the likelihood of death decreased over time, as one would expect, there was still a 10-15

percent increase in the likelihood of death associated with displacement even after twenty years.

Similarly, Strully (2009) used data from the 1999, 2001, and 2003 waves of the PSID to examine the impact of job loss from establishment closings on health outcomes. She found that losing a job due to an establishment closure was associated with a 54 percent chance of reporting fair or poor health. Among people with no pre-existing health conditions, job loss increased the chance of a new health problem by 83 percent.

More recently, Noelke and Beckfield (2014) examined whether job loss resulting from layoffs or firm closure affected the risk of mortality using a sample of individuals between ages 45 and 66 drawn from the HRS during the period between 1999 and 2012. The authors found that mortality risk was significantly elevated for individuals experiencing job loss, compared with those who did not lose their job. Interestingly however, this effect was present only during the time of recessions whereas job loss during normal economic times or booms was not associated with any significant change in mortality risk.

In another recent study, Schaller and Stevens (2014) used data from the MEP to examine the short-term effects of job displacement on health outcomes with a particular emphasis on the role of health insurance shocks and changes in medical care utilization in mediating these effects. Using a large longitudinal sample of individuals who lost their jobs due to a lay off or business closure and a wide range of health related outcomes, the authors showed that job loss resulted in worsening rates of self-reported health including mental health, but was not associated with statistically significant increases in chronic conditions. Furthermore, they found that continuing access to health insurance and

medical care played an important role as a mediating factor for the health effects of job loss for displaced workers whenever the lost job was the primary source of insurance.

4.B. Job Loss and Health Behaviors

There is also a related literature on the impact of job loss on health behaviors. The overall evidence from this literature is mixed. The weight of the evidence from this strand of the literature is that the relationship between job loss and health behaviors is complex and multi-faceted, involving varying interactions between responses to changes in available time and income associated with losing a job. Accordingly, the effects do not follow a uniform pattern across various health behaviors and it is not straightforward to make broad generalizations encompassing all types of behaviors. For example, several studies showed that unemployment raised the likelihood of obesity (Leino-Arjas et al., 1999; Marcus, 2014; Virtanen et al., 2008) while others found no statistically significant association (Montgomery et al., 1998). There is also evidence to suggest that reduced hours of work lowered the likelihood of obesity (Berniell, 2012; Courtemanche, 2009). Several studies found that own unemployment was associated with an increase in the likelihood of physical exercise (Berniell, 2012) and a decrease in the consumption of alcohol (Lenio-Arjas et al., 1999).

A number of studies showed that unemployment was associated with a increased probability of smoking (Bolton and Rodriguez, 2009; De Vogli and Santinello, 2005; Henkel, 2011; Marcus, 2014; Novo et al., 2000), a finding that stands in contrast to the evidence obtained from studies using an aggregate measure of unemployment. But then there is also evidence to support the opposite. For example, Xu (2013) combined health data from the BRFSS between 1984 and 2005 and the NHIS between 1976 and 2001 with employment data from the CPS to examine the relationship between wages and hours of

work on health behaviors. He found that higher wages and hours of work observed during economic expansions were associated with increased smoking and less physical activity. Colman and Dave (2014) studied the effects of individual experience of unemployment on a range of health behaviors during the most recent recession using panel data from both the PSID and the NLSY79. The authors found that becoming unemployed was associated with a moderate decrease in smoking as well as a decline in both total physical activity and food expenditures, leading to a small increase in body mass index.

5. Empirical Analysis for the Relationship between Unemployment and Health

5.1. Aim and Data

The purpose of this analysis is to estimate the relationship between unemployment and health and health behaviors. The analysis is performed using data from the Behavioral Risk Factor Surveillance System (BRFSS). The BRFSS designed by the Centers for Disease Control and Prevention is an on-going health survey system tracking the health conditions and risk behaviors in the United States since 1984. Steadily expanding from 15 states in 1984, the BRFSS is a representative telephone survey that currently provides coverage of all 50 states and the District of Columbia. Over the course of each year, the BRFSS contacts over 200,000 individuals to create a repeated annual cross section.

Our analysis is conducted on individuals of prime working age who are between ages 25-54. The analysis covers the period between 2000 and 2012.[5] Following the literature on the subject, self-employed individuals are excluded from the analysis sample as the responses of self-employed individuals to business cycle fluctuations may be different than other populations due to differences in their access to health insurance. We also exclude individuals who are students and homemakers from the analysis sample. After excluding missing observations on key variables, we have around 35,000 observations for the full California. Note however that the size of analysis sample slightly differs determined by the number of observations for each of the outcome variables. Variable definitions and descriptive statistics are presented in Table 1 and Tables 2A-2F,

[5] Note that the BRFSS stopped making county identifiers public starting 2013.

respectively. Table 2A shows the means for the outcome variables for the full California sample and Table 2B displays the means for the sample of non-SCAQMD counties. Finally, descriptive statistics for the counties of San Bernardino, Riverside, Orange, and Los Angeles are presented in Tables 2C-2F, respectively.

5.1.A. Measures of Unemployment

Our first measure of economic conditions is the county unemployment rate at the monthly level derived from the Local Area Unemployment Statistics (LAUS) program of the Bureau of Labor Statistics (BLS). We merge this measure (Unemp) with our analysis sample from the BRFSS. We take the average of this measure over a three-month period because contemporaneous values might not reflect the true economic conditions in a state, but rather capture short-term fluctuations. As shown in Table2A1, the average county unemployment rate was 7.7 percent during our analysis period. Among the four SCAQMD counties, Riverside county appears to have the highest county unemployment rate with 8.5 percent while Orange county has the lowest rate with 5.4 percent.

Our second and third measures of unemployment are at the individual level. The BRFSS asks respondents whether they had been out of work for more than a year or less than a year. We construct two individual level unemployment measures based on responses to these questions: Short-term unemployed (St_Unemp), which is a binary indicator variable, takes on the value of 1 if the respondent reported to have been out of work for less than a year, and 0 otherwise; and Long-term unemployed (Lt_Unemp) is a binary indicator variable constructed similarly for individuals who have been out of work for more than a year. The omitted category in our regression models includes those individuals who are employed. As shown in Table 2A, 5.1 percent of our sample is

unemployed for less than a year and 6.8 percent is unemployed for more than a year in California during our analysis period. Focusing on the SCAQMD counties, San Bernardino county has the highest rate for both short-term and long-term unemployed with 7.5 and 7 percent, respectively, while Orange has the lowest rates with 3.7 and 6.1 percent for short-term and long-term unemployed.

5.1.B. Outcome Variables

Topics included in BRFSS provide an extensive overview of a respondent's current health, health history, and health behaviors. Current health questions range from broad ones, such as those asking about general health, to specific ones, such as questions asking if the respondent snores. Included in this range are questions regarding smoking and drinking behavior, stress, and mental health. Overall, the BRFSS gives a detailed picture of health and health care in the United States. In addition to detailed health questions, the BRFSS provides information on the typical demographic characteristics of its respondents.

One of the domains of outcomes we consider in this analysis is smoking behavior. The “Smoker” outcome is an indicator variable equal to 1 if the respondent is a current smoker, and 0 otherwise. BRFSS provides information on the smoking behavior based on whether the respondent smokes daily, some days, is a former smoker, or has never smoked. The variable “Daily Smoker” indicates whether the respondent smokes every day. As shown in Table 2A, about 16 percent of our sample reported being a current smoker and 10 percent reported being a daily smoker.

Our next set of outcomes is related to excessive alcohol consumption. Specifically, we examine two measures of alcohol use: binge drinking and chronic

drinking. Binge drinking behavior is measured by an indicator variable, which takes on the value of 1 if the respondent drank more than five servings of alcohol in one sitting during the previous month, and 0 otherwise. Similarly, chronic drinking captures behavior among those who report to having 60 or more drinks during the past month. About 19 and 7 percent of our sample fall under the categories of binge and chronic drinkers, respectively.

Next we have three measures that relate to physical activity patterns and dieting. In the BRFSS, the respondents are asked: "During the past month, other than your regular job, did you participate in any physical activities or exercises such as running, calisthenics, golf, gardening, or walking for exercise?" If the respondent reported any physical activity in the past 30 days other than that which he or she does while working, we defined a "Physical Activity" indicator that takes on the value of 1, and otherwise 0. Similarly, the "Overweight" and "Obese" outcomes are indicator variables equal to 1 if the respondent's self-reported height and weight result in a Body Mass Index greater than 25 and 30, respectively.[6] As shown in Table 2A, approximately 78 percent of sample respondents reported having engaged in physical activity, while 25 percent of our sample was obese and 64 percent are overweight. Interestingly, the proportion of sample in SCAQMD counties who are obese and overweight are higher than the rest of the state with about 33 and 71 percent, respectively.

The outcome variables thus far have measured potential channels through which the unemployment can affect health. The next set of outcomes measures the respondent's reported health directly. The outcome of "General Health" captures the respondent's

[6] Body Mass Index is calculated as the ratio of weight in kilograms and height in meters squared.

overall general health at the time of the interview. While the original response is a categorical variable on a Likert scale from 1 to 5, we condense respondent's answers to a binary variable equal to 1 if the respondent is in very good or excellent health, and 0 otherwise. Likewise, the outcomes of "Excellent Health" and "Poor Health" are indicators if the respondent reports being in excellent or poor health, respectively. About 87 percent of the full sample is in either excellent or good health. The proportion in excellent and poor health are 25 and 2 percent, respectively. The figures for SCAQMD counties are in line with these figures.

The next two outcomes focus on the respondent's mental well-being, which includes stress, depression, and problems with emotions over the 30 days preceding the interview. These outcomes are measured by indicator variables equal to 1 if the respondent reports poor mental health for more than 10 or 20 days in the past month, and 0 otherwise. About 13 percent of our sample reported having mental health problems for at least 10 days in the past 30 days, while 6 percent reported having such problems for at least 20 days during that period. The figures for the SCAQMD counties are similar to these figures.

We estimate our models for the full California sample, the combined sample of four SCAQMD counties, and four individual counties separately. Furthermore, we present estimates for the full sample as well as separately by gender (male versus female) and race/ethnicity (whites, blacks, and Hispanics). In some of the analysis for the SCAQMD counties, we also supplement our models with two air pollution measures: (i) number of days during which PM2.5 exceeded the threshold (ii) number of days during

which Ozone exceeded the threshold. The average values for the number of days on which PM2.5 and Ozone exceed the thresholds are 2.13 and 5.83, respectively.

5.1.C. Control Variables

We supplement our analysis with a set of explanatory variables on age, gender, race and ethnicity, marital status, education, and income levels. BRFSS reports income categories of: 1) Under $10,000; 2) $10,000-$14,999; 3) $15,000-$19,999; 4) $20,000-$24,999; 5) $25,000-$34,999; 6) $35,000-$49,000; 6) $50,000-$74,999; and 7) $75,000 and over. For estimation purposes, the respondent's income is first assumed to be the midpoint of the categories or 150 percent of the top category and is then converted to 2010 dollars using the all items CPI.

5.2. Empirical Model

We estimate a series of regressions that relate changes in health and health behaviors to two indicators of individual experience of unemployment, county macroeconomic conditions measured by county unemployment rate, and a vector of individual level characteristics. Specifically, our basic empirical analysis is in the following form:

$$H_{icmy} = \alpha_0 + \alpha_1 Unemp_{cmy} + \alpha_2 St\_Unemp_{icmy} + \alpha_3 Lt\_Unemp_{icmy} + \mathbf{X}_{icmy}\,\alpha_4 + county + month + year + \varepsilon_{icmy}, \quad (1)$$

where H_{icmy} is one of our outcome measures for individual *i* living in county c interviewed in month *m* of year *y* and $\mathbf{X}_{icmy}$ is a vector of individual characteristics. The coefficients of interest in equation (1) are α_1, the effect of county unemployment rate

($Unemp_{cmy}$)on the outcome variables; and α_2 and α_3, the impact of being unemployed for less than a year (St_Unemp_{icmy})and more than a year ($_3Lt\_Unemp_{icmy}$), respectively.

In equation (1), we also control for county fixed effects, "county" which would account for permanent differences across counties that may affect health and health behaviors, such as lifestyles associated with weather patterns, persistent smoking propensities, and county infrastructures on health care and education. Note that the identification of α_1 in equation (1) comes from within county variation in economic conditions over time, rather than fluctuations across counties. In other words, we are not comparing individuals in, let's say high income counties with those in low income counties, but instead those living within the same county.

The "month" is a vector of month fixed effects, which accounts for the seasonality in some of the health behaviors such as physical activity. We also control for year fixed effects, "year", which would capture statewide trends and shocks that may influence health behaviors, such as fluctuations in food and cigarette prices, calorie content in chain restaurants, the reduction in payroll tax in 2010, and federal and state regulations related to health. The ε_{icmy} is an idiosyncratic random error term. We estimate linear probability models using Ordinary Least Squares (OLS) and report robust standard errors clustered at the county and month, assuming that observations are independent across states and months but not within states in a given month.[7] All the regressions are weighted using the BRFSS sampling weights.

[7] It is well-known that least squares estimates of coefficients in linear probability models are consistent estimates of average probability derivatives, but that standard errors are biased as a result of heteroscedasticity. We report standard error estimates that are robust to any form of heteroscedasticity.

Note that we present estimates from three main specifications with respect to the three unemployment measures. The first specification only includes the county unemployment rate. Then we present estimates from a specification that contains all three unemployment variables. Finally, we show estimates from a specification that only includes individual level of unemployment measures, i.e., being unemployed for less than a year and for more than a year.

In equation (1), we account for unobserved heterogeneity correlated with both economic conditions and health behaviors through the set of time variant characteristics gauged by $\mathbf{X}_{icmy}$ and time-invariant factors captured by the county fixed effects. We also estimate our models using county-specific linear time trends in an attempt to account for the confounding factors further. Adding county-specific linear time trends help us account for unobserved factors that vary within counties over time such as changes in health care delivery services that closely follow tax revenues.

