

# Is the Foreclosure Crisis Making Us Sick?

Janet Currie  
Princeton University and NBER  
Department of Economics  
Email: jcurrie@princeton.edu

Erdal Tekin  
Georgia State University and NBER  
Department of Economics  
Andrew Young School of Public Policy  
Email: tekin@gsu.edu

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## **Abstract**

We investigate the relationship between foreclosure activity and health using data from Arizona, California, Florida, and New Jersey, four states that have been among the hardest hit by the foreclosure crisis. We combine data on all foreclosures between 2005 to 2009 with data on all emergency room and hospital visits. We find that foreclosures are associated with increases in urgent, unscheduled visits for preventable conditions, as well as with increases in visits for conditions including suicide attempts, heart attacks, and stroke, urinary tract infections, gastro-intestinal problems, chest pain and dysrhythmias. For example, among 20-49 year olds, an increase of 100 foreclosures in the zip code increases the incidence of urgent, unscheduled visits by 4.3%. The estimated effects are particularly large for Hispanics, though we find the largest estimated effects on heart attack and stroke among blacks. Foreclosure activity has no significant effect on visits for cancer, a condition that is likely to be less affected by short-term stress. We show that the estimated effects cannot be accounted for by increasing unemployment, by people switching from out-patient to hospital providers, or by changes in housing prices.

## **I. Introduction**

The expansion of mortgage credit over the last decade was followed by a sharp decline in housing prices, which has caused foreclosure rates to reach historically high levels in the United States. According to Realtytrac, a leading firm that monitors and markets foreclosed homes, a record 2.82 million homes faced foreclosure in 2009, a 21 percent rise from 2008 and a huge 120 percent jump from 2007. One in 45 homes (2.23 percent of all housing units in the U.S.) received at least one foreclosure filing during 2010. As policymakers have debated measures to stabilize the housing market and minimize the damage to the U.S. economy, researchers have turned their attention to understanding the consequences of rising foreclosures.

While a number of studies have investigated the effect of the foreclosure crisis on outcomes such as home prices and sales, residential investment, and durable consumption (e.g., Immergluck and Smith, 2006a; Calomiris, Longhofer, and Miles, 2008; Rogers and Winter, 2009; Harding, Rosenblatt, and Yao, 2009; Mian, Sufi, and Trebbi, 2010), there has been no large-scale investigation of the effect of the crisis on health. If the foreclosure crisis is having harmful effects on the public health, then policymakers need to factor such a finding into account as they evaluate the costs and benefits of policy responses designed to stabilize the housing market. More generally, the foreclosure crisis represents a large shock to the financial wellbeing of many households, and so represents a fresh way to examine the relationship between wealth and health.

Foreclosures might be expected to influence health through several mechanisms. First, for the individuals directly involved, a home foreclosure is often an intensely stressful life event. A growing literature suggests that stress can have harmful consequences through psychological responses such as depression or higher levels of hormones such as cortisol, and that stressful life

experiences are associated with both physical and mental illnesses (Goldberger and Breznitz, 1993; McEwen, 1998a, 1998b; Cooper, 2005; Schneiderman, Ironson, and Siegel, 2005). Second, a high rate of foreclosure in a neighborhood has negative impacts on those who do not lose their homes since homeowners see the value of their properties fall (Lin, Rosenblatt, and Yao, 2009; Immergluck and Smith, 2006a; Mian, Sufi, and Trebbi, 2011). Third, financial problems and stress may cause changes in health behaviors, which in turn may have negative health consequences. For example, people may smoke or drink more, stop taking medications because they cannot afford them, or stop going to the doctor for preventive care.

The goal of this paper is to investigate whether the foreclosure crisis is having an adverse effect on health. In order to investigate these health effects, we assemble quarterly data on all foreclosures, Emergency Room (ER) visits, and hospitalizations from four states (Arizona, California, Florida, and New Jersey) which are among the 10 states that have been hardest hit by the crisis. Data on foreclosure activity is linked to data on ER visits and hospital discharges at the zip code level. We control for zip code fixed effects so that our effects are identified by changes within zip codes (rather than comparisons of, for example, rich and poor neighborhoods). We also control for interactions of county, quarter, and year in order to control for time-varying features of local labor markets such as unemployment rates. Hence, we take advantage of the fact that some zip codes were much more heavily impacted than others even within a county.

We find considerable evidence of an increase in non-elective (i.e. urgent and unscheduled) hospital and ER visits. However, an increase in visits does not necessarily indicate that people are becoming sicker because of the foreclosure crisis. Therefore, we consider and reject a number of other possible explanations for this relationship. Specifically, we show that the

estimated effects cannot be completely accounted for by increasing unemployment, by people switching from out-patient to hospital providers, or by declining house prices.

We find large increases in hospitalizations for conditions that are “Prevention Quality Indicators,” (PQIs) i.e. conditions which should not result in hospital or ER visits if patients receive proper preventive care. For example, an increase of 100 foreclosures, which is approximately the increase experienced in the average zip code in our sample, raises admissions for hypertension by 7.1% among 50-64 year olds.

Foreclosure is associated with significant increases in suicide attempts, heart attacks, and stroke, diagnoses that are not usually treated in an outpatient setting. Foreclosure is also associated with increases in urgent, unscheduled visits for conditions such as urinary tract infections, gastrointestinal problems, and heart problems such as chest pain and dysrhythmias. These effects are particularly pronounced for Hispanics, though we find the largest estimated effects on heart attack and stroke among blacks. We do not find any effects of foreclosure activity on visits for cancer, a condition that is likely to be less affected by stress, at least in the short term. While we cannot say definitively that the stress of foreclosure is causing these increases in sick visits, we believe it is the most likely explanation.

The rest of the paper is laid out as follows. In Section II, we provide some background information about the foreclosure crisis, and previous work on the relationship between economic activity and health. We then discuss our data in Section III and methods in Section IV, followed by the results in Section V, and a brief conclusion in Section VI.