One important issue to consider in estimating the relationship between unemployment and health is the potential reverse causality between the two. In particular, people who experience health problems are more likely to face difficulties finding and maintaining jobs. As a result, a simple correlation between unemployment and health would reflect both the causal effect of unemployment on health as well as the likely fact that people with poor health would poor labor market outcomes. Therefore, failing to account for the potential reverse causality would yield biased estimates of the causal impact of unemployment on health. Note that reverse causality is not a concernr for the estimate on the county unemployment variable. This is because it is unlikely that an individual's own health or health behaviors would affect the unemployment rate of the

county in which he/she lives. The issue is likely to be a more serious concern for individual measures of unemployment, St_Unemp and Lt_Unemp. However, we are not using contemporaneous measures in this case, but instead lagged measures that refer to a period one year or more prior to the interview date. Since current health outcomes cannot influence past unemployment experiences, the problem of reverse causality is mitigated in our analysis. However, given that the interrelationship between unemployment and health outcomes is likely to be persistent for many individuals over time, this problem may not be completely eliminated. In this case, our estimates for the effect of St_Unemp and Lt_Unemp would be an upper bound.

Finally, we estimate models controlling for two air pollution measures: (i) number of days during which PM2.5 exceeded the threshold (ii) number of days during which Ozone exceeded the threshold.

5.3. Empirical Results

We begin by presenting the estimates for the full sample of California counties in Tables 3A and 3B. Table 3A presents estimates for the full sample controlling for individual characteristics, county fixed effects, and month and year fixed effects. Table 3B adds county specific linear time trends to the specification in Table 3A. Within each table, we show estimates in three Panels. Panel A present estimates from a specification with county unemployment rate only. Panel B shows estimates from a specification with county unemployment rate as well as the two individual measures of unemployment. Finally, Panel C displays estimates from a specification that only contains the individual experience of unemployment for less than a year and for more than a year. In every

table, we present estimates for all 12 outcome models. To economize on space, we do not show the estimates on other control variables.

As shown in Table 3A, there is little evidence of a statistically significant association between county unemployment rate and the outcomes of health and health behaviors. Furthermore, all of the estimates are too small in magnitude to have any meaningful implications. For example, even if we focus on the models for being "obese" and being excellent health - the only models with statistically significant estimates – a one percentage point increase in the county unemployment rate is associated with a 0.006 (0.606/100) percentage point increase in being obese and 0.006 (0.558/100) percentage point increase in being in excellent health. Aside from the small size of the estimates, the pattern is also not clear. For example, on the one hand, estimates suggest that county unemployment rate is positively associated with being in good physical health and negatively associated with being in poor physical health. On the other hand, the estimates on having mental health problems are both positive suggesting that county unemployment rate is negatively associated with mental health.

Turning to the second panel in which we have all three unemployment variables, we continue to observe that county unemployment is inconsequential for health outcomes. Focusing on the individual measures of unemployment however, we see that the estimates become more precisely estimated. In particular, being out of job lowers the likelihood of being in good or excellent health, being in excellent health and increases the likelihood of being in poor health. Furthermore, the estimates are both positive and significant for both mental health outcomes, suggesting that being unemployed is associated with more days with mental health problems. The evidence on the outcomes

of health behaviors is somewhat mixed. For example, being unemployed increases propensity to be a smoker, but lowers the likelihood of binge drinking. It also appears that physical activity is positively impacted by being unemployed. While this may explain why the negative estimate on being overweight, it is inconsistent with the positive estimate on the likelihood of being obese. A comparison between the estimates on being unemployed for the long-term and the short-term reveals that the impact of job loss on health is typically worse for those who are unemployed for less than one year than those who are without a job for more than one year. While it may appear as counterintuitive, there may be several plausible explanations for this pattern. For example, it may be that individuals develop mechanisms to cope with the adverse effects of unemployment over time by making adjustments in their life styles and behaviors, for instance, by reducing smoking and alcohol consumption. The psychological negative shock associated with losing a job may also be more severe in the short-term than it is in the long-term. Finally, individuals who lose their employment are also likely to lose their health insurance. These individuals may choose not to purchase private health insurance initially in anticipation of finding employment or to preserve their funds. They may also fail to quality for public healthcare programs like Medicaid in the short-term. But as they remain unemployed for a long-term, they may gain eligibility for Medicaid or other publicly available health insurance programs designed to help low-income individuals and their families.

None of the estimates on the county unemployment rate is influenced by controlling for individual measures of unemployment. They are still imprecisely estimated and small in magnitude. One explanation for the results on county

unemployment rate may be that aggregate measures of unemployment indeed has little affect on individual health and health behaviors in California. This is not necessarily very surprising because we probably capture most of the variation across counties using county fixed effects and there may be little variation left in the county unemployment rate to identify any local labor market effects on health. An alternative explanation may be that county unemployment rate is not a very good measure to represent the conditions of the local labor market. Local labor markets do not necessarily follow the same boundaries as counties, so this measure may particularly noisy.

In panel C, we show estimates from a specification in which we drop the county unemployment rate and only control for the two individual measures of unemployment. The estimates on the short and long-term unemployment measures remain almost indistinguishable from those in panel B. This is not surprising giving the null effects of county unemployment rate on health.

The overall pattern remains similar when we control for county-specific linear time trends in Table 3B. That is, the long-term and short-term experiences of individual job loss appears to have detrimental effects on both the physical and mental health of these individuals. Similar to Table 3A, we do not see a consistent pattern for the effects of individual measures of unemployment on health behaviors.

In Tables 4A-4C, we show estimates for the combined sample of four SCAQMD counties. Tables 4A and 4B present estimates without trends and with trends, while Table 4C adds two air pollution measures to the specification in Table 4B. These estimates are largely consistent with those for the full California. County unemployment rate is again mostly insignificant and the estimates are small in magnitude. The

individual measures of unemployment however follow the same pattern observed for California, i.e., experience of unemployment has a negative effect on both physical and mental health. For example, being unemployed for less than one year increases the likelihood of being in poor health by about 4 percentage points, while being without a job for more than a year increases that same likelihood by about 1 percentage point. Estimates are again larger in magnitude for short-term unemployed than long-term unemployed. Somewhat differently from the full California analysis, the estimate on the long-term unemployed are a little less precisely estimated, which is probably due to smaller sample sizes in the analysis with SCAQMD counties. As shown in Table 4C, controlling for the air pollution measures makes no difference to the estimates on the unemployment variables. This is probably due to the fact that there is little variation left in these two variables after we account for county fixed effects as well as county specific linear time trends and also because they are noisy measures of air pollution in the first place.

In Tables 5A and 5B, we present estimates from specifications in which we interact county unemployment rate with an indicator representing the four SCAQMD counties to assess whether the impact of county unemployment rate differs between the SCAQMD counties and the rest of the state. Focusing on our most comprehensive specification shown in Table 5B, which includes county specific trends, we see no statistically significant evidence for a differential impact of county unemployment rate on health as all of the interaction terms are imprecisely estimated and small in magnitude.

In Table 6, we present estimates separately for each of the four SCAQMD counties. We present these estimates only for the specification with short and long-term

unemployment without controlling for the county unemployment rate since that measure does not appear to have any significant implications on health and health behaviors. The emerging picture from Table 6 is that the effects are qualitatively similar among the four counties although there appear to exist some differences in the magnitude of the estimates. Furthermore, the estimates are more precise for the Los Angeles county, probably due to the larger sample size for this county. Also the mental health effects appear to be stronger for the long-term unemployed in Orange and San Bernardino counties than the other two counties, which is a reversal from the previous pattern.

Next we examine whether the estimates of unemployment differ by gender and race/ethnicity. To do this, we estimate our models separately for whites, blacks, and Hispanics as well as males and females. We perform this analysis for the full California sample as well as the combined sample of SCAQMD counties without and with county specific linear time trends. Appendix Tables 1A-1B to 5A-5B present estimates for the full California sample for whites, blacks, Hispanics, males, and females, respectively, for all three panels without trends and then with trends. The estimates suggest that the effects of short-term and long-term unemployment on health is fairly similar across both genders and three race/ethnicity categories.

The results from the same analysis using the combined sample of four SCAQMD counties are presented Appendix Tables 6A-6B to 10A-10B. The summary picture from these tables is that the impact of unemployment on health and health behaviors are felt uniformly across all these five demographic groups. However, the estimates appear to be stronger for males than females. With respect to race and ethnicity, the negative impact of unemployment is particularly strong for blacks than the other two groups, but only for

the short-term, while the long-term effects of unemployment on physical and mental health appear to be relatively small and imprecisely estimated for blacks.

5.4. Summary

The results presented above indicate that the relationship between aggregate level of unemployment and individual health and health behaviors is too small to have any meaningful implications for both the state of California including the four SCAQMD counties. When we measure unemployment at the individual level however, there appears to be a negative relationship between both physical and mental health and being unemployed. In particular, both the short-term (being unemployed for less than one year) and long-term (being unemployed for longer than one year) have negative impacts on self-reported measures of physical and mental health. Furthermore, the effects appear to be stronger among those who are in the short-term unemployed category than those in the long-term unemployed group. There also appears to be significant effects on several measures of health behaviors, although it is unclear if there is a particular pattern. The sub-population analysis by gender and race/ethnicity reveals that the effects are largely consistent across these demographic groups and not driven by a particular gender or race/ethnicity. Similarly, we do not see the effects to be driven by a particular county within the four county region, with a possible exception that those living in Los Angles county appear to be a little more strongly affected by unemployment both in terms of physical and mental health. Finally, the mental health effects of unemployment appear to be stronger for long-term unemployed in Orange and San Bernardino counties than the other two counties.

5.5. Auxiliary Analysis for the Impact of Unemployment on Mortality

As described in the literature review, the majority of the studies on the impact of unemployment on health focus on mortality as the outcome measure. After all, mortality can be considered the most important health outcome. Furthermore, it is measured without any error. To supplement our analysis with the one using the BRFSS data, we next estimate models using county level mortality rates drawn from the U.S. Vital Statistics provided by the National Center for Health Statistics (NCHS). The Vital Statistics records each instance of death based on information from death certificates filed with the vital statistics offices of each state and the District of Columbia. Using data from the 2000-2010 Vital Statistics, we estimate models for the mortality rate (number of deaths per 100,000) as a function of county unemployment rate as well as county, year, and month fixed effects. Similar to the BRFSS analysis, we estimate models with and without county specific linear time trends. In Table 7 we present estimates from regressions that use data from all California counties and in Table 8, we show estimates from regressions restricted to the four SCAQMD counties. Note that the average monthly mortality rate in California is about 61 per 100,000 persons. This figure is slightly lower at about 55 for the four SCAQMD counties. Among the SCAQMD counties, Riverside has the highest mortality rate with 62 followed by San Bernardino with 56, Los Angeles with 52 and Orange county with 50 deaths per 100,000 persons.

The first column in Table 7 indicates that a one percentage point increase is associated with a decrease in mortality rate by 0.80 deaths (79.66/100) per 100,000. Focusing on the second column, the estimate on the interaction term indicates that the impact of unemployment on mortality rate is stronger in the SCAQMD counties as a

whole than the rest of the state. The estimates in the third column allows for the interaction effects to be different for each of the four counties. The estimates suggest that the negative impact of unemployment on mortality rate is strongest for Riverside and San Bernardino than the two other counties. In fact, the interaction term is positive and significant for the Orange county indicating that every additional percentage increase in the unemployment rate increases mortality rate in this county by about 0.34 person compared to the rest of the state. In columns (3)-(6), we estimate the same models controlling for county specific linear time trends. As shown in the table, the estimates become less precisely estimated when we do that. In fact, the impact of unemployment on the mortality rate becomes statistically indistinguishable between SCAQMD counties and the rest of California. But there still appears to be a negative relationship between the mortality rate and unemployment for those living in San Bernardino and Riverside counties.

Finally, in Table 8, we limit our analysis to the four SCAQMD counties. The first two columns present estimates from a specification with county, year, and month fixed effects, but without trends, and column (2) shows estimates with all the fixed effects and trends. Note that we also control for the two measures of air pollution in these models However, similar to the analysis with the BRFSS, the estimates are extremely robust to controlling for these variables. Focusing on the estimates from the most comprehensive specification shown in columns (3) and (4), we see that county unemployment has negative impact on the mortality rate for the SCAQMD region as a whole. According to the point estimate, mortality rate goes down by about 1 per 100,000 in response to a one percentage point increase in unemployment rate. With respect to individual counties, the

effect of unemployment on mortality appears to be strongest for Riverside. For example, a one percentage point increase in unemployment lowers mortality rate by about 0.50 more in the Riverside county than the Los Angeles county. The relationship is not statistically significant between Los Angeles and the two other counties, San Bernardino and Orange.

5.6. Implications

The cost of health care imposes an enormous burden on the U.S. economy, comprising about 17 percent of the annual GDP. For many Americans health insurance is tied directly to employment, so losing a job means losing access to health care, often for one's family as well as oneself. Without access to adequate health care, the health impacts of unemployment would be worsened as people would not be able to seek proper treatment and medication for their conditions. If unemployment has a negative impact on health and health care costs, then policymakers need to factor this into account as they evaluate the costs and benefits of policy responses designed to help unemployed individuals such as the unemployment insurance program.

However, the impact of unemployment extends beyond individuals and families to communities and neighborhoods. High unemployment and poverty go hand in hand. Accordingly, many characteristics of poor neighborhoods such as low-quality housing, restricted access to public transportation and community health services, few recreational services are likely to have negative consequences on health themselves or to amplify the negative impacts of unemployment. Therefore, policymakers must consider these external health costs of unemployment as well when evaluating the benefits and costs of

more comprehensive policy strategies designed to help people find and maintain jobs such as child care subsidies, and training and education subsidies.

The results from the empirical analysis suggest that county unemployment rate itself appears to have no impact on health. However, unemployed individuals have worse health than those who are employed regardless of the county unemployment rate. It is important to note that the estimate of the impact of own unemployment on health is likely to be overestimated to the extent that unemployed and employed individuals differ from each other in many respects, which may be associated with health. Some of these differences are accounted for by our analysis. However, one always risk the possibility of remaining omitted characteristics in an analysis with observational data. Finally, unemployment rate appears to be negatively associated with the county mortality rate, i.e., number of deaths decrease as unemployment increases.

Based on these findings, fluctuations in the local unemployment rate are unlikely to be associated with health and health behaviors in any meaningful manner, at least for the state of California. The results of this study are largely in line with the accumulated evidence produced by the large literature on this subject. However, caution should be exercised in making specific policy formulations using the results of this study since this is still the first empirical analysis of the relationship between unemployment and health that is explicitly focused on the state of California and the SCAQMD counties.

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Table 1: Variable Definitions

Unemployment Variables		
Unemp	:	County unemployment rate (3 month moving average)
St_Unemp	:	1 if the respondent has been out of a job for less than a year, 0 otherwise
Lt_Unemp[a]	:	1 if the respondent has been out of a job for more than a year, 0 otherwise
Outcome variables		
Smoker[b]	:	1 if the respondent is a current smoker, 0 otherwise
Daily smoker	:	1 if the respondent reports smoking every day, 0 otherwise
Binge	:	1 if the respondent drank more than 5 servings of alcohol in one sitting during the previous month, 0 otherwise.
Chronic Drinker	:	1 if the respondent had 60 or more any alcoholic beverage in the past 30 days, 0 otherwise
Physical	:	1 If the respondent reported any physical activity in the past 30 days other than that which he or she does while working, 0 otherwise
Overweight	:	1 if the respondent's body mass index (BMI) $\geq$ 25, 0 otherwise
Obese	:	1 if the respondent's BMI $\geq$ 30, otherwise
General Health	:	1 if the respondent reports good or excellent general health at the time of interview, 0 otherwise
Excellent Health	:	1 if the respondent reports excellent health at the time of the interview, 0 otherwise
Poor Health	:	1 if the respondent reports poor health at the time of the interview, 0 otherwise
Mental$\geq$10[c]	:	1 if the respondent reports to having mental health problems $\geq$10 days past month , 0 otherwise
Mental$\geq$20	:	1 if the respondent reports to having mental health problems $\geq$20 days past month , 0 otherwise

Notes: Sample includes BRFSS individuals who are between ages 25-54 and in the labor force excluding self-employer. The sample covers years 2000-2012. Note that county identifiers are not publicly available starting 2013.

[a] Omitted category includes individuals who are employed.

[b] Includes individuals who smoke every day or some days.

[c] The variable is based on the question "Now thinking about your mental health, which includes stress, depression, and problems with emotions, for how many days during the past 30 days was your mental health not good?"

Table 2A: Descriptive Statistics - All California

Variable	Observations	Mean	Standard Deviation
Smoker	36,543	0.164	0.371
Daily Smoker	36,042	0.104	0.306
Binge	34,806	0.189	0.392
Chronic Drinker	34,073	0.067	0.251
Physical	36,008	0.779	0.415
Overweight	35,509	0.640	0.480
Obese	35,509	0.246	0.431
General Health	36,530	0.868	0.339
Excellent Health	36,530	0.245	0.430
Poor Health	36,530	0.015	0.122
Mental≥10	36,389	0.129	0.335
Mental≥20	36,389	0.061	0.239
Unemp	36,543	0.077	0.035
St_Unemp	36,543	0.051	0.219
Lt_Unemp	36,543	0.068	0.251

Table 2B: Descriptive Statistics - Non-SCAQMD Counties

Variable	Observations	Mean	Standard Deviation
Smoker	22,227	0.164	0.370
Daily Smoker	21,897	0.107	0.309
Binge	21,305	0.193	0.395
Chronic Drinker	20,915	0.071	0.256
Physical	21,942	0.798	0.402
Overweight	21,573	0.633	0.482
Obese	21,573	0.240	0.427
General Health	22,223	0.885	0.319
Excellent Health	22,223	0.262	0.440
Poor Health	22,223	0.015	0.120
Mental≥10	22,136	0.125	0.331
Mental≥20	22,136	0.058	0.234
Unemp	22,227	0.080	0.038
St_Unemp	22,227	0.048	0.213
Lt_Unemp	22,227	0.070	0.254

Table 2C: Descriptive Statistics - San Bernardino County

Variable	Observations	Mean	Standard Deviation
Smoker	2,109	0.185	0.389
Daily Smoker	2,083	0.140	0.347
Binge	2,015	0.198	0.398
Chronic Drinker	1,972	0.077	0.267
Physical	2,079	0.745	0.436
Overweight	2,067	0.714	0.452
Obese	2,067	0.325	0.468
General Health	2,108	0.857	0.350
Excellent Health	2,108	0.224	0.417
Poor Health	2,108	0.020	0.139
Mental≥10	2,101	0.144	0.351
Mental≥20	2,101	0.063	0.244
Unemp	2,109	0.079	0.036
St_Unemp	2,109	0.075	0.263
Lt_Unemp	2,109	0.070	0.255

Table 2D: Descriptive Statistics - Riverside County

Variable	Observations	Mean	Standard Deviation
Smoker	2,068	0.162	0.369
Daily Smoker	2,043	0.104	0.306
Binge	1,991	0.188	0.391
Chronic Drinker	1,946	0.067	0.251
Physical	2,040	0.762	0.426
Overweight	2,015	0.683	0.466
Obese	2,015	0.298	0.457
General Health	2,063	0.861	0.346
Excellent Health	2,063	0.235	0.424
Poor Health	2,063	0.015	0.120
Mental≥10	2,057	0.150	0.357
Mental≥20	2,057	0.079	0.270
Unemp	2,068	0.085	0.036
St_Unemp	2,068	0.056	0.230
Lt_Unemp	2,068	0.069	0.253

Table 2E: Descriptive Statistics - Orange County

Variable	Observations	Mean	Standard Deviation
Smoker	3,119	0.138	0.345
Daily Smoker	3,069	0.082	0.274
Binge	2,942	0.173	0.378
Chronic Drinker	2,880	0.052	0.222
Physical	3,068	0.808	0.394
Overweight	3,027	0.603	0.489
Obese	3,027	0.203	0.403
General Health	3,118	0.868	0.338
Excellent Health	3,118	0.259	0.438
Poor Health	3,118	0.008	0.091
Mental≥10	3,098	0.122	0.328
Mental≥20	3,098	0.057	0.232
Unemp	3,119	0.054	0.022
St_Unemp	3,119	0.037	0.190
Lt_Unemp	3,119	0.061	0.239

Table 2F: Descriptive Statistics - Los Angeles County

Variable	Observations	Mean	Standard Deviation
Smoker	7,020	0.169	0.375
Daily Smoker	6,950	0.099	0.298
Binge	6,553	0.185	0.388
Chronic Drinker	6,360	0.063	0.244
Physical	6,879	0.744	0.436
Overweight	6,827	0.638	0.481
Obese	6,827	0.243	0.429
General Health	7,018	0.838	0.369
Excellent Health	7,018	0.214	0.410
Poor Health	7,018	0.018	0.131
Mental≥10	6,997	0.132	0.338
Mental≥20	6,997	0.063	0.243
Unemp	7,020	0.077	0.028
St_Unemp	7,020	0.055	0.227
Lt_Unemp	7,020	0.066	0.247

Table 3A: Estimates for All California (No Trends)

	Smoker	Daily Smoker	Binge	Chronic Drinker	Physical	Overweight	Obese	General Health	Excellent	Poor	Mental≥10	Mental≥20
Panel A												
Unemp	0.183	0.149	-0.163	0.041	0.402	0.329	0.616*	-0.117	0.558**	-0.047	0.088	0.220
	(0.289)	(0.223)	(0.291)	(0.205)	(0.306)	(0.325)	(0.342)	(0.265)	(0.277)	(0.085)	(0.243)	(0.170)
Panel B												
Unemp	0.129	0.108	-0.137	0.036	0.387	0.342	0.606*	-0.059	0.595**	-0.070	0.010	0.169
	(0.289)	(0.223)	(0.292)	(0.204)	(0.307)	(0.326)	(0.343)	(0.263)	(0.277)	(0.085)	(0.243)	(0.171)
St_Unemp	0.085***	0.060***	-0.046***	0.007	0.018*	-0.024*	0.023**	-0.111***	-0.068***	0.043***	0.118***	0.076***
	(0.012)	(0.011)	(0.011)	(0.007)	(0.010)	(0.012)	(0.012)	(0.011)	(0.009)	(0.006)	(0.013)	(0.010)
Lt_Unemp	0.057***	0.058***	-0.011	0.010	0.021*	-0.016	0.002	-0.024**	-0.021*	0.011***	0.087***	0.058***
	(0.013)	(0.011)	(0.011)	(0.007)	(0.011)	(0.012)	(0.014)	(0.010)	(0.012)	(0.004)	(0.010)	(0.008)
Panel C												
St_Unemp	0.085***	0.060***	-0.046***	0.007	0.019*	-0.024*	0.023**	-0.111***	-0.067***	0.043***	0.118***	0.076***
	(0.012)	(0.011)	(0.011)	(0.007)	(0.010)	(0.012)	(0.012)	(0.011)	(0.009)	(0.006)	(0.013)	(0.010)
Lt_Unemp	0.057***	0.058***	-0.012	0.010	0.021*	-0.016	0.002	-0.024**	-0.021*	0.011***	0.087***	0.058***
	(0.013)	(0.011)	(0.011)	(0.007)	(0.011)	(0.012)	(0.014)	(0.010)	(0.012)	(0.004)	(0.010)	(0.008)
Observations	36,299	35,819	34,571	33,885	35,789	35,290	35,290	36,288	36,288	36,288	36,149	36,149

Notes: Standard errors clustered at the month*year are shown in parentheses. *, **, and *** indicate statistical significance at 10%, 5% and 1%, respectively.

Table 3B: Estimates for All California (With Trends)

	Smoker	Daily Smoker	Binge	Chronic Drinker	Physical	Overweight	Obese	General Health	Excellent	Poor	Mental≥10	Mental≥20
Panel A												
Unemp	-0.232	-0.048	-0.182	0.158	0.440	0.349	0.515	-0.374	0.487	-0.070	0.313	0.203
	(0.331)	(0.283)	(0.357)	(0.221)	(0.398)	(0.373)	(0.392)	(0.339)	(0.334)	(0.115)	(0.278)	(0.211)
Panel B												
Unemp	-0.290	-0.093	-0.161	0.153	0.424	0.364	0.504	-0.312	0.526	-0.094	0.229	0.148
	(0.331)	(0.282)	(0.358)	(0.221)	(0.399)	(0.374)	(0.392)	(0.338)	(0.334)	(0.115)	(0.280)	(0.213)
St_Unemp	0.085***	0.060***	-0.045***	0.007	0.018*	-0.025**	0.023**	-0.110***	-0.067***	0.043***	0.118***	0.076***
	(0.012)	(0.011)	(0.011)	(0.007)	(0.010)	(0.012)	(0.012)	(0.011)	(0.009)	(0.006)	(0.013)	(0.010)
Lt_Unemp	0.056***	0.058***	-0.011	0.010	0.022**	-0.016	0.002	-0.024**	-0.021*	0.012***	0.088***	0.058***
	(0.013)	(0.011)	(0.011)	(0.007)	(0.011)	(0.012)	(0.014)	(0.010)	(0.012)	(0.004)	(0.010)	(0.008)
Panel C												
St_Unemp	0.085***	0.060***	-0.045***	0.007	0.019*	-0.025**	0.023**	-0.110***	-0.067***	0.043***	0.118***	0.077***
	(0.012)	(0.011)	(0.011)	(0.007)	(0.010)	(0.012)	(0.012)	(0.011)	(0.009)	(0.006)	(0.013)	(0.010)
Lt_Unemp	0.056***	0.058***	-0.011	0.010	0.022**	-0.016	0.003	-0.024**	-0.021*	0.012***	0.088***	0.058***
	(0.013)	(0.011)	(0.011)	(0.007)	(0.011)	(0.012)	(0.014)	(0.010)	(0.012)	(0.004)	(0.010)	(0.008)
Observations	36,299	35,819	34,571	33,885	35,789	35,290	35,290	36,288	36,288	36,288	36,149	36,149

Notes: Standard errors clustered at the month*year are shown in parentheses. *, **, and *** indicate statistical significance at 10%, 5% and 1%, respectively.

Table 4A: Estimates for SCAQMD Counties (No Trends)

	Smoker	Daily Smoker	Binge	Chronic Drinker	Physical	Overweight	Obese	General Health	Excellent	Poor	Mental≥10	Mental≥20
Panel A												
Unemp	0.510	0.213	-0.444	-0.013	0.948*	0.012	-0.317	0.340	0.570	0.002	0.414	-0.155
	(0.419)	(0.354)	(0.601)	(0.441)	(0.528)	(0.619)	(0.658)	(0.589)	(0.440)	(0.147)	(0.579)	(0.376)
Panel B												
Unemp	0.504	0.218	-0.439	-0.014	0.957*	0.014	-0.326	0.364	0.591	-0.005	0.412	-0.155
	(0.418)	(0.349)	(0.599)	(0.441)	(0.528)	(0.623)	(0.658)	(0.586)	(0.436)	(0.147)	(0.587)	(0.384)
St_Unemp	0.085***	0.055***	-0.025*	0.013	0.004	-0.026	0.037**	-0.110***	-0.076***	0.042***	0.110***	0.077***
	(0.017)	(0.017)	(0.015)	(0.009)	(0.014)	(0.017)	(0.017)	(0.016)	(0.014)	(0.008)	(0.020)	(0.014)
Lt_Unemp	0.047**	0.054***	-0.007	0.008	0.028*	-0.015	-0.001	-0.014	0.001	0.011*	0.089***	0.069***
	(0.020)	(0.016)	(0.018)	(0.011)	(0.017)	(0.015)	(0.024)	(0.017)	(0.020)	(0.006)	(0.016)	(0.014)
Panel C												
St_Unemp	0.085***	0.055***	-0.026*	0.013	0.005	-0.026	0.037**	-0.110***	-0.076***	0.042***	0.110***	0.077***
	(0.017)	(0.017)	(0.015)	(0.009)	(0.014)	(0.017)	(0.017)	(0.016)	(0.014)	(0.008)	(0.020)	(0.014)
Lt_Unemp	0.047**	0.053***	-0.007	0.008	0.028*	-0.015	-0.001	-0.014	0.001	0.011*	0.089***	0.069***
	(0.020)	(0.016)	(0.018)	(0.011)	(0.017)	(0.015)	(0.024)	(0.017)	(0.020)	(0.006)	(0.016)	(0.014)
Observations	14,236	14,069	13,424	13,096	13,994	13,863	13,863	14,228	14,228	14,228	14,173	14,173

Notes: Standard errors clustered at the month*year are shown in parentheses. *, **, and *** indicate statistical significance at 10%, 5% and 1%, respectively.