## **II. Background**

Explanations for the foreclosure crisis include: a relaxation in underwriting standards and

the expansion of mortgage credit to subprime borrowers (e.g., U.S. Department of Housing and Urban Development, 2009; Dell’Ariccia, Igan, and Laeven, 2008; Demyanyk and Van Hemert, 2011); mortgage securitization having an adverse effect on the screening practices of lenders (e.g., Keys et al., 2010); widespread negative equity caused by the willingness of mortgage lenders to issue mortgage-debt on homes in which the owners had little or no equity (e.g., Gerardi, Ross, and Willen, 2009, 2011); and a rapid increase in interest rates after a period of historically low levels that fueled a housing bubble (e.g., Mayer and Hubbard, 2008).

Whatever the root causes, delinquencies and foreclosures soared starting in late 2006, and housing prices plummeted (Campbell, Giglio, and Pathak, 2009; Calomiris, Longhofer, and Miles, 2008, Harding, Rosenblatt, and Yao, 2009, Lin, Rosenblatt, and Yao, 2009; Immergluck and Smith, 2006a). The turmoil in the housing market spread to capital markets and generated the current continuing economic malaise (e.g., Green, 1997; Leamer, 2007; Gauger and Snyder, 2003).

*a) How Could Foreclosures Affect Health?*

The implications of the crisis for non-economic domains such as health have been largely ignored.<sup>1</sup> Yet there are good reasons to expect the foreclosure crisis to impact health. First, foreclosure represents a potentially extremely stressful experience as well as the culmination of a stressful process for the affected homeowner. Stress is hypothesized to affect health both by depressing the immune system and making a person more susceptible to infection, and through the direct action of “stress hormones” on factors such as blood pressure and cardiovascular health (McEwen, 1998a, 1998b).

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<sup>1</sup> Bennett, Scharoun-Lee, and Tucker-Seeley (2009) point to the urgent need for credible research investigating the health effects of foreclosures.

Many studies have shown a connection between stress on the job and poorer cardiovascular health (see for example, Bosma et al., 1998; Belkic et al., 2004). Kahn and Pearlman (2006) examine the relationship between financial stress over the life course and health. Animal studies have also demonstrated that stress associated with falling rank in a social hierarchy has negative health effects (see Sapolsky, 1993; Cohen, 1999). Hence, it is not unreasonable to suppose that the stress associated with foreclosure might have negative effects on human health.

The effects on mental health might be particularly important. Individuals experiencing difficulties making their mortgage payments experience lower levels of psychological wellbeing (Nettleton and Burrows, 1998; Taylor, Pevalin, and Todd, 2007) and the media has highlighted depression, anxiety, and even suicide in high foreclosure communities (Ablow, 2008; Butts, 2010; Sundaram, 2010). Deaton (2011) examines data on self-reported well-being from the Gallup organization and finds that self-reported levels of worry and stress rose after the fall of 2008 (the beginning of his sample period) and stayed high until the spring of 2009. In view of our findings, it is striking that he finds higher levels of stress among younger adults. However, he also cautions that the answers to such self-reported questions are sensitive to various aspects of questionnaire design.

Whether foreclosure is an especially stressful event or not depends on the circumstances. For example, Bajari, Chu, and Park (2008) consider two broad categories of defaults. Defaults in the first category include homeowners who rationally decide to “walk away” from a mortgage when it is no longer in their interest to pay it. For example, a buyer with a negligible down payment might be substantially better off walking away from a mortgage in response to falling housing prices. The second category includes borrowers who lose their homes due to short-term

liquidity constraints. These borrowers might have been particularly adversely affected by the credit freeze and by interest rate “resets” that suddenly increased their monthly payments. Bajari et al. conclude that short-term credit constraints were at least as important as the decline in housing prices in explaining the increase in defaults, suggesting that for many borrowers, default was due to factors outside their control and hence likely to be stressful.

A second reason for foreclosure to affect health is that, since housing represents the major store of wealth for most people, declines in housing prices represent a significant decline in wealth, not just for those who suffer foreclosure, but also for their neighbors.<sup>2</sup> For example, Mian, Sufi and Trebbi (2011) conclude that a one standard deviation increase in foreclosures results in a growth rate in housing prices that is two-thirds of a standard deviation lower.

A large literature documents a robust relationship between health and wealth in many different contexts (see Deaton 2002 for a concise survey). There are several potential explanations for the observed correlation. One is that it is really health that affects wealth. For example, Warren et al. (2007) argue that many bankruptcies are caused by ill health. Pollack and Lynch (2009) compare individuals enrolled in mortgage counseling in Philadelphia with respondents of a community health survey in Pennsylvania between July and October 2008. The foreclosure sample was significantly more likely to have hypertension, heart disease, or psychiatric disorders than the community sample. However, in their sample foreclosure may indeed be caused by poor health rather than vice-versa since over a quarter of their foreclosure group owed money to medical creditors. Moreover, Philadelphia has not been particularly hard hit by foreclosure, ranking 77<sup>th</sup> among metropolitan areas in terms of foreclosures in 2008, suggesting that their sample of mortgage counselees might have been negatively selected.

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<sup>2</sup> Similarly, there is a positive association between health and home ownership, presumably because home owners are wealthier than renters on average (Dietz and Haurin, 2003; Pollack, Knesebeck, and Siegrist, 2004).



In contrast, the foreclosure crisis we examine represents a sharp shock to wealth that is unlikely to have been caused by a sudden epidemic of ill health among the U.S. population. Moreover, while in hindsight many commentators have said that a crash was inevitable, the timing and severity of it were certainly a surprise to almost all observers (Mian and Sufi, 2010; Calomiris, Longhofer, and Miles, 2008; Demyanyk and Van Hemert, 2011). Hence, there is no reason to suppose that the spike in foreclosures was caused by the health problems of individual homeowners, and any relationship between the increase in foreclosures and increased health problems is likely to represent a relationship running from foreclosure to health rather than vice versa.

A third way that foreclosure (and loss of wealth more generally) may affect health is by affecting access to medical care and/or health behaviors. Several studies have linked economic crisis to reductions in the utilization of medical care (e.g., Lusardi, Schneider, and Tufano, 2010; Williams and Collins, 1995; Feinstein, 1993). It is possible that people smoke or drink more (though they could also reduce consumption in response to financial constraints), consume a lower quality diet, or get less exercise when they are financially strapped.