Table 4B: Estimates for SCAQMD Counties (With Trends)

	Smoker	Daily Smoker	Binge	Chronic Drinker	Physical	Overweight	Obese	General Health	Excellent	Poor	Mental≥10	Mental≥20
Panel A												
Unemp	0.158	0.195	-0.735	-0.213	0.613	0.312	-0.638	-0.410	0.142	0.079	0.714	-0.551
	(0.623)	(0.529)	(0.871)	(0.534)	(0.743)	(0.797)	(0.930)	(0.894)	(0.650)	(0.199)	(0.772)	(0.508)
Panel B												
Unemp	0.141	0.193	-0.730	-0.215	0.624	0.317	-0.654	-0.369	0.175	0.066	0.696	-0.562
	(0.630)	(0.528)	(0.868)	(0.536)	(0.744)	(0.804)	(0.929)	(0.891)	(0.641)	(0.200)	(0.781)	(0.518)
St_Unemp	0.085***	0.055***	-0.025*	0.013	0.004	-0.026	0.037**	-0.110***	-0.076***	0.042***	0.109***	0.077***
	(0.017)	(0.017)	(0.015)	(0.009)	(0.014)	(0.017)	(0.016)	(0.016)	(0.014)	(0.008)	(0.019)	(0.014)
Lt_Unemp	0.047**	0.054***	-0.007	0.008	0.029*	-0.015	-0.001	-0.015	0.001	0.012*	0.089***	0.069***
	(0.020)	(0.016)	(0.018)	(0.011)	(0.017)	(0.015)	(0.024)	(0.017)	(0.020)	(0.006)	(0.016)	(0.014)
Panel C												
St_Unemp	0.085***	0.055***	-0.025*	0.013	0.004	-0.026	0.037**	-0.110***	-0.076***	0.042***	0.110***	0.077***
	(0.017)	(0.017)	(0.015)	(0.009)	(0.014)	(0.017)	(0.016)	(0.016)	(0.014)	(0.008)	(0.020)	(0.014)
Lt_Unemp	0.047**	0.054***	-0.007	0.008	0.029*	-0.015	-0.001	-0.015	0.001	0.011*	0.089***	0.069***
	(0.020)	(0.016)	(0.018)	(0.011)	(0.017)	(0.015)	(0.024)	(0.017)	(0.020)	(0.006)	(0.016)	(0.014)
Observations	14,236	14,069	13,424	13,096	13,994	13,863	13,863	14,228	14,228	14,228	14,173	14,173

Notes: Standard errors clustered at the month*year are shown in parentheses. *, **, and *** indicate statistical significance at 10%, 5% and 1%, respectively.

Table 4C: Estimates for SCAQMD Counties (With Trends + Air Pollution Controls)

	Smoker	Daily Smoker	Binge	Chronic Drinker	Physical	Overweight	Obese	General Health	Excellent	Poor	Mental≥10	Mental≥20
Panel A												
Unemp	0.110	0.154	-0.742	-0.216	0.637	0.275	-0.642	-0.410	0.130	0.069	0.726	-0.550
	(0.616)	(0.525)	(0.872)	(0.536)	(0.740)	(0.802)	(0.926)	(0.895)	(0.649)	(0.201)	(0.766)	(0.507)
Panel B												
Unemp	0.093	0.151	-0.737	-0.218	0.648	0.280	-0.658	-0.370	0.163	0.056	0.707	-0.561
	(0.623)	(0.524)	(0.868)	(0.537)	(0.742)	(0.809)	(0.925)	(0.891)	(0.639)	(0.203)	(0.776)	(0.517)
St_Unemp	0.085***	0.055***	-0.025*	0.013	0.004	-0.026	0.037**	-0.110***	-0.076***	0.042***	0.109***	0.077***
	(0.017)	(0.017)	(0.015)	(0.009)	(0.014)	(0.017)	(0.017)	(0.016)	(0.014)	(0.008)	(0.019)	(0.014)
Lt_Unemp	0.047**	0.054***	-0.007	0.008	0.029*	-0.015	-0.001	-0.015	0.001	0.012*	0.089***	0.069***
	(0.020)	(0.016)	(0.018)	(0.011)	(0.017)	(0.015)	(0.024)	(0.017)	(0.020)	(0.006)	(0.016)	(0.014)
Panel C												
St_Unemp	0.085***	0.055***	-0.025*	0.013	0.004	-0.026	0.037**	-0.110***	-0.076***	0.042***	0.110***	0.077***
	(0.017)	(0.017)	(0.015)	(0.009)	(0.014)	(0.017)	(0.016)	(0.016)	(0.014)	(0.008)	(0.020)	(0.014)
Lt_Unemp	0.047**	0.054***	-0.007	0.008	0.029*	-0.015	-0.001	-0.015	0.001	0.011*	0.089***	0.069***
	(0.020)	(0.016)	(0.018)	(0.011)	(0.017)	(0.015)	(0.024)	(0.017)	(0.020)	(0.006)	(0.016)	(0.014)
Observations	14,236	14,069	13,424	13,096	13,994	13,863	13,863	14,228	14,228	14,228	14,173	14,173

Notes: Standard errors clustered at the month*year are shown in parentheses. *, **, and *** indicate statistical significance at 10%, 5% and 1%, respectively.

Table 5A: Estimates with SCAQMD Counties Interaction (No Trends)

	Smoker	Daily Smoker	Binge	Chronic Drinker	Physical	Overweight	Obese	General Health	Excellent	Poor	Mental≥10	Mental≥20
Panel A												
Unemp	0.230	0.292	-0.164	0.070	0.095	0.101	0.620*	-0.340	0.621**	-0.017	0.256	0.334*
	(0.307)	(0.251)	(0.316)	(0.207)	(0.348)	(0.344)	(0.355)	(0.278)	(0.294)	(0.098)	(0.245)	(0.173)
Unemp*SCAQMD	-0.075	-0.231	0.002	-0.043	0.495***	0.365	-0.007	0.361**	-0.102	-0.049	-0.273**	-0.186*
	(0.186)	(0.156)	(0.182)	(0.145)	(0.189)	(0.235)	(0.202)	(0.148)	(0.179)	(0.056)	(0.138)	(0.101)
Panel B												
Unemp	0.187	0.258	-0.146	0.065	0.083	0.112	0.613*	-0.296	0.650**	-0.035	0.193	0.293*
	(0.307)	(0.250)	(0.316)	(0.207)	(0.348)	(0.345)	(0.356)	(0.276)	(0.295)	(0.098)	(0.246)	(0.174)
St_Unemp	0.085***	0.060***	-0.046***	0.007	0.018*	-0.025**	0.023**	-0.111***	-0.067***	0.043***	0.118***	0.077***
	(0.012)	(0.011)	(0.011)	(0.007)	(0.010)	(0.012)	(0.012)	(0.011)	(0.009)	(0.006)	(0.013)	(0.010)
Lt_Unemp	0.057***	0.058***	-0.011	0.010	0.021*	-0.016	0.002	-0.024**	-0.021*	0.011***	0.087***	0.058***
	(0.013)	(0.011)	(0.011)	(0.007)	(0.011)	(0.012)	(0.014)	(0.010)	(0.012)	(0.004)	(0.010)	(0.008)
Unemp*SCAQMD	-0.093	-0.242	0.013	-0.045	0.492***	0.370	-0.012	0.384***	-0.088	-0.058	-0.298**	-0.202**
	(0.185)	(0.156)	(0.182)	(0.144)	(0.189)	(0.235)	(0.201)	(0.148)	(0.179)	(0.056)	(0.138)	(0.101)
Panel C												
St_Unemp	0.085***	0.060***	-0.046***	0.007	0.018*	-0.025**	0.023**	-0.111***	-0.067***	0.043***	0.118***	0.077***
	(0.012)	(0.011)	(0.011)	(0.007)	(0.010)	(0.012)	(0.012)	(0.011)	(0.009)	(0.006)	(0.013)	(0.010)
Lt_Unemp	0.057***	0.058***	-0.011	0.010	0.021*	-0.016	0.002	-0.024**	-0.021*	0.011***	0.087***	0.058***
	(0.013)	(0.011)	(0.011)	(0.007)	(0.011)	(0.012)	(0.014)	(0.010)	(0.012)	(0.004)	(0.010)	(0.008)
Unemp*SCAQMD	0.094	0.015	-0.133	0.021	0.575*	0.482	0.602*	0.088	0.561*	-0.093	-0.104	0.092
	(0.301)	(0.228)	(0.298)	(0.219)	(0.304)	(0.348)	(0.356)	(0.264)	(0.288)	(0.084)	(0.255)	(0.177)
Observations	36,299	35,819	34,571	33,885	35,789	35,290	35,290	36,288	36,288	36,288	36,149	36,149

Notes: Standard errors clustered at the month*year are shown in parentheses. *, **, and *** indicate statistical significance at 10%, 5% and 1%, respectively.

Table 5B: Estimates with SCAQMD Counties Interaction (With Trends)

	Smoker	Daily Smoker	Binge	Chronic Drinker	Physical	Overweight	Obese	General Health	Excellent	Poor	Mental≥10	Mental≥20
Panel A												
Unemp	-0.105	0.023	-0.205	0.139	0.268	0.190	0.362	-0.441	0.613*	-0.077	0.344	0.193
	(0.357)	(0.305)	(0.367)	(0.232)	(0.412)	(0.405)	(0.403)	(0.338)	(0.345)	(0.120)	(0.275)	(0.209)
Unemp*SCAQMD	-0.331	-0.186	0.060	0.052	0.446	0.413	0.395	0.174	-0.329	0.020	-0.080	0.025
	(0.292)	(0.234)	(0.319)	(0.173)	(0.314)	(0.338)	(0.306)	(0.290)	(0.316)	(0.097)	(0.246)	(0.184)
Panel B												
Unemp	-0.152	-0.015	-0.190	0.134	0.255	0.201	0.354	-0.394	0.642*	-0.096	0.276	0.149
	(0.356)	(0.304)	(0.367)	(0.232)	(0.413)	(0.406)	(0.404)	(0.335)	(0.346)	(0.120)	(0.276)	(0.209)
St_Unemp	0.086***	0.060***	-0.045***	0.007	0.018*	-0.025**	0.023*	-0.110***	-0.067***	0.043***	0.118***	0.076***
	(0.012)	(0.011)	(0.011)	(0.007)	(0.010)	(0.012)	(0.012)	(0.011)	(0.009)	(0.006)	(0.013)	(0.010)
Lt_Unemp	0.056***	0.058***	-0.011	0.010	0.022**	-0.016	0.002	-0.024**	-0.021*	0.012***	0.088***	0.058***
	(0.013)	(0.011)	(0.011)	(0.007)	(0.011)	(0.012)	(0.014)	(0.010)	(0.012)	(0.004)	(0.010)	(0.008)
Unemp*SCAQMD	-0.361	-0.206	0.076	0.050	0.441	0.422	0.387	0.215	-0.305	0.004	-0.123	-0.003
	(0.290)	(0.232)	(0.319)	(0.173)	(0.313)	(0.337)	(0.306)	(0.291)	(0.315)	(0.098)	(0.248)	(0.185)
Panel C												
St_Unemp	0.086***	0.060***	-0.045***	0.007	0.018*	-0.025**	0.023*	-0.110***	-0.067***	0.043***	0.118***	0.076***
	(0.012)	(0.011)	(0.011)	(0.007)	(0.010)	(0.012)	(0.012)	(0.011)	(0.009)	(0.006)	(0.013)	(0.010)
Lt_Unemp	0.056***	0.058***	-0.011	0.010	0.022**	-0.016	0.002	-0.024**	-0.021*	0.012***	0.088***	0.058***
	(0.013)	(0.011)	(0.011)	(0.007)	(0.011)	(0.012)	(0.014)	(0.010)	(0.012)	(0.004)	(0.010)	(0.008)
Unemp*SCAQMD	-0.513	-0.221	-0.114	0.184	0.696	0.623	0.741*	-0.179	0.337	-0.092	0.153	0.146
	(0.370)	(0.307)	(0.425)	(0.245)	(0.452)	(0.415)	(0.445)	(0.409)	(0.400)	(0.131)	(0.347)	(0.262)
Observations	36,299	35,819	34,571	33,885	35,789	35,290	35,290	36,288	36,288	36,288	36,149	36,149

Notes: Standard errors clustered at the month*year are shown in parentheses. *, **, and *** indicate statistical significance at 10%, 5% and 1%, respectively.