#### *b) Effects of Unemployment on Health*

While the health effects of foreclosure have been ignored, there is an extensive and related literature examining the effects of unemployment and job loss on health. Ruhm (2000, 2003, 2008), Ruhm and Black (2002), Neumayer (2004), and Gerdtham and Ruhm (2006) find that higher unemployment is associated with lower mortality rates, while Dehejia and Lleras-Muney (2004) find that higher unemployment improves infant health. These studies use state-level data.

These patterns have been attributed to recession-induced changes in health behaviors,

though the evidence on this channel is mixed. For example, Xu and Kaestner (2010) study a group of low income individuals and find that higher employment is associated with more cigarette smoking and fewer visits to doctors for preventive care. However, Deb et al. (2009) examine a sample of older workers and find that some of them experience increases in body mass index and alcohol consumption in response to job loss. Miller et al. (2009) argue that the cyclical changes in mortality are concentrated in the young and the old and so are unlikely to represent changes in health behaviors among working age adults.

Sullivan and Wachter (2009) follow a large sample of individuals who lost their jobs in mass layoffs. They find significantly higher death rates due to accidents and heart conditions in this group, both immediately and in the longer term. Eliason and Storrie (2009a) examine data from plant closings in Sweden in 1987 and 1988 and find that mortality rises by 44 percent in the four years following job loss. In particular, they find a 2 fold increase in suicide. Eliason and Storrie (2009b) also find increases in hospitalizations due to self harm, accidents, and alcohol-related causes in the 12 years following displacement. However, Browning et al. (2006) examine the effects of job loss in a 10 percent sample of the population of Denmark and find no effect on hospitalizations for circulatory or digestive ailments.

While foreclosure and unemployment may both be viewed as negative economic shocks, they differ in key respects: Foreclosure does not entail increases in leisure, and unemployment does not generally have spillovers in terms of other peoples' wealth (though a mass layoff might). Still, the literature on unemployment and health is relevant for two reasons. First, while it is somewhat inconclusive, on the whole it suggests that economic shocks can have health effects. Second, the foreclosure crisis has been followed by the worst recession since the Great Depression. Hence, it is reasonable to wonder whether the health effects we find are due to unemployment rather than foreclosure?

We argue below that foreclosure does have separate effects on health, though high unemployment exacerbates the impact of high foreclosure rates.

*c) Potential Differences in Effects by Race, Ethnicity and Age*

Minority groups are thought to have been particularly hit hard by the foreclosure crisis (Rugh and Massey, 2010) in part because lending agencies targeted low-income minority neighborhoods for risky loans (Avery, Brevoort, and Canner, 2007; Bocian, Ernst, and Li, 2008; Calem, Gillen, and Wachter, 2004; Mayer and Pence, 2008; Squires, 2008). These groups may also have had a more difficult time with the crisis given lower savings, poorer labor market prospects, lower rates of private health insurance coverage, and poorer baseline health than other groups. Bowdler, Quercia, and Smith (2010) argue that Latinos have been particularly strongly affected, which is provocative in light of the strong health effects we find for Hispanics.

The effects of foreclosures on health might also be expected to vary by age. While overall levels of financial literacy are poor (e.g., Lusardi and Tufano, 2009), financial decision making usually improves with age (e.g. Agarwal et al., 2007) and older people are less likely to borrow on the equity in their homes (e.g., Duca and Kumar, 2010). But there is also some evidence that senior citizens have been disproportionately targeted by lenders for predatory lending purposes (Government Accountability Office, 2004, Delgadillo, Erickson, and Piercy, 2008; Collins, 2009). Cunningham and Capone (1990), and Anderson and VanderHoff (1999) find that foreclosure rates decrease with age, but these studies are based on data at least 20 years old. Ludy and Herlitz (2009) note that the largest increases in homeownership from 1995 to 2004 were among those between 20 and 44. Perhaps the most useful study is by Shelton (2008) who analyzed a random sample of 2.5 million persons from Experian, the credit rating agency.

She finds that three quarters of foreclosures in the second half of 2007 were among homeowners less than 50. These figures suggest that the effects of foreclosure may be stronger among younger individuals, and perhaps among children since most parents are in this age range.

*d) Summary*

The previous literature has largely ignored the possible relationship between the foreclosure crisis and population health, though it does suggest that such a relationship could exist. Ours is the first comprehensive effort to consider this potential relationship. As such, the findings from this paper constitute an important baseline for future research by providing estimates of the impact of foreclosures on a range of important health problems. Our paper also makes a contribution to the broader literature on the relationship between wealth and health. By focusing on the foreclosure crisis, we limit the bias due to reverse causality that plagues most studies of this relationship.

### **III. Data**

We focus on the states of Arizona, California, Florida and New Jersey for several reasons. First, we wish to focus on states that have recently had extremely high levels of foreclosures. Together these four states comprised almost 50 percent of all the foreclosure filings in 2008 (RealtyTrac Press Release, January 15, 2009). They were all in the top 10 foreclosure states, posting the 3<sup>rd</sup>, 1<sup>st</sup>, 2<sup>nd</sup>, and 10<sup>th</sup> largest totals of foreclosures in the country in 2010, respectively. Second, we wish to use hospital discharge and emergency room data for entire

states, rather than from a sample of hospitals.<sup>3</sup> It is important to include ER visits in addition to hospitalizations, because financial constraints can affect whether the person first presents at the ER, as well as the probability that someone on the margin is admitted to hospital if they do appear at the ER. Not all states provide public access to these kinds of data, and not all of those that do also release information about the patient's zip code and/or county.

Foreclosure data are available at the zip code level monthly between April 2005 through December 2009 from RealtyTrac. RealtyTrac is a leading foreclosure monitoring and marketing company, which collects data from public records at the local level, which is where legal documents for foreclosures are recorded, posted, and published. With coverage that accounts for more than 90 percent of the U.S. population, the RealtyTrac data have been widely used by the media as well as researchers studying foreclosures (e.g., Mian, Sufi, and Trebbi, 2011; Hernandez, 2009; Pettit et al., 2009; Gaffney, 2009).

The foreclosure data includes information about both notice of trustee sales (NTS) and/or a notice of foreclosure sale (NFS). Following instructions from RealtyTrac, we construct measures of foreclosures as NTS+NFS.<sup>4</sup> The data also includes information about real-estate owned (REO) properties, which are properties that have gone back to the mortgage lender after an unsuccessful foreclosure auction, and remain unsold. We include REOs as an additional control for neighborhood conditions in our regressions.

We include two additional measures of local housing market conditions in some of our specifications. Zip code level data on housing prices in each quarter comes from Zillow. Zillow

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<sup>3</sup> For example, the National Inpatient Database has a 20 percent sample of hospitals and it is not possible to tell if changes in hospitalizations or ER visits at hospitals in the sample might be counter-balanced by changes in these outcomes at other hospitals outside the sample.

<sup>4</sup> A state generally has either NTS or NFS and this depends on whether the state uses a judicial or a non-judicial process in foreclosures. The main difference between a judicial process and a non-judicial process is that the former procedure requires court action on a foreclosed home. In general, NTS is available only for non-judicial states, while NFS is only available for judicial states. Some states use both procedures. Among our sample states, AZ and CA conduct both judicial and non-judicial foreclosures, while FL and NJ only conduct judicial foreclosures.

does not compile data for every zip code, so the use of this variable reduces our sample size somewhat. Data on vacancies in each quarter comes from the U.S. postal service. Vacancies may serve as a proxy for neighborhood disinvestment, lower property values, reduced local services, and crime that may negatively influence both the psychological and physical well-being of individuals living in these neighborhoods (e.g., Mallach, 2009; Schuetz, Been, and Gould, 2008; Immergluck and Smith, 2006b). The postal service asks mail carriers to report addresses that have been vacant 90 days or more. These data do not start until the fourth quarter of 2005, so including them also causes some loss of data. Including these measures in our model sheds light on the extent to which the effects of foreclosure can be explained by loss of wealth due to falling housing prices, or by negative externalities due to high vacancy rates.

Our health measures come from two databases covering emergency room (ER) visits and hospital admissions respectively. These data are collected by state governments in order to oversee hospitals. The Healthcare Cost and Utilization Project (HCUP), collects these data from participating states and releases them in a standard form.<sup>5</sup> Data on ER visits, comes from the State Emergency Department Databases (SEDD), which capture discharge information on all emergency department visits that do not result in an admission. Hospitalization data come from the State Inpatient Databases (SID), which hold the universe of inpatient discharge abstracts. In order for a discharge record to exist, the patient must have been admitted to hospital; hence the SID contains records of patients who require more intensive treatment or for whom treatment cannot be provided on an out-patient basis. The smallest level of geographic detail give both databases is the zip code.<sup>6</sup>

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<sup>5</sup> Visit <http://www.ahrq.gov/data/hcup/> for more information on HCUP databases.

<sup>6</sup> We restrict the sample to Zip Code Tabulation Areas (ZCTAs) as these are the units reported by the Census. Zip codes are constructed by the postal service and frequently change. ZCTAs are constructed by Census and remain consistent between Censuses. Using ZCTAs allows us to merge population estimates to our data. We

In order to match the hospitalization data and the foreclosure data, we calculate the total number of hospitalizations in each category for each zip code and quarter. Similarly, we calculate the total number of foreclosures and REOs for each zip code and quarter. We impute zeros for zip codes that appear in RealtyTrac but have no hospitalizations. The result is a balanced panel of 3,525 zip codes with 19 time periods for a total of 66,975 observations.

In what follows, we devote most of our attention to a combined data set of ER visits that did not result in hospitalizations, plus all hospitalizations other than those for childbirth, contraception, and abortion. We excluded these procedures because we felt that fertility responses to foreclosure could be quite complex, and because indigent women are covered by public insurance for prenatal care and child birth. We treat ER visits and hospital admissions together, because wealth, demographic characteristics, or changes in health insurance status might be correlated with the decision to admit a patient presenting at the ER, at the margin.

We also look separately at elective procedures (which never occur in ERs). Elective procedures are coded by HCUP, and involve visits that are not urgent, not emergencies, and not trauma care. Typically, these visits are scheduled. To say that they are not urgent does not necessarily imply that they are unimportant. Elective visits might include regularly scheduled visits for chemotherapy, for example. However, patients have more discretion over the schedule of elective visits and might decide to forego them or to stretch out the time between visits in response to financial constraints.

Figures 1 and 2 show changes in foreclosure rates and changes in non-elective visits (both hospitalizations and ER) for zip codes in New Jersey, one of our sample states.<sup>7</sup> Rates are calculated using zip code population data from the 2000 Census. That is, these rates can be

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drop about 10% of our sample that could not be matched to ZCTAs. The final number of ZCTAs in our analysis sample is 3,525. For ease of understanding we use the term zip code throughout.

<sup>7</sup> The pattern is similar for the other three sample states. 15

interpreted as the number of foreclosures or hospitalizations per person (rather than per property). We calculate the rate this way since we look at person-level medical data. The figures show that there is considerable variation across zip codes in both types of changes. They also suggest that areas that experienced the sharpest increases in foreclosures also tended to experience the largest increases in hospitalizations.

Table 1 shows means for all zip codes, as well as for those that were in the top and bottom fifths of the distribution of the rate of foreclosures in 2009. While the average zip code in our sample had 90.8 foreclosures in 2009, zip codes in the top fifth had 201 foreclosures compared to only 4.74 foreclosures in the least impacted zip codes. The table shows that the number of foreclosures increased 15 fold in the most highly impacted zip codes, but less than 4 fold in the least impacted zip codes. Housing prices also fell more precipitously in the most impacted zip codes, and vacancies soared.