Table 6: Estimated of Unemployment on Health for Individual SCAQMD Counties

	Smoker	Daily Smoker	Binge	Chronic Drinker	Physical	Overweight	Obese	General Health	Excellent	Poor	Mental≥10	Mental≥20
Los Angeles												
stunemp	0.065**	0.036*	-0.010	0.015	0.005	-0.038*	0.063**	-0.091***	-0.081***	0.038***	0.122***	0.084***
	(0.023)	(0.019)	(0.019)	(0.011)	(0.019)	(0.021)	(0.022)	(0.023)	(0.017)	(0.011)	(0.027)	(0.018)
ltunemp	0.015	0.027	-0.014	0.002	0.037	-0.005	0.046	-0.020	-0.015	0.008	0.068***	0.069***
	(0.025)	(0.021)	(0.025)	(0.016)	(0.025)	(0.020)	(0.034)	(0.026)	(0.030)	(0.009)	(0.020)	(0.021)
Observations	6,980	6,912	6,516	6,328	6,844	6,789	6,789	6,978	6,978	6,978	6,957	6,957
Orange												
stunemp	0.066**	0.022	-0.050**	0.005	-0.037	-0.057	-0.025	-0.087*	-0.023	0.016	0.089	0.099*
	(0.026)	(0.026)	(0.022)	(0.019)	(0.049)	(0.056)	(0.050)	(0.041)	(0.044)	(0.012)	(0.060)	(0.045)
ltunemp	0.036	0.033	0.033	0.050	0.000	-0.011	-0.110**	-0.046*	0.039	0.014	0.101**	0.081**
	(0.039)	(0.031)	(0.054)	(0.030)	(0.040)	(0.031)	(0.046)	(0.024)	(0.029)	(0.011)	(0.036)	(0.033)
Observations	3,097	3,048	2,920	2,862	3,047	3,009	3,009	3,096	3,096	3,096	3,076	3,076
Riverside												
stunemp	0.111*	0.058	-0.038	0.011	0.022	0.059	0.039	-0.175***	-0.085*	0.060**	0.113*	0.055
	(0.054)	(0.039)	(0.063)	(0.025)	(0.035)	(0.043)	(0.045)	(0.019)	(0.040)	(0.026)	(0.058)	(0.038)
ltunemp	0.113**	0.110**	-0.019	-0.006	0.009	-0.001	0.006	0.047	-0.032	0.010	0.095*	0.029
	(0.040)	(0.037)	(0.035)	(0.029)	(0.040)	(0.042)	(0.053)	(0.041)	(0.035)	(0.017)	(0.049)	(0.038)
Observations	2,059	2,034	1,982	1,941	2,032	2,006	2,006	2,055	2,055	2,055	2,048	2,048
San Bernardino												
stunemp	0.139***	0.132**	-0.065*	0.007	0.029	-0.017	0.027	-0.130***	-0.091**	0.059**	0.080*	0.046
	(0.029)	(0.051)	(0.035)	(0.026)	(0.032)	(0.038)	(0.025)	(0.039)	(0.039)	(0.021)	(0.042)	(0.038)
ltunemp	0.125*	0.128**	-0.019	-0.011	0.045	-0.071	-0.047	-0.033	0.010	0.029	0.170***	0.099***
	(0.060)	(0.044)	(0.044)	(0.022)	(0.035)	(0.047)	(0.031)	(0.033)	(0.061)	(0.018)	(0.043)	(0.025)
Observations	2,100	2,075	2,006	1,965	2,071	2,059	2,059	2,099	2,099	2,099	2,092	2,092

Notes: Standard errors clustered at the month*year are shown in parentheses. *, **, and *** indicate statistical significance at 10%, 5% and 1%, respectively.

Table 7: Estimates of the Effect of County Unemployment on Mortality Rates

	Mortality Rate	Mortality Rate	Mortality Rate	Mortality Rate	Mortality Rate	Mortality Rate
Unemp	-79.656***	-73.013***	-57.623***	-61.971***	-58.909***	-55.708***
	(8.572)	(8.027)	(7.515)	(8.259)	(8.075)	(8.102)
San Bernardino*Unemp			-27.451***			-20.280**
			(7.900)			(9.746)
Riverside*Unemp			-72.173***			-50.163***
			(8.993)			(11.796)
Orange*Unemp			34.755***			3.497
			(11.129)			(10.095)
Los Angeles *Unemp			-1.345			2.688
			(7.197)			(8.002)
SCAQMD*Unemp		-14.478**			-8.381	
		(6.496)			(6.728)	
County Fixed Effects	Y	Y	Y	Y	Y	Y
Year Fixed Effects	Y	Y	Y	Y	Y	Y
Month Fixed Effects	Y	Y	Y	Y	Y	Y
County Specific Trends	N	N	N	Y	Y	Y
R-squared	0.850	0.851	0.854	0.861	0.861	0.862
Observations	6,240	6,240	6,240	6,240	6,240	6,240

Notes: Standard errors clustered at the month*year are shown in parentheses. *, **, and *** indicate statistical significance at 10%, 5% and 1%, respectively.

Table 8: Estimates of the Effect of County Unemployment on Mortality Rates (SCAQMD Counties)

	Mortality Rate	Mortality Rate	Mortality Rate	Mortality Rate
Unemp	-155.007***	-81.745***	-98.000***	-74.845**
	(24.803)	(28.580)	(25.878)	(28.830)
San Bernardino*Unemp		-22.008*		-19.340
		(11.850)		(12.782)
Riverside*Unemp		-65.044***		-50.107***
		(11.982)		(13.881)
Orange*Unemp		29.882*		-4.775
		(15.014)		(14.509)
County fixed effects	Y	Y	Y	Y
Year Fixed Effects	Y	Y	Y	Y
Month Fixed Effects	Y	Y	Y	y
County Specific Trends	N	N	y	y
R-squared	0.852	0.863	0.864	0.867
Observations	528	528	528	528

Notes: Standard errors clustered at the month*year are shown in parentheses. *, **, and *** indicate statistical significance at 10%, 5% and 1%, respectively.

Appendix Table 1A: Estimates for Whites - All California (No Tr

	Smoker	Daily Smoker	Binge	Chronic Drinker	Physical	Overweight	Obese	General Health	Excellent	Poor	Mental≥10	Mental≥20
Panel A												
Unemp	0.449	0.431	-0.290	0.175	0.121	-0.063	0.395	-0.091	0.594	-0.097	-0.042	0.390*
	(0.370)	(0.316)	(0.397)	(0.298)	(0.355)	(0.449)	(0.474)	(0.230)	(0.440)	(0.094)	(0.320)	(0.221)
Panel B												
Unemp	0.351	0.348	-0.264	0.174	0.117	-0.016	0.405	-0.016	0.644	-0.124	-0.169	0.303
	(0.366)	(0.315)	(0.398)	(0.299)	(0.355)	(0.451)	(0.475)	(0.232)	(0.443)	(0.094)	(0.323)	(0.223)
St_Unemp	0.098***	0.065***	-0.056***	-0.010	-0.022	-0.034*	-0.002	-0.111***	-0.056***	0.042***	0.141***	0.094***
	(0.020)	(0.020)	(0.018)	(0.013)	(0.016)	(0.019)	(0.018)	(0.016)	(0.017)	(0.010)	(0.020)	(0.016)
Lt_Unemp	0.083***	0.084***	-0.002	0.008	0.019	-0.046**	-0.013	-0.039***	-0.038**	0.012**	0.100***	0.071***
	(0.017)	(0.016)	(0.018)	(0.012)	(0.016)	(0.019)	(0.017)	(0.011)	(0.018)	(0.005)	(0.015)	(0.013)
Panel C												
St_Unemp	0.099***	0.066***	-0.056***	-0.009	-0.022	-0.034*	-0.002	-0.111***	-0.055***	0.042***	0.141***	0.095***
	(0.020)	(0.019)	(0.018)	(0.013)	(0.016)	(0.019)	(0.018)	(0.016)	(0.017)	(0.010)	(0.020)	(0.016)
Lt_Unemp	0.084***	0.085***	-0.002	0.009	0.019	-0.046**	-0.013	-0.039***	-0.037**	0.012**	0.100***	0.072***
	(0.017)	(0.016)	(0.018)	(0.012)	(0.016)	(0.019)	(0.017)	(0.011)	(0.018)	(0.005)	(0.015)	(0.012)
Observations	18,777	18,583	17,843	17,625	18,613	18,435	18,435	18,772	18,772	18,772	18,701	18,701

Notes: Standard errors clustered at the month*year are shown in parentheses. *, **, and *** indicate statistical significance at 10%, 5% and 1%, respectively.

Appendix Table 1B: Estimates for Whites - All California (With Trends)

	Smoker	Daily Smoker	Binge	Chronic Drinker	Physical	Overweight	Obese	General Health	Excellent	Poor	Mental≥10	Mental≥20
Panel A												
Unemp	0.133	0.103	-0.161	0.319	0.141	-0.124	0.029	-0.252	0.517	-0.088	0.254	0.370
	(0.438)	(0.387)	(0.501)	(0.343)	(0.430)	(0.564)	(0.540)	(0.275)	(0.573)	(0.121)	(0.384)	(0.265)
Panel B												
Unemp	0.024	0.012	-0.133	0.318	0.137	-0.071	0.040	-0.168	0.573	-0.118	0.109	0.270
	(0.434)	(0.385)	(0.501)	(0.343)	(0.430)	(0.566)	(0.541)	(0.280)	(0.577)	(0.122)	(0.388)	(0.266)
St_Unemp	0.098***	0.066***	-0.056***	-0.011	-0.022	-0.034*	-0.001	-0.111***	-0.056***	0.042***	0.142***	0.095***
	(0.020)	(0.020)	(0.018)	(0.013)	(0.016)	(0.019)	(0.018)	(0.016)	(0.017)	(0.010)	(0.020)	(0.016)
Lt_Unemp	0.083***	0.084***	-0.001	0.008	0.019	-0.048**	-0.014	-0.039***	-0.038**	0.013**	0.101***	0.072***
	(0.017)	(0.016)	(0.018)	(0.012)	(0.016)	(0.019)	(0.017)	(0.011)	(0.018)	(0.005)	(0.015)	(0.013)
Panel C												
St_Unemp	0.098***	0.066***	-0.056***	-0.011	-0.022	-0.034*	-0.001	-0.111***	-0.055***	0.042***	0.142***	0.095***
	(0.021)	(0.020)	(0.018)	(0.013)	(0.016)	(0.019)	(0.018)	(0.016)	(0.017)	(0.010)	(0.020)	(0.016)
Lt_Unemp	0.083***	0.084***	-0.001	0.009	0.019	-0.048**	-0.014	-0.040***	-0.038**	0.013**	0.101***	0.073***
	(0.017)	(0.016)	(0.018)	(0.012)	(0.016)	(0.019)	(0.017)	(0.011)	(0.018)	(0.005)	(0.015)	(0.012)
Observations	18,777	18,583	17,843	17,625	18,613	18,435	18,435	18,772	18,772	18,772	18,701	18,701

Notes: Standard errors clustered at the month*year are shown in parentheses. *, **, and *** indicate statistical significance at 10%, 5% and 1%, respectively.

Appendix Table 2A: Estimates for Blacks - All California (No Trends)

	Smoker	Daily Smoker	Binge	Chronic Drinker	Physical	Overweight	Obese	General Health	Excellent	Poor	Mental≥10	Mental≥20
Panel A												
Unemp	0.149	1.400	1.470	0.022	-1.530	-1.599	-0.790	0.574	-2.440*	-0.241	1.041	0.800
	(1.348)	(1.131)	(1.128)	(0.807)	(1.471)	(1.454)	(1.666)	(1.074)	(1.468)	(0.455)	(1.511)	(1.013)
Panel B												
Unemp	0.206	1.401	1.520	0.084	-1.641	-1.682	-0.800	0.449	-2.582*	-0.185	1.163	0.851
	(1.336)	(1.122)	(1.120)	(0.799)	(1.473)	(1.474)	(1.661)	(1.071)	(1.479)	(0.458)	(1.463)	(1.002)
St_Unemp	0.078	0.034	0.013	0.048	-0.091*	-0.095	-0.016	-0.121**	-0.128***	0.050*	0.140**	0.068*
	(0.052)	(0.051)	(0.051)	(0.043)	(0.053)	(0.061)	(0.055)	(0.047)	(0.034)	(0.026)	(0.056)	(0.037)
Lt_Unemp	0.102*	0.105*	0.083	0.038	0.036	-0.034	-0.020	-0.017	0.014	-0.006	0.122**	0.096**
	(0.055)	(0.054)	(0.055)	(0.033)	(0.039)	(0.046)	(0.054)	(0.037)	(0.056)	(0.009)	(0.057)	(0.044)
Panel C												
St_Unemp	0.078	0.032	0.011	0.048	-0.089*	-0.093	-0.016	-0.121**	-0.125***	0.050*	0.139**	0.067*
	(0.052)	(0.051)	(0.051)	(0.043)	(0.053)	(0.061)	(0.055)	(0.047)	(0.034)	(0.026)	(0.056)	(0.037)
Lt_Unemp	0.102*	0.105*	0.082	0.038	0.036	-0.035	-0.020	-0.017	0.014	-0.006	0.122**	0.096**
	(0.055)	(0.054)	(0.055)	(0.033)	(0.039)	(0.046)	(0.054)	(0.037)	(0.056)	(0.009)	(0.057)	(0.044)
Observations	1,693	1,663	1,561	1,513	1,665	1,660	1,660	1,692	1,692	1,692	1,685	1,685

Notes: Standard errors clustered at the month*year are shown in parentheses. *, **, and *** indicate statistical significance at 10%, 5% and 1%, respectively.

Appendix Table 2B: Estimates for Blacks - All California (With Trends)

	Smoker	Daily Smoker	Binge	Chronic Drinker	Physical	Overweight	Obese	General Health	Excellent	Poor	Mental≥10	Mental≥20
Panel A												
Unemp	-2.121	-0.066	2.754*	0.910	-0.610	-0.326	0.003	-0.428	-2.524	-0.097	1.725	0.438
	(1.693)	(1.310)	(1.439)	(0.694)	(1.647)	(1.757)	(1.935)	(1.112)	(1.804)	(0.427)	(1.558)	(1.208)
Panel B												
Unemp	-2.176	-0.136	2.813*	0.944	-0.627	-0.305	0.013	-0.425	-2.532	-0.091	1.671	0.392
	(1.667)	(1.292)	(1.431)	(0.692)	(1.639)	(1.765)	(1.930)	(1.117)	(1.813)	(0.436)	(1.512)	(1.195)
St_Unemp	0.085*	0.037	0.005	0.049	-0.072	-0.079	-0.020	-0.126***	-0.135***	0.050*	0.148***	0.079**
	(0.051)	(0.049)	(0.050)	(0.043)	(0.053)	(0.062)	(0.057)	(0.048)	(0.033)	(0.027)	(0.056)	(0.036)
Lt_Unemp	0.104*	0.105*	0.087	0.041	0.031	-0.033	-0.016	-0.011	0.009	-0.009	0.116**	0.094**
	(0.055)	(0.054)	(0.055)	(0.034)	(0.040)	(0.046)	(0.054)	(0.036)	(0.056)	(0.009)	(0.057)	(0.043)
Panel C												
St_Unemp	0.085	0.037	0.004	0.048	-0.072	-0.079	-0.020	-0.126***	-0.135***	0.050*	0.148***	0.079**
	(0.051)	(0.049)	(0.050)	(0.043)	(0.053)	(0.062)	(0.057)	(0.048)	(0.033)	(0.027)	(0.056)	(0.037)
Lt_Unemp	0.103*	0.105*	0.086	0.041	0.031	-0.034	-0.016	-0.011	0.008	-0.009	0.116**	0.094**
	(0.055)	(0.054)	(0.055)	(0.034)	(0.040)	(0.046)	(0.054)	(0.036)	(0.056)	(0.009)	(0.057)	(0.043)
Observations	1,693	1,663	1,561	1,513	1,665	1,660	1,660	1,692	1,692	1,692	1,685	1,685

Notes: Standard errors clustered at the month*year are shown in parentheses. *, **, and *** indicate statistical significance at 10%, 5% and 1%, respectively.

Appendix Table 3A: Estimates for Hispanics - All California (No Trends)

	Smoker	Daily Smoker	Binge	Chronic Drinker	Physical	Overweight	Obese	General Health	Excellent	Poor	Mental≥10	Mental≥20
Panel A												
Unemp	-0.109	-0.159	-0.374	0.123	0.420	0.141	0.829	-0.289	1.086**	-0.009	-0.122	0.063
	(0.472)	(0.364)	(0.516)	(0.307)	(0.588)	(0.505)	(0.625)	(0.523)	(0.427)	(0.180)	(0.387)	(0.295)
Panel B												
Unemp	-0.134	-0.174	-0.359	0.118	0.394	0.145	0.820	-0.227	1.120***	-0.031	-0.163	0.035
	(0.472)	(0.363)	(0.517)	(0.307)	(0.590)	(0.505)	(0.626)	(0.521)	(0.429)	(0.181)	(0.388)	(0.297)
St_Unemp	0.064***	0.044***	-0.035**	0.011	0.051***	-0.009	0.036	-0.121***	-0.072***	0.045***	0.096***	0.065***
	(0.017)	(0.015)	(0.015)	(0.010)	(0.019)	(0.019)	(0.023)	(0.020)	(0.013)	(0.010)	(0.019)	(0.014)
Lt_Unemp	0.052**	0.049***	-0.025	0.008	0.022	0.007	0.020	-0.009	-0.026**	0.012	0.064***	0.040***
	(0.020)	(0.015)	(0.020)	(0.012)	(0.017)	(0.018)	(0.025)	(0.017)	(0.012)	(0.008)	(0.016)	(0.012)
Panel C												
St_Unemp	0.064***	0.044***	-0.035**	0.011	0.051***	-0.009	0.036	-0.121***	-0.071***	0.045***	0.096***	0.065***
	(0.017)	(0.015)	(0.015)	(0.011)	(0.019)	(0.019)	(0.023)	(0.020)	(0.012)	(0.010)	(0.019)	(0.014)
Lt_Unemp	0.052**	0.049***	-0.025	0.008	0.022	0.007	0.020	-0.009	-0.026**	0.012	0.064***	0.040***
	(0.020)	(0.015)	(0.020)	(0.012)	(0.017)	(0.018)	(0.025)	(0.017)	(0.012)	(0.008)	(0.016)	(0.012)
Observations	11,654	11,460	11,196	10,871	11,415	11,090	11,090	11,652	11,652	11,652	11,603	11,603

Notes: Standard errors clustered at the month*year are shown in parentheses. *, **, and *** indicate statistical significance at 10%, 5% and 1%, respectively.

Appendix Table 3B: Estimates for Hispanics - All California (With Trends)

	Smoker	Daily Smoker	Binge	Chronic Drinker	Physical	Overweight	Obese	General Health	Excellent	Poor	Mental≥10	Mental≥20
Panel A												
Unemp	-0.641	-0.306	-0.687	0.099	0.786	-0.236	0.688	-0.651	1.055**	-0.076	-0.109	-0.049
	(0.550)	(0.478)	(0.595)	(0.368)	(0.704)	(0.600)	(0.697)	(0.632)	(0.469)	(0.248)	(0.458)	(0.348)
Panel B												
Unemp	-0.684	-0.338	-0.665	0.091	0.751	-0.231	0.671	-0.575	1.101**	-0.105	-0.172	-0.092
	(0.551)	(0.477)	(0.597)	(0.368)	(0.706)	(0.599)	(0.700)	(0.627)	(0.469)	(0.248)	(0.460)	(0.350)
St_Unemp	0.064***	0.044***	-0.034**	0.012	0.051***	-0.010	0.036	-0.119***	-0.070***	0.045***	0.096***	0.065***
	(0.018)	(0.015)	(0.015)	(0.010)	(0.019)	(0.019)	(0.023)	(0.020)	(0.013)	(0.010)	(0.019)	(0.014)
Lt_Unemp	0.053***	0.050***	-0.025	0.009	0.023	0.009	0.020	-0.008	-0.027**	0.012	0.063***	0.040***
	(0.020)	(0.015)	(0.020)	(0.012)	(0.017)	(0.018)	(0.025)	(0.017)	(0.012)	(0.008)	(0.016)	(0.012)
Panel C												
St_Unemp	0.064***	0.044***	-0.034**	0.012	0.051***	-0.010	0.036	-0.119***	-0.070***	0.045***	0.096***	0.065***
	(0.017)	(0.015)	(0.015)	(0.010)	(0.019)	(0.019)	(0.022)	(0.020)	(0.013)	(0.010)	(0.019)	(0.014)
Lt_Unemp	0.053***	0.050***	-0.025	0.009	0.023	0.009	0.020	-0.008	-0.027**	0.012	0.063***	0.040***
	(0.020)	(0.015)	(0.020)	(0.012)	(0.017)	(0.018)	(0.025)	(0.017)	(0.012)	(0.008)	(0.016)	(0.012)
Observations	11,654	11,460	11,196	10,871	11,415	11,090	11,090	11,652	11,652	11,652	11,603	11,603

Notes: Standard errors clustered at the month*year are shown in parentheses. *, **, and *** indicate statistical significance at 10%, 5% and 1%, respectively.

Appendix Table 4A: Estimates for Males - All California (No Trends)

	Smoker	Daily Smoker	Binge	Chronic Drinker	Physical	Overweight	Obese	General Health	Excellent	Poor	Mental≥10	Mental≥20
Panel A												
Unemp	0.069	-0.018	-0.221	0.240	0.577	0.418	0.857*	-0.270	0.844**	-0.076	0.244	0.199
	(0.437)	(0.334)	(0.471)	(0.315)	(0.465)	(0.479)	(0.488)	(0.395)	(0.420)	(0.124)	(0.332)	(0.217)
Panel B												
Unemp	-0.018	-0.080	-0.193	0.230	0.573	0.445	0.836*	-0.192	0.875**	-0.109	0.137	0.130
	(0.436)	(0.333)	(0.472)	(0.314)	(0.465)	(0.481)	(0.488)	(0.391)	(0.419)	(0.125)	(0.326)	(0.216)
St_Unemp	0.128***	0.082***	-0.056***	0.013	0.005	-0.035*	0.041**	-0.148***	-0.071***	0.056***	0.146***	0.097***
	(0.021)	(0.017)	(0.021)	(0.013)	(0.016)	(0.020)	(0.018)	(0.020)	(0.015)	(0.010)	(0.019)	(0.014)
Lt_Unemp	0.077***	0.073***	-0.010	0.014	0.006	-0.027	0.007	-0.031**	-0.000	0.021***	0.099***	0.060***
	(0.020)	(0.017)	(0.021)	(0.012)	(0.017)	(0.017)	(0.019)	(0.014)	(0.016)	(0.006)	(0.015)	(0.011)
Panel C												
St_Unemp	0.128***	0.082***	-0.056***	0.013	0.006	-0.034*	0.042**	-0.148***	-0.070***	0.056***	0.146***	0.097***
	(0.021)	(0.017)	(0.020)	(0.013)	(0.016)	(0.020)	(0.018)	(0.020)	(0.015)	(0.010)	(0.019)	(0.014)
Lt_Unemp	0.077***	0.073***	-0.010	0.014	0.006	-0.027	0.007	-0.032**	0.000	0.021***	0.099***	0.060***
	(0.020)	(0.017)	(0.021)	(0.012)	(0.017)	(0.017)	(0.019)	(0.014)	(0.016)	(0.006)	(0.015)	(0.011)
Observations	16,857	16,619	16,027	15,717	16,601	16,621	16,621	16,852	16,852	16,852	16,770	16,770

Notes: Standard errors clustered at the month*year are shown in parentheses. *, **, and *** indicate statistical significance at 10%, 5% and 1%, respectively.

Appendix Table 4B: Estimates for Males - All California (With Trends)

	Smoker	Daily Smoker	Binge	Chronic Drinker	Physical	Overweight	Obese	General Health	Excellent	Poor	Mental≥10	Mental≥20
Panel A												
Unemp	-0.533	-0.383	-0.326	0.338	0.493	0.530	0.685	-0.690	0.822*	-0.100	0.145	-0.002
	(0.501)	(0.417)	(0.553)	(0.337)	(0.584)	(0.530)	(0.578)	(0.490)	(0.479)	(0.167)	(0.400)	(0.290)
Panel B												
Unemp	-0.607	-0.436	-0.302	0.330	0.490	0.553	0.666	-0.620	0.851*	-0.130	0.053	-0.062
	(0.501)	(0.415)	(0.554)	(0.337)	(0.585)	(0.533)	(0.579)	(0.487)	(0.480)	(0.167)	(0.397)	(0.290)
St_Unemp	0.127***	0.083***	-0.054***	0.013	0.004	-0.035*	0.042**	-0.147***	-0.071***	0.056***	0.145***	0.096***
	(0.021)	(0.017)	(0.020)	(0.013)	(0.016)	(0.020)	(0.018)	(0.020)	(0.015)	(0.010)	(0.019)	(0.014)
Lt_Unemp	0.073***	0.070***	-0.009	0.014	0.006	-0.027	0.007	-0.033**	-0.000	0.022***	0.099***	0.061***
	(0.020)	(0.017)	(0.021)	(0.012)	(0.017)	(0.017)	(0.019)	(0.014)	(0.016)	(0.006)	(0.015)	(0.011)
Panel C												
St_Unemp	0.127***	0.082***	-0.055***	0.014	0.005	-0.035*	0.042**	-0.148***	-0.071***	0.056***	0.145***	0.096***
	(0.021)	(0.017)	(0.020)	(0.013)	(0.016)	(0.020)	(0.018)	(0.020)	(0.015)	(0.010)	(0.019)	(0.014)
Lt_Unemp	0.073***	0.070***	-0.009	0.015	0.006	-0.027	0.007	-0.033**	0.000	0.022***	0.099***	0.061***
	(0.020)	(0.017)	(0.021)	(0.012)	(0.017)	(0.017)	(0.019)	(0.014)	(0.016)	(0.006)	(0.015)	(0.011)
Observations	16,857	16,619	16,027	15,717	16,601	16,621	16,621	16,852	16,852	16,852	16,770	16,770

Notes: Standard errors clustered at the month*year are shown in parentheses. *, **, and *** indicate statistical significance at 10%, 5% and 1%, respectively.

Appendix Table 5A: Estimates for Females - All California (No Trends)

	Smoker	Daily Smoker	Binge	Chronic Drinker	Physical	Overweight	Obese	General Health	Excellent	Poor	Mental≥10	Mental≥20
Panel A												
Unemp	0.308	0.331	-0.184	-0.223	0.094	0.188	0.221	0.095	0.192	-0.035	-0.147	0.246
	(0.324)	(0.293)	(0.249)	(0.179)	(0.397)	(0.438)	(0.416)	(0.347)	(0.417)	(0.117)	(0.374)	(0.285)
Panel B												
Unemp	0.281	0.311	-0.169	-0.224	0.072	0.196	0.219	0.130	0.222	-0.049	-0.189	0.219
	(0.323)	(0.294)	(0.249)	(0.179)	(0.396)	(0.437)	(0.416)	(0.346)	(0.419)	(0.117)	(0.374)	(0.284)
St_Unemp	0.057***	0.042***	-0.028***	0.001	0.036**	-0.026	0.005	-0.074***	-0.062***	0.030***	0.092***	0.057***
	(0.014)	(0.013)	(0.010)	(0.007)	(0.015)	(0.018)	(0.017)	(0.015)	(0.013)	(0.007)	(0.016)	(0.011)
Lt_Unemp	0.040***	0.043***	-0.008	0.004	0.041***	-0.002	0.000	-0.013	-0.046***	-0.000	0.074***	0.055***
	(0.012)	(0.010)	(0.010)	(0.006)	(0.015)	(0.018)	(0.016)	(0.012)	(0.014)	(0.004)	(0.013)	(0.011)
Panel C												
St_Unemp	0.057***	0.042***	-0.028***	0.001	0.036**	-0.026	0.005	-0.074***	-0.062***	0.030***	0.092***	0.057***
	(0.014)	(0.013)	(0.010)	(0.007)	(0.015)	(0.018)	(0.017)	(0.015)	(0.013)	(0.007)	(0.016)	(0.011)
Lt_Unemp	0.040***	0.043***	-0.008	0.004	0.041***	-0.002	0.000	-0.013	-0.046***	-0.000	0.074***	0.055***
	(0.012)	(0.010)	(0.010)	(0.006)	(0.015)	(0.018)	(0.016)	(0.012)	(0.014)	(0.004)	(0.013)	(0.011)
Observations	19,442	19,200	18,544	18,168	19,188	18,669	18,669	19,436	19,436	19,436	19,379	19,379

Notes: Standard errors clustered at the month*year are shown in parentheses. *, **, and *** indicate statistical significance at 10%, 5% and 1%, respectively.