The ER and hospitalization data is explored in Table 2. HCUP data sets classify diagnoses using a tool called Clinical Classification Software (CCS).<sup>8</sup> This software takes thousands of International Classification of Disease (ICD) codes and groups them into clinically meaningful categories. We use the single level diagnosis codes, and group them into larger aggregates using information from the multi-level diagnosis codes. For example, single codes 122 (Pneumonia), 123 (Influenza), 124 (Acute and Chronic Tonsillitis), 125 (Acute Bronchitis), and 126 (other Upper Respiratory Tract Infections) are grouped together in a category we call “Upper Respiratory Tract Infections”. More information about our aggregates is in the Appendix.

An additional hospitalization category that we consider is an index of “Prevention Quality Indicators” (PQIs). These indicators are published by the Agency for Healthcare Research and Quality (AHRQ) and are based on ICD-9-CM diagnosis codes. PQIs are index conditions for

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<sup>8</sup> More information is available at <http://www.hcup-us.ahrq.gov/toolssoftware/ccs/ccs.jsp#download>.



which good outpatient care can prevent the need for hospitalizations or ER visits, or for which early intervention can prevent complications or more severe diseases. Hospitalizations and ER visits for many other conditions may also be preventable to some extent, but PQIs are those which can almost always be prevented with appropriate care. To the extent that individuals stressed by the foreclosure process have fewer preventive doctor visits, stop adhering to prescription medicine regimes, or reduce self care, underlying health problems may be exacerbated by foreclosure activity. The PQI category includes short and long-term complications of diabetes, amputations due to diabetes, and uncontrolled diabetes, perforated appendix, chronic obstructive pulmonary disease, hypertension, congestive heart failure, dehydration, bacterial pneumonia, urinary tract infection, angina without procedure, and adult asthma.

Table 2 shows the number of hospitalizations of different types overall, and for high and low foreclosure zip codes. The first two rows show that the number of visits for elective procedures is small relative to the number of non-elective visits. Less than half of elective visits are covered by private health insurance, which reflects the importance of Medicare and Medicaid. If we look at persons of working age who are unlikely to be eligible for public health insurance (patients 20 to 49 or 50 to 64), about 2/3 of elective visits are covered. Comparing elective visits in high and low foreclosure zip codes, we see that people in high foreclosure zip codes have 46 percent more visits for elective procedures than those in low foreclosure zip codes.

The second section of the table shows that there are a relatively large number of PQI visits (i.e. visits that should not have occurred if the patient had received adequate preventive care). Three CCS categories fall wholly under the PQI rubric (diabetes, hypertension, and asthma) and visits in these categories are broken out separately. Comparing high and low foreclosure zip codes suggests that people in high foreclosure zip codes are 140% more likely to have visits for

conditions that were preventable.

The rest of the table shows total non-elective visits and non-elective visits by category. Non-elective conditions are quite skewed towards a few diagnoses. For example, injuries, malaise, gastrointestinal problems, and upper respiratory tract infections together account for almost half of all visits. In what follows, we focus on the top 10 diagnoses, as well as on the PQI, cancer, and mental health diagnoses. The latter are of independent interest given the strong connection between stress and mental health.

The second and third columns of Table 2 show types of visits for people in zip codes in the top and bottom fifths of foreclosure activity (as of 2009). While the difference in population is about 45 percent, people in these areas experience more than double the number of non-elective visits in most categories of visits. Visits for suicide attempts stand out since, while rare, they are 4.4 times more prevalent in high foreclosure areas.

#### **IV. Research Design and Methods**

We estimate a series of models that relate changes in the number of hospitalizations or ER visits to the number of foreclosures. Specifically, we estimate models of the form:

$$(1) \quad H_{zqt} = \alpha_0 + \alpha_1 F_{zqt-1} + \alpha_2 REO_{zqt-1} + \mu_z + \lambda_{cqt} + \varepsilon_{zqt},$$

where  $H_{zqt}$  is an outcome measure such as the number of ER visits in zip code  $z$  in quarter  $q$  in year  $t$ . The variable of interest in equation (1) is  $F_{zqt-1}$ , the number of foreclosures in the zip code last quarter. We also control for the number of REOs last quarter. Neighborhoods with large numbers of foreclosed properties that have not been sold may be different than other neighborhoods with similar levels of foreclosure activity. Indicators for each zip code,  $\mu_z$ , are included to control for any time-invariant zip code level factors that may be correlated with both foreclosures and health. To

adjust for correlations within a zip code, standard errors are clustered at the zip code level. The unit of analysis in equation (1) is a zip code, quarter, and year.<sup>9</sup> The data is weighted using the zip code population for the relevant demographic group from the 2000 Census.

The vector  $\lambda_{cqt}$  includes an indicator for each county, quarter, and year. These indicators control for any time varying county level factors that are correlated with both foreclosures and health. For example, they serve as controls for unemployment in a particular county, year, and quarter, as well as for seasonality in foreclosures which may be different in different areas. To the extent that most local governmental responses to the foreclosure crisis are made at the county or state level rather than at the zip code level, these fixed effects would also account for things like changes in health services for the needy. The vector  $\varepsilon_{zqt}$  represents an idiosyncratic random error term.

We estimate separate models by age, focusing on those 0 to 19, 20 to 49, 50 to 64, and 65 plus. While people in different age groups may be differentially affected by the foreclosure crisis, they also suffer from different types of medical conditions. For example, people younger than 50 have few heart attacks. Those 65 and over also have public health insurance in the form of Medicare.

We also estimate separate models by race and ethnicity. Again, while there is good reason to suppose that minorities have been differentially affected by the foreclosure crisis, they may also differ in terms of the types of maladies they are prone to, the probability of having

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<sup>9</sup> Note that we have specified equation (1) in terms of levels. It might be more natural to think of specifying the equation in terms of rates; that is, the rate of hospitalization would be regressed on the rate of foreclosures. However, accurate data on population is only available at the zip code level from the decennial Census. If the measure of population used to construct the rates is a constant, then equation (1) is equivalent to a model specified in rates (since both sides would be divided by the same constant to get the rate). Moreover, including the zip code fixed effect accounts for the fact that some zip codes are much larger than others.

health insurance, and so on.

We will show robust and consistent evidence of a strong association between foreclosure and increases in visits. However, to answer the question of the title, which is whether foreclosures are making us sick, it is necessary to investigate the mechanisms underlying this association.

One possibility is that it is not foreclosure per se, but increases in unemployment that are driving the increases in hospitalizations and ER visits. As discussed above, we are controlling for county-level unemployment in each year and quarter by including the vector  $\lambda_{cqt}$ . But unemployment may vary at the zip code level within counties, though official unemployment rates are not computed at the zip code level (and therefore no zip code level measure is available). However, while high levels of unemployment may be currently causing foreclosures (Schmidt, 2011), this was not the case during much of our sample period, when the main cause of foreclosure was questionable mortgage practices and the collapse of the housing market.

In order to address the role of unemployment, we estimate models using only data from 2005 to 2007, before the steep climb in unemployment began. Indeed, unemployment was falling over most of that period. Second, we also estimate models interacting county-level unemployment measures with zip code level foreclosure rates. Third, we estimate models aggregated to the county level that include both foreclosures and the unemployment rate in order to compare the estimated effects at the same level of aggregation. All of the models suggest that high levels of foreclosure are associated with increases in hospitalizations, though the county level estimates are much smaller than those estimated at the zip code level suggesting that aggregation masks much of the relevant variation in foreclosure rates.

A second possibility is that the foreclosure crisis is not making people sick, but only

causing them to switch out of private doctor's offices and into hospitals and emergency rooms. We address this issue in several ways. First, we focus on non-elective visits, which are urgent and unscheduled. Switching is likely to be more of an issue for elective visits. Second, we examine specific conditions which are almost always treated in hospitals and emergency rooms rather than outpatient settings, including heart attack and stroke. For these conditions, the possibility of "switching" is extremely limited. Third, we look separately at patients who have private health insurance or Medicare and therefore have little need to switch venues (though it may be argued that the privately insured would like to avoid co-pays when financially strapped). Fourth, if our results were driven mainly by venue switching, then we would expect to see smaller estimates for minorities, since minorities are more likely to use hospitals and emergency rooms for primary care to begin with. Instead, we find larger effects of foreclosure on visits for minorities. Increases in hospital and emergency room visits for preventable conditions do suggest that people are cutting back on outpatient visits, but also suggest that this is having a real, negative impact on their health.

## **V. Results**

Table 3 provides an overview of our results by age. Each entry of the table is from a separate regression and shows the coefficient  $\alpha_1$  on foreclosures in the last period. These coefficients are not directly comparable with each other given different baseline numbers of visits in each category and demographic group. Hence, we also show the baseline number of visits, and the percent change in visits implied by the coefficient estimate. If the coefficient  $\alpha_1$  is statistically significant at least at the 95% level of confidence, then we show the implied percent change in bold type.

A comparison of the first and second columns shows that foreclosure had relatively little impact on elective procedures compared to its impact on non-elective procedures. There are large and statistically significant increases in non-elective procedures for all age groups, although the effects are smallest for the elderly and largest for children. The estimates imply that an increase of 100 foreclosures would increase non-elective visits by 8.2% among children, 4.3% among those 20-49, 5.9% among those 50-64, and by 1.1% among the elderly.

The third column of Table 3 shows that there are large and significant impacts on preventable visits for all age groups, though again, the increases are smaller for the elderly than for other groups. There are also significant increases in visits for the specific types of preventable conditions we investigate, diabetes, hypertension, and asthma, though these increases are not statistically significant among the elderly. The difference between the effects on the elderly and the effects on those 50-64 suggests that while the elderly are not immune to the effects of the crisis, they are not suffering to the same extent as younger age groups, which in turn may be because of Medicare coverage.

Table 4 shows estimates of the effects of foreclosure on mental health. There appears to be no significant impact on those aged 65 and over, but large effects on the other age groups. For example, an increase of 100 foreclosures would be associated with increases of 14.6%, 9.2%, and 12.8% in visits for anxiety among those 50-64, 20-49, and 0-19, respectively. The increases in visits related to suicide attempts are particularly striking, though they must be interpreted with some caution given the small baseline numbers of such visits. Given that not every person with a mental health crisis presents at an ER or hospital, it appears that the foreclosure crisis may be taking a particularly heavy toll in terms of mental health.

Table 5 breaks non-elective visits for physical health problems down by CCS category,

focusing on the most quantitatively important categories, and on cancer, which, as discussed above, can be viewed as a “control” category that should be less impacted by stress than some of the others.

As expected, there is no impact of foreclosure on cancer visits. There is an impact on heart attack and stroke, but only among those 50-64. It is not surprising that younger age groups are unaffected given the baseline concentration of visits for heart attack and stroke among older people. However, all groups less than 65 see an increase in milder heart problems such as chest pain and dysrhythmias. We also see significant increases in gastro-intestinal problems, UI tract problems, and respiratory infections (both upper respiratory and other) which are plausibly stress-related. Finally, we see large increases in a category we have labeled “malaise” which includes people presenting with symptoms such as “fever of unknown origin,” nausea, abdominal pain, and so on.

Table 6 shows alternative specifications for a representative group of the conditions discussed above, and for two age groups, those 20-49 and 50-64. Panels 1 and 6 show estimates from models that add zip code level measures of housing prices and vacancies. Perhaps surprisingly, adding these variables reduces the estimated impact of foreclosure only slightly. For example, among 20-49 year olds the implied percent change in non-elective visits with an additional 100 foreclosures falls from 4.3% to 4.1%. We also show the estimated effects of real-estate owned properties. More real-estate owned properties, and more vacant properties are both predictive of higher visit levels across the board. Similarly, higher housing prices have generally negative effects on the number of visits, though there is an anomalous positive estimated effect of housing prices on suicides. The similarity of the estimated effects of foreclosure with and without housing prices suggests that spillover effects of foreclosure onto

housing prices cannot be the main mechanism driving the effects on health.

Panels 2 and 7 of Table 6 show estimates for 2005 through 2007 only. As discussed above, unemployment did not start to rise until 2008. Unemployment was actually falling throughout most of 2005 and 2006. Table 6 shows that we still find large increases in visits in this part of the sample, though some of our estimates are less precisely estimated given that the sample has been cut in half.