Appendix Table 5B: Estimates for Females - All California (With Trends)

	Smoker	Daily Smoker	Binge	Chronic Drinker	Physical	Overweight	Obese	General Health	Excellent	Poor	Mental≥10	Mental≥20
Panel A												
Unemp	0.281	0.464	0.006	-0.118	0.209	0.100	0.215	0.107	0.108	-0.072	0.631	0.502
	(0.380)	(0.344)	(0.303)	(0.196)	(0.524)	(0.548)	(0.455)	(0.416)	(0.479)	(0.144)	(0.404)	(0.328)
Panel B												
Unemp	0.239	0.430	0.016	-0.119	0.173	0.112	0.214	0.152	0.154	-0.089	0.562	0.456
	(0.380)	(0.346)	(0.303)	(0.196)	(0.524)	(0.547)	(0.455)	(0.414)	(0.482)	(0.145)	(0.411)	(0.329)
St_Unemp	0.056***	0.042***	-0.027***	0.001	0.036**	-0.026	0.004	-0.074***	-0.062***	0.030***	0.092***	0.057***
	(0.014)	(0.013)	(0.010)	(0.007)	(0.015)	(0.018)	(0.017)	(0.015)	(0.013)	(0.007)	(0.016)	(0.011)
Lt_Unemp	0.041***	0.043***	-0.007	0.004	0.043***	-0.002	0.000	-0.014	-0.046***	-0.001	0.074***	0.055***
	(0.012)	(0.010)	(0.010)	(0.006)	(0.015)	(0.018)	(0.016)	(0.012)	(0.014)	(0.004)	(0.013)	(0.011)
Panel C												
St_Unemp	0.057***	0.042***	-0.027***	0.001	0.036**	-0.026	0.004	-0.074***	-0.061***	0.030***	0.092***	0.057***
	(0.014)	(0.013)	(0.010)	(0.007)	(0.015)	(0.018)	(0.017)	(0.015)	(0.013)	(0.007)	(0.016)	(0.011)
Lt_Unemp	0.041***	0.043***	-0.007	0.004	0.043***	-0.002	0.000	-0.014	-0.046***	-0.001	0.074***	0.055***
	(0.012)	(0.010)	(0.010)	(0.006)	(0.015)	(0.018)	(0.016)	(0.012)	(0.014)	(0.004)	(0.013)	(0.011)
Observations	19,442	19,200	18,544	18,168	19,188	18,669	18,669	19,436	19,436	19,436	19,379	19,379

Notes: Standard errors clustered at the month*year are shown in parentheses. *, **, and *** indicate statistical significance at 10%, 5% and 1%, respectively.

Appendix Table 6A: Estimates for Whites - SCAQMD Counties (No Trends)

	Smoker	Daily Smoker	Binge	Chronic Drinker	Physical	Overweight	Obese	General Health	Excellent	Poor	Mental≥10	Mental≥20
Panel A												
Unemp	1.743***	1.025*	-0.774	-0.214	0.743	-0.139	-1.237	0.070	0.252	-0.023	0.021	0.337
	(0.629)	(0.581)	(0.820)	(0.647)	(0.670)	(0.839)	(0.925)	(0.460)	(0.874)	(0.162)	(0.756)	(0.494)
Panel B												
Unemp	1.727***	1.015*	-0.772	-0.213	0.746	-0.139	-1.238	0.080	0.261	-0.027	0.010	0.328
	(0.622)	(0.575)	(0.818)	(0.648)	(0.671)	(0.843)	(0.925)	(0.462)	(0.878)	(0.156)	(0.767)	(0.498)
St_Unemp	0.138***	0.092**	-0.018	-0.026	-0.020	-0.045	-0.015	-0.089***	-0.074**	0.040**	0.111***	0.089***
	(0.036)	(0.036)	(0.034)	(0.021)	(0.024)	(0.032)	(0.029)	(0.027)	(0.031)	(0.018)	(0.032)	(0.028)
Lt_Unemp	0.069***	0.084***	0.008	-0.007	-0.012	-0.057*	-0.039	-0.030*	-0.033	0.014	0.098***	0.080***
	(0.025)	(0.024)	(0.031)	(0.020)	(0.030)	(0.031)	(0.030)	(0.017)	(0.030)	(0.009)	(0.025)	(0.019)
Panel C												
St_Unemp	0.138***	0.092**	-0.018	-0.026	-0.020	-0.045	-0.015	-0.089***	-0.074**	0.040**	0.111***	0.089***
	(0.036)	(0.036)	(0.034)	(0.021)	(0.024)	(0.032)	(0.029)	(0.027)	(0.031)	(0.018)	(0.032)	(0.028)
Lt_Unemp	0.069***	0.084***	0.008	-0.007	-0.012	-0.057*	-0.039	-0.030*	-0.033	0.014	0.098***	0.080***
	(0.025)	(0.024)	(0.031)	(0.020)	(0.030)	(0.031)	(0.030)	(0.017)	(0.030)	(0.009)	(0.025)	(0.019)
Observations	6,247	6,191	5,848	5,768	6,196	6,135	6,135	6,243	6,243	6,243	6,218	6,218

Notes: Standard errors clustered at the month*year are shown in parentheses. *, **, and *** indicate statistical significance at 10%, 5% and 1%, respectively.

Appendix Table 6B: Estimates for Whites - SCAQMD Counties (With Trends)

	Smoker	Daily Smoker	Binge	Chronic Drinker	Physical	Overweight	Obese	General Health	Excellent	Poor	Mental≥10	Mental≥20
Panel A												
Unemp	1.572*	0.784	-0.591	-0.172	1.371	-0.628	-3.116***	-0.442	0.582	0.156	0.599	-0.169
	(0.806)	(0.782)	(1.196)	(0.871)	(0.927)	(1.386)	(1.120)	(0.605)	(1.563)	(0.176)	(0.973)	(0.571)
Panel B												
Unemp	1.545*	0.764	-0.592	-0.167	1.375	-0.627	-3.117***	-0.426	0.596	0.148	0.572	-0.190
	(0.784)	(0.758)	(1.194)	(0.869)	(0.930)	(1.394)	(1.122)	(0.617)	(1.569)	(0.168)	(0.986)	(0.571)
St_Unemp	0.138***	0.092**	-0.018	-0.026	-0.020	-0.045	-0.015	-0.089***	-0.074**	0.040**	0.111***	0.089***
	(0.036)	(0.036)	(0.034)	(0.021)	(0.024)	(0.032)	(0.029)	(0.027)	(0.031)	(0.018)	(0.032)	(0.028)
Lt_Unemp	0.069***	0.084***	0.008	-0.006	-0.012	-0.058*	-0.040	-0.030*	-0.033	0.014	0.098***	0.080***
	(0.026)	(0.024)	(0.031)	(0.020)	(0.030)	(0.031)	(0.030)	(0.017)	(0.030)	(0.009)	(0.025)	(0.019)
Panel C												
St_Unemp	0.138***	0.092**	-0.018	-0.026	-0.020	-0.045	-0.015	-0.089***	-0.074**	0.040**	0.111***	0.089***
	(0.036)	(0.036)	(0.034)	(0.021)	(0.024)	(0.032)	(0.029)	(0.027)	(0.031)	(0.018)	(0.032)	(0.028)
Lt_Unemp	0.069***	0.084***	0.008	-0.006	-0.012	-0.058*	-0.040	-0.030*	-0.033	0.014	0.098***	0.080***
	(0.026)	(0.024)	(0.031)	(0.020)	(0.030)	(0.031)	(0.030)	(0.017)	(0.030)	(0.009)	(0.025)	(0.019)
Observations	6,247	6,191	5,848	5,768	6,196	6,135	6,135	6,243	6,243	6,243	6,218	6,218

Notes: Standard errors clustered at the month*year are shown in parentheses. *, **, and *** indicate statistical significance at 10%, 5% and 1%, respectively.

Appendix Table 7A: Estimates for Blacks - SCAQMD Counties (No Trends)

	Smoker	Daily Smoker	Binge	Chronic Drinker	Physical	Overweight	Obese	General Health	Excellent	Poor	Mental≥10	Mental≥20
Panel A												
Unemp	2.059	2.675	2.362	-0.317	1.443	-5.567***	-0.432	2.261	0.142	-0.737	2.559	0.589
	(2.127)	(2.169)	(1.880)	(1.474)	(2.454)	(1.864)	(3.111)	(2.015)	(2.000)	(0.996)	(2.140)	(1.599)
Panel B												
Unemp	2.209	2.774	2.651	-0.201	1.565	-5.621***	-0.630	2.275	0.294	-0.741	2.870	0.799
	(2.163)	(2.230)	(1.902)	(1.463)	(2.418)	(1.799)	(3.152)	(1.961)	(2.049)	(0.980)	(2.174)	(1.608)
St_Unemp	0.024	-0.035	-0.028	0.035	-0.089	-0.144*	-0.032	-0.137**	-0.119***	0.072*	0.216***	0.115**
	(0.052)	(0.050)	(0.063)	(0.057)	(0.071)	(0.073)	(0.068)	(0.066)	(0.038)	(0.039)	(0.074)	(0.043)
Lt_Unemp	0.062	0.042	0.104	0.050	0.049	-0.040	-0.083	0.003	0.060	-0.000	0.131*	0.088
	(0.072)	(0.070)	(0.070)	(0.049)	(0.049)	(0.053)	(0.063)	(0.040)	(0.080)	(0.014)	(0.077)	(0.055)
Panel C												
St_Unemp	0.024	-0.036	-0.028	0.035	-0.090	-0.144*	-0.032	-0.137**	-0.119***	0.072*	0.215***	0.115**
	(0.052)	(0.049)	(0.063)	(0.057)	(0.071)	(0.077)	(0.068)	(0.065)	(0.038)	(0.039)	(0.074)	(0.044)
Lt_Unemp	0.059	0.039	0.101	0.050	0.047	-0.034	-0.082	0.001	0.059	0.000	0.128	0.087
	(0.072)	(0.070)	(0.070)	(0.049)	(0.050)	(0.052)	(0.062)	(0.041)	(0.079)	(0.013)	(0.077)	(0.054)
Observations	894	884	818	790	881	879	879	893	893	893	890	890

Notes: Standard errors clustered at the month*year are shown in parentheses. *, **, and *** indicate statistical significance at 10%, 5% and 1%, respectively.

Appendix Table 7B: Estimates for Blacks - SCAQMD Counties (With Trends)

	Smoker	Daily Smoker	Binge	Chronic Drinker	Physical	Overweight	Obese	General Health	Excellent	Poor	Mental≥10	Mental≥20
Panel A												
Unemp	0.024	1.386	1.675	-0.881	0.741	-5.072*	1.128	-0.067	0.904	-0.264	3.623	-0.125
	(2.412)	(2.155)	(2.157)	(1.278)	(3.064)	(2.734)	(3.082)	(2.170)	(2.668)	(0.923)	(2.171)	(1.882)
Panel B												
Unemp	0.163	1.558	2.049	-0.765	1.038	-4.949*	0.936	0.151	1.275	-0.379	3.701*	-0.034
	(2.471)	(2.253)	(2.160)	(1.216)	(3.021)	(2.629)	(3.149)	(2.095)	(2.747)	(0.927)	(2.176)	(1.894)
St_Unemp	0.025	-0.035	-0.031	0.034	-0.090	-0.146*	-0.036	-0.133**	-0.121***	0.073*	0.215***	0.116**
	(0.050)	(0.050)	(0.063)	(0.057)	(0.072)	(0.075)	(0.067)	(0.065)	(0.038)	(0.039)	(0.074)	(0.043)
Lt_Unemp	0.059	0.041	0.102	0.048	0.047	-0.041	-0.083	0.002	0.060	-0.000	0.132*	0.087
	(0.072)	(0.070)	(0.069)	(0.048)	(0.049)	(0.053)	(0.063)	(0.040)	(0.080)	(0.013)	(0.077)	(0.054)
Panel C												
St_Unemp	0.025	-0.035	-0.031	0.033	-0.090	-0.148*	-0.035	-0.133**	-0.120***	0.072*	0.217***	0.116**
	(0.050)	(0.049)	(0.063)	(0.057)	(0.071)	(0.076)	(0.067)	(0.065)	(0.039)	(0.039)	(0.074)	(0.043)
Lt_Unemp	0.059	0.039	0.100	0.049	0.046	-0.037	-0.083	0.002	0.059	0.000	0.129	0.087
	(0.071)	(0.069)	(0.069)	(0.049)	(0.050)	(0.053)	(0.062)	(0.040)	(0.079)	(0.013)	(0.077)	(0.054)
Observations	894	884	818	790	881	879	879	893	893	893	890	890

Notes: Standard errors clustered at the month*year are shown in parentheses. *, **, and *** indicate statistical significance at 10%, 5% and 1%, respectively.

Appendix Table 8A: Estimates for Hispanics - SCAQMD Counties (No Trends)

	Smoker	Daily Smoker	Binge	Chronic Drinker	Physical	Overweight	Obese	General Health	Excellent	Poor	Mental≥10	Mental≥20
Panel A												
Unemp	-0.160	-0.312	-0.675	-0.043	0.748	-0.395	0.526	0.212	0.481	0.114	0.069	-0.746
	(0.594)	(0.582)	(0.908)	(0.574)	(1.112)	(0.863)	(1.003)	(1.175)	(0.691)	(0.293)	(0.809)	(0.597)
Panel B												
Unemp	-0.154	-0.296	-0.696	-0.043	0.767	-0.394	0.525	0.228	0.491	0.115	0.079	-0.734
	(0.586)	(0.580)	(0.908)	(0.575)	(1.117)	(0.861)	(0.999)	(1.174)	(0.697)	(0.297)	(0.814)	(0.602)
St_Unemp	0.068***	0.041*	-0.022	0.019	0.031	0.017	0.069**	-0.115***	-0.082***	0.041***	0.094***	0.060***
	(0.023)	(0.021)	(0.019)	(0.014)	(0.025)	(0.024)	(0.030)	(0.025)	(0.016)	(0.011)	(0.025)	(0.017)
Lt_Unemp	0.038	0.047**	-0.044	0.007	0.049**	0.013	0.031	-0.009	-0.009	0.016	0.063**	0.054***
	(0.032)	(0.023)	(0.030)	(0.019)	(0.020)	(0.023)	(0.038)	(0.028)	(0.015)	(0.012)	(0.024)	(0.019)
Panel C												
St_Unemp	0.068***	0.041*	-0.022	0.019	0.031	0.017	0.069**	-0.115***	-0.082***	0.041***	0.094***	0.060***
	(0.023)	(0.021)	(0.019)	(0.014)	(0.025)	(0.024)	(0.030)	(0.025)	(0.016)	(0.011)	(0.025)	(0.017)
Lt_Unemp	0.038	0.047**	-0.044	0.007	0.049**	0.013	0.031	-0.009	-0.009	0.016	0.063**	0.054***
	(0.032)	(0.023)	(0.030)	(0.019)	(0.020)	(0.023)	(0.039)	(0.028)	(0.015)	(0.012)	(0.024)	(0.019)
Observations	5,722	5,633	5,473	5,289	5,578	5,492	5,492	5,720	5,720	5,720	5,699	5,699

Notes: Standard errors clustered at the month*year are shown in parentheses. *, **, and *** indicate statistical significance at 10%, 5% and 1%, respectively.