Panels 3 and 8 of Table 6 include interactions between the unemployment rate and the number of foreclosures. Because unemployment is available only at the county level, the main effect of unemployment is absorbed by the county\*year\*quarter effects included in all of our models. The implied percent change in visits is shown for two different levels of unemployment that roughly bracket the range of our data: 5% and 10%. The percent changes are positive (except for suicide when unemployment is 5%), and the estimated percent change when unemployment is 10% is strikingly similar to what we see in our main specifications. Thus, these estimates suggest that while foreclosure and unemployment have separate impacts, the impact of foreclosure is worse when unemployment is high.

Panels 4 and 9 present estimates of the effect of foreclosure using county level data. The models include county fixed effects and an indicator for each year\*quarter as well as the unemployment rate. While we find positive effects of foreclosures on visits, the implied percentage changes are about half as big as in the zip code level models.<sup>10</sup> Hence, using county level data appears to attenuate the estimated effects of foreclosure. In the county level models, higher unemployment rates are associated with higher visits levels for preventable conditions and

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<sup>10</sup> There are approximately 20 times as many foreclosures in the county than in the zip code. To take 20-49 year olds for example, the zip code level analysis implies that 100 foreclosures would increase non-elective visits by 4.3%. The county level analysis implies that 2000 foreclosures would increase non-elective visits by about 2%.



gastrointestinal problems in the 20-49 year old group, and with visits for hypertension (a preventable condition) in the 50-64 year old group. However, there is no significant effect of the unemployment rate on non-elective visits overall.

Panels 5 and 10 present estimates using the sample of privately insured visits only. The composition of the privately insured may be changing over time, but if those losing insurance are likely to be sicker in any case (at least within age categories) then composition effects would cause us to see decreases rather than increases in privately insured visits. However, within the privately insured sample, we still find significant positive effects on visits for suicide attempts, malaise, and upper respiratory infections in the 20-49 year old group. In the 50-64 year old group, we find positive effects on total non-elective visits, preventable visits, and on gastrointestinal problems, malaise, and upper respiratory infections. These estimates suggest that even those who retain private health insurance are not immune from the negative health effects of the foreclosure crisis.

As discussed above, there is good reason to expect larger effects of the foreclosure crisis on the health of blacks and Hispanics. Hence, we have estimated all of our models by age, race, and ethnicity. These estimates are shown in Appendix Tables 1 and 2, but given the length of these tables, the major findings are summarized in Figures 3 to 6.

Figure 3 shows the percent change in non-elective visits for everyone, for blacks, and for Hispanics, for each age group. The most striking finding is a much larger increase in visits for Hispanics than for everyone else. The difference is particularly pronounced among the elderly. The figure also illustrates the age profile noted above, with larger effects for the youngest people. This is however, not true for blacks, where visits for children seem to be relatively unaffected by the crisis. It is possible that black children have been largely cushioned from the

medical effects of the crisis by eligibility for the Medicaid program.

Figure 4 presents similar data for preventable visits. Again, the most striking finding is the much larger estimated impacts for Hispanics. Figure 5 shows an extremely similar profile for suicide attempts. One difference is that among blacks, suicide attempts are much more common among younger people than among the elderly, where they are negligible.

Figure 6 shows a similar plot for heart attack and stroke. The 0-19 year old group are omitted since they are much less likely than other groups to have visits for these conditions. This figure is strikingly different than the others because it shows high impacts of foreclosures for blacks as well as for Hispanics. In fact, blacks 50-64 have the highest estimated percent change in heart attack and stroke with foreclosures: Our estimates imply that an additional 100 foreclosures in the average zip code would be associated with a 7.9% increase in heart attack or stroke in this group. This analysis suggests that minorities, and especially Hispanics, really have been at double jeopardy in the foreclosure crisis – both more likely to live in highly impacted zip codes, and more likely to suffer ill health as a result.

Finally, we have estimated county-level models of the effects of foreclosure on mortality (since mortality data are available from the National Center for Health Statistics only at the county level). It is possible that visits for illness respond more quickly than deaths to foreclosure so that our design is better able to detect illnesses than deaths.

## **VI. Conclusions**

This study represents a first look at the question of whether the foreclosure crisis has been making Americans sick. The results suggest that it is having negative effects not only on the health of the U.S. economy, but also on the health of millions of individuals enduring

foreclosure. Moreover, we show that our results really are due to foreclosure, rather than higher unemployment rates and that they cannot be accounted for by people switching health care providers in response to financial constraints. We also find that our results are robust to the inclusion of housing prices in our models, which suggests that they are not driven by the spillover effects of the foreclosure crisis on housing prices. While it is not possible to conclusively prove that the increase in visits is caused by the stress of foreclosure, we suggest that this is a reasonable interpretation of our findings.

We find that foreclosure has significant effects on visits for mental health, visits for preventable conditions, and on visits for a wide range of physical conditions that are susceptible to stress including suicide attempts, heart attack, and stroke. Effects differ strongly by race and by age: The foreclosure crisis is having its most harmful effects on those younger than age 65 and on minorities, especially Hispanics, though blacks 50 to 65 experience the largest increase in visits for heart attack and stroke of any group. Taken together, these results highlight an important implication of the foreclosure crisis that has not received much attention from policy-makers.