Appendix Table 8B: Estimates for Hispanics - SCAQMD Counties (With Trends)

	Smoker	Daily Smoker	Binge	Chronic Drinker	Physical	Overweight	Obese	General Health	Excellent	Poor	Mental≥10	Mental≥20
Panel A												
Unemp	-0.485	-0.208	-0.991	-0.533	-0.434	-0.635	0.780	-0.245	0.364	0.115	-0.508	-1.404*
	(0.968)	(0.866)	(1.178)	(0.767)	(1.434)	(1.094)	(1.313)	(1.569)	(0.962)	(0.375)	(1.154)	(0.779)
Panel B												
Unemp	-0.502	-0.206	-0.997	-0.537	-0.417	-0.638	0.757	-0.188	0.404	0.100	-0.530	-1.411*
	(0.961)	(0.860)	(1.181)	(0.769)	(1.440)	(1.089)	(1.314)	(1.556)	(0.963)	(0.381)	(1.167)	(0.792)
St_Unemp	0.068***	0.041*	-0.021	0.019	0.031	0.017	0.068**	-0.114***	-0.082***	0.041***	0.095***	0.060***
	(0.024)	(0.021)	(0.020)	(0.014)	(0.025)	(0.024)	(0.030)	(0.024)	(0.016)	(0.011)	(0.025)	(0.017)
Lt_Unemp	0.038	0.048**	-0.045	0.007	0.051**	0.014	0.033	-0.011	-0.010	0.015	0.063**	0.054***
	(0.032)	(0.023)	(0.030)	(0.019)	(0.020)	(0.024)	(0.038)	(0.028)	(0.015)	(0.012)	(0.024)	(0.019)
Panel C												
St_Unemp	0.068***	0.040*	-0.022	0.019	0.030	0.016	0.069**	-0.114***	-0.082***	0.041***	0.095***	0.060***
	(0.024)	(0.020)	(0.019)	(0.014)	(0.024)	(0.024)	(0.030)	(0.024)	(0.016)	(0.011)	(0.025)	(0.017)
Lt_Unemp	0.038	0.048**	-0.044	0.007	0.051**	0.014	0.033	-0.011	-0.010	0.015	0.063**	0.054***
	(0.032)	(0.023)	(0.030)	(0.019)	(0.020)	(0.024)	(0.038)	(0.028)	(0.015)	(0.012)	(0.024)	(0.019)
Observations	5,722	5,633	5,473	5,289	5,578	5,492	5,492	5,720	5,720	5,720	5,699	5,699

Notes: Standard errors clustered at the month*year are shown in parentheses. *, **, and *** indicate statistical significance at 10%, 5% and 1%, respectively.

Appendix Table 9A: Estimates for Males - SCAQMD Counties (No Trends)

	Smoker	Daily Smoker	Binge	Chronic Drinker	Physical	Overweight	Obese	General Health	Excellent	Poor	Mental≥10	Mental≥20
Panel A												
Unemp	0.903	0.514	-0.780	0.451	1.534*	0.336	0.376	0.328	0.687	0.043	1.294**	0.299
	(0.640)	(0.569)	(0.967)	(0.646)	(0.878)	(0.921)	(0.873)	(0.915)	(0.735)	(0.199)	(0.630)	(0.472)
Panel B												
Unemp	0.840	0.476	-0.768	0.439	1.534*	0.360	0.347	0.407	0.725	0.017	1.217*	0.245
	(0.639)	(0.569)	(0.964)	(0.647)	(0.882)	(0.931)	(0.873)	(0.910)	(0.730)	(0.197)	(0.625)	(0.471)
St_Unemp	0.115***	0.065***	-0.037	0.028	-0.000	-0.049	0.053**	-0.148***	-0.073***	0.048***	0.120***	0.082***
	(0.032)	(0.023)	(0.030)	(0.017)	(0.023)	(0.030)	(0.024)	(0.030)	(0.024)	(0.014)	(0.028)	(0.019)
Lt_Unemp	0.062*	0.068**	-0.008	0.013	0.005	0.006	0.030	-0.018	0.004	0.020**	0.090***	0.064***
	(0.033)	(0.026)	(0.035)	(0.018)	(0.028)	(0.022)	(0.031)	(0.024)	(0.029)	(0.009)	(0.022)	(0.017)
Panel C												
St_Unemp	0.116***	0.065***	-0.038	0.028	0.001	-0.049	0.053**	-0.147***	-0.073***	0.048***	0.121***	0.082***
	(0.032)	(0.023)	(0.029)	(0.017)	(0.023)	(0.030)	(0.023)	(0.030)	(0.024)	(0.014)	(0.029)	(0.019)
Lt_Unemp	0.062*	0.068**	-0.008	0.013	0.005	0.006	0.030	-0.018	0.004	0.020**	0.090***	0.064***
	(0.033)	(0.026)	(0.035)	(0.018)	(0.028)	(0.022)	(0.031)	(0.024)	(0.029)	(0.009)	(0.022)	(0.017)
Observations	6,720	6,632	6,332	6,185	6,599	6,627	6,627	6,717	6,717	6,717	6,677	6,677

Notes: Standard errors clustered at the month*year are shown in parentheses. *, **, and *** indicate statistical significance at 10%, 5% and 1%, respectively.

Appendix Table 9B: Estimates for Males - SCAQMD Counties (With Trends)

	Smoker	Daily Smoker	Binge	Chronic Drinker	Physical	Overweight	Obese	General Health	Excellent	Poor	Mental≥10	Mental≥20
Panel A												
Unemp	0.411	0.185	-1.279	-0.036	0.651	0.503	-0.636	-0.691	0.363	0.013	0.803	-0.167
	(0.925)	(0.823)	(1.337)	(0.790)	(1.150)	(1.190)	(1.357)	(1.393)	(1.013)	(0.248)	(0.943)	(0.724)
Panel B												
Unemp	0.360	0.158	-1.260	-0.050	0.652	0.529	-0.657	-0.615	0.403	-0.010	0.737	-0.212
	(0.938)	(0.823)	(1.332)	(0.797)	(1.154)	(1.201)	(1.353)	(1.392)	(1.006)	(0.245)	(0.942)	(0.726)
St_Unemp	0.115***	0.065***	-0.037	0.028*	-0.000	-0.049	0.053**	-0.148***	-0.073***	0.048***	0.120***	0.082***
	(0.032)	(0.023)	(0.029)	(0.017)	(0.023)	(0.030)	(0.023)	(0.030)	(0.024)	(0.014)	(0.028)	(0.019)
Lt_Unemp	0.061*	0.068**	-0.008	0.013	0.006	0.006	0.030	-0.019	0.004	0.020**	0.089***	0.064***
	(0.033)	(0.026)	(0.035)	(0.018)	(0.028)	(0.022)	(0.031)	(0.024)	(0.029)	(0.009)	(0.022)	(0.017)
Panel C												
St_Unemp	0.115***	0.065***	-0.037	0.028*	-0.000	-0.049	0.053**	-0.148***	-0.073***	0.048***	0.120***	0.082***
	(0.032)	(0.023)	(0.029)	(0.017)	(0.023)	(0.029)	(0.023)	(0.030)	(0.024)	(0.014)	(0.028)	(0.019)
Lt_Unemp	0.061*	0.068**	-0.008	0.013	0.005	0.006	0.030	-0.019	0.004	0.020**	0.089***	0.064***
	(0.033)	(0.026)	(0.035)	(0.018)	(0.028)	(0.022)	(0.031)	(0.024)	(0.029)	(0.009)	(0.022)	(0.017)
Observations	6,720	6,632	6,332	6,185	6,599	6,627	6,627	6,717	6,717	6,717	6,677	6,677

Notes: Standard errors clustered at the month*year are shown in parentheses. *, **, and *** indicate statistical significance at 10%, 5% and 1%, respectively.

Appendix Table 10A: Estimates for Females - SCAQMD Counties (No Trends)

	Smoker	Daily Smoker	Binge	Chronic Drinker	Physical	Overweight	Obese	General Health	Excellent	Poor	Mental≥10	Mental≥20
Panel A												
Unemp	0.039	-0.208	-0.114	-0.601*	0.186	-0.485	-1.241	0.361	0.430	-0.091	-0.594	-0.687
	(0.584)	(0.542)	(0.478)	(0.336)	(0.797)	(0.863)	(0.833)	(0.650)	(0.837)	(0.241)	(0.858)	(0.615)
Panel B												
Unemp	0.087	-0.162	-0.116	-0.601*	0.229	-0.524	-1.268	0.338	0.409	-0.082	-0.495	-0.607
	(0.586)	(0.545)	(0.478)	(0.336)	(0.802)	(0.859)	(0.834)	(0.656)	(0.846)	(0.241)	(0.863)	(0.615)
St_Unemp	0.070***	0.049**	-0.007	0.001	0.014	-0.019	0.014	-0.072***	-0.077***	0.035***	0.103***	0.074***
	(0.020)	(0.019)	(0.016)	(0.009)	(0.023)	(0.026)	(0.027)	(0.024)	(0.017)	(0.010)	(0.025)	(0.017)
Lt_Unemp	0.039**	0.042***	-0.003	-0.000	0.046*	-0.044*	-0.039	-0.010	-0.006	0.003	0.090***	0.076***
	(0.016)	(0.013)	(0.016)	(0.008)	(0.024)	(0.023)	(0.024)	(0.020)	(0.020)	(0.007)	(0.021)	(0.018)
Panel C												
St_Unemp	0.070***	0.049**	-0.007	0.001	0.014	-0.018	0.014	-0.072***	-0.077***	0.035***	0.103***	0.074***
	(0.020)	(0.019)	(0.016)	(0.009)	(0.023)	(0.026)	(0.027)	(0.024)	(0.017)	(0.010)	(0.025)	(0.017)
Lt_Unemp	0.039**	0.042***	-0.003	-0.000	0.046*	-0.044*	-0.039	-0.010	-0.006	0.003	0.090***	0.076***
	(0.016)	(0.013)	(0.016)	(0.008)	(0.024)	(0.023)	(0.024)	(0.020)	(0.020)	(0.007)	(0.021)	(0.018)
Observations	7,516	7,437	7,092	6,911	7,395	7,236	7,236	7,511	7,511	7,511	7,496	7,496

Notes: Standard errors clustered at the month*year are shown in parentheses. *, **, and *** indicate statistical significance at 10%, 5% and 1%, respectively.

Appendix Table 10B: Estimates for Females - SCAQMD Counties (With Trends)

	Smoker	Daily Smoker	Binge	Chronic Drinker	Physical	Overweight	Obese	General Health	Excellent	Poor	Mental≥10	Mental≥20
Panel A												
Unemp	0.140	0.345	-0.001	-0.345	0.575	-0.145	-0.838	0.172	-0.100	0.100	0.787	-1.013
	(0.752)	(0.659)	(0.611)	(0.383)	(1.121)	(1.297)	(1.017)	(0.879)	(1.131)	(0.309)	(0.917)	(0.724)
Panel B												
Unemp	0.157	0.369	-0.003	-0.345	0.607	-0.175	-0.870	0.176	-0.092	0.096	0.840	-0.967
	(0.756)	(0.670)	(0.610)	(0.383)	(1.124)	(1.299)	(1.020)	(0.893)	(1.146)	(0.313)	(0.936)	(0.729)
St_Unemp	0.070***	0.048**	-0.007	0.001	0.013	-0.019	0.013	-0.071***	-0.077***	0.035***	0.102***	0.074***
	(0.020)	(0.019)	(0.016)	(0.009)	(0.023)	(0.026)	(0.027)	(0.024)	(0.017)	(0.010)	(0.025)	(0.017)
Lt_Unemp	0.039**	0.041***	-0.003	-0.001	0.048*	-0.045*	-0.041*	-0.011	-0.007	0.002	0.091***	0.076***
	(0.017)	(0.013)	(0.016)	(0.008)	(0.024)	(0.023)	(0.024)	(0.020)	(0.020)	(0.007)	(0.021)	(0.018)
Panel C												
St_Unemp	0.070***	0.048**	-0.007	0.001	0.013	-0.019	0.013	-0.071***	-0.077***	0.035***	0.102***	0.074***
	(0.020)	(0.019)	(0.016)	(0.009)	(0.023)	(0.026)	(0.027)	(0.024)	(0.017)	(0.010)	(0.025)	(0.017)
Lt_Unemp	0.039**	0.041***	-0.003	-0.000	0.047*	-0.045*	-0.040*	-0.011	-0.007	0.002	0.091***	0.076***
	(0.016)	(0.013)	(0.016)	(0.008)	(0.024)	(0.023)	(0.024)	(0.019)	(0.020)	(0.007)	(0.021)	(0.018)
Observations	7,516	7,437	7,092	6,911	7,395	7,236	7,236	7,511	7,511	7,511	7,496	7,496

Notes: Standard errors clustered at the month*year are shown in parentheses. *, **, and *** indicate statistical significance at 10%, 5% and 1%, respectively.