## References

- Ablow, Keith (Writer). (July 30 2008). Dr. Keith: Home Foreclosures Become Large Public Health Concern: Fox News.
- Agarwal, S., Driscoll, J., Gabaix, X., & Laibson, D. (2007). The age of reason: Financial decisions over the life-cycle with implications for regulation: NBER Working Paper 13191.
- Anderson, R., & VanderHoff, J. (1999). Mortgage default rates and borrower race. *Journal of Real Estate Research*, 18(2), 279-289.
- Avery, R.B., Brevoort, K.P., & Canner, G.B. (2007). The 2006 HMDA Data *Fed. Res. Bull.* A73, 93.
- Bajari, Patrick, Chenghuan Sean Chu, Minjung Park. (2008). An Empirical Model of Subprime Mortgage Default from 2000 to 2007, NBER Working Paper #14625, Dec.
- Belkic, K.L., Landsbergis, P.A., Schnall, P.L., & Baker, D. (2004). Is Job Strain a Major Source of Cardiovascular Disease Risk? *Scandinavian Journal of Work, Environment & Health*, 30(2), 85-128.
- Bennett, G.G., Scharoun-Lee, M., & Tucker-Seeley, R. (2009). Will the public's health fall victim to the home foreclosure epidemic? *Public Library of Science Medicine*, 6(6), 1-5.
- Bocian, D.G., Ernst, K.S., & Li, W. (2008). Race, ethnicity and subprime home loan pricing. *Journal of Economics and Business*, 60(1-2), 110-124.
- Bosma, H., Marmot, M.G., Hemingway, H., Nicholson, A.C., Brunner, E., & Stansfeld, S.A. (1997). Low job control and risk of coronary heart disease in Whitehall II (prospective cohort) study. *BMJ*, 314(7080), 558.
- Bowdler, J., R., Quercia, & Smith, D.A. (2010). *The foreclosure generation: The long-term impact of the housing crisis on Latino children and families*. National Council of La Raza and the UNC Center for Community.
- Browning, Martin, A. Moller Dano and E. Heinesen. (2006). Job Displacement and Stress-Related health Outcomes, *Health Economics*, 15(10), 1061-1075.
- Butts, Mike. (2010, July 25). State's suicide rate up by 22%, *Idaho Press Tribune*.
- Calem, Paul, Kevin Gillen, and Susan Wachter. (2004). The Neighborhood Distribution of Subprime Lending, *Journal of Real Estate Finance and Economics*, 29 #4, 393-410.
- Calomiris, Charles W., Longhofer, Stanley D., & Miles, William. (2008). The Foreclosure-House Price Nexus: Lessons from the 2007-2009 Housing Turmoil.

Campbell, J.Y., Giglio, S., & Pathak, P. (2009). Forced sales and house prices: National Bureau of Economic Research Cambridge, Mass., USA.

Cohen, S. (1999) Social Status and Susceptibility to Upper Respiratory Infections, in *Socioeconomic Status and Health in Industrialized Nations: Social, Psychological, and Biological Pathways*, Nancy Adler et al. (ed.) Annals of the New York Academy of Sciences, v. 896: 246-253.

Collins, J.M. (2009). Education Levels and Mortgage Application Outcomes: Evidence of Financial Literacy (Vol. Discussion Paper No. 1369-09): University of Wisconsin-Madison, Institute for Research on Poverty.

Cooper, C.L. (2005). *Handbook of stress medicine and health*: CRC.

Cunningham, D.F., & Capone Jr, C.A. (1990). The relative termination experience of adjustable to fixed-rate mortgages. *Journal of Finance*, 1687-1703.

Currie, J. (2009). Healthy, wealthy, and wise: Socioeconomic status, poor health in childhood, and human capital development. *Journal of Economic Literature*, 47(1), 87-122.

Currie, J., & Lin, W. (2007). Chipping away at health: more on the relationship between income and child health. *Health Affairs*, 26(2), 331.

Deaton, Angus. (2002) Policy Implications of the Gradient of Health and Wealth, *Health Affairs*, 21 #2: 13-30.

Deaton, Angus. "The Financial Crisis and the Well-Being of America," NBER Working Paper #17128, June 2011.

Dehejia, R., & Lleras-Muney, A. (2004). Booms, Busts, and Babies' Health. *Quarterly Journal of Economics*, 119(3), 1091-1130.

Delgadillo, L.M., Erickson, L.V., & Piercy, K.W. (2008). Disentangling the Differences Between Abusive and Predatory Lending: Professionals' Perspectives. *Journal of Consumer Affairs*, 42(3), 313-334.

Dell'Ariccia, G., Igan, D., & Laeven, L. (2008). Credit booms and lending standards: Evidence from the subprime mortgage market (Vol. Working Paper No. 2008-2106): International Monetary Fund.

Demyanyk, Y., & Van Hemert, O. (2011). Understanding the subprime mortgage crisis. *Review of Financial Studies*, 24(6), 1848.

Deb, Partha, Gallo, William T., P. Ayyagari, Jason Fletcher, Jody Sindelar. (2009). Job Loss: Eat, Drink, and Try to be Merry? NBER Working Paper #15123.

- Dietz, R.D., & Haurin, D.R. (2003). The social and private micro-level consequences of homeownership. *Journal of Urban Economics*, 54(3), 401-450.
- Dooley, D., Fielding, J., & Levi, L. (1996). Health and unemployment. *Annual review of public health*, 17(1), 449-465.
- Duca, J.V., & Kumar, A. (2010). Financial Literacy and Mortgage Equity Withdrawals: Federal Reserve Bank of Dallas.
- Eliason, M. and Storrie. (2009a). Does Job Loss Shorten Life? *Journal of Human Resources*, 44(2), 277-302.
- Eliason, M. and Storrie. (2009b). Job Loss is Bad for Your Health: Swedish Evidence on Cause-Specific Hospitalization Following Involuntary Job Loss, *Social Science and Medicine*, 68(8), 1396-1406.
- Feinstein, J.S. (1993). The relationship between socioeconomic status and health: a review of the literature. *The Milbank Quarterly*, 71(2), 279-322.
- Gaffney, M. (2009). Money, Credit, and Crisis. *American Journal of Economics and Sociology*, 68(4), 983-1038.
- Gallo, W.T., Bradley, E.H., Siegel, M., & Kasl, S.V. (2000). Health effects of involuntary job loss among older workers. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, 55(3), S131.
- Gauger, J., & Coxwell Snyder, T. (2003). Residential Fixed Investment and the Macroeconomy: Has Deregulation Altered Key Relationships? *The Journal of Real Estate Finance and Economics*, 27(3), 335-354.
- Gerardi, K., Ross, S.L., & Willen, P. (2011). Decoding misperceptions: The role of underwriting and appropriate policy responses. *Journal of Policy Analysis and Management*, 30(2), 396-398.
- Gerardi, K., & Willen, P. (2009). Subprime mortgages, foreclosures, and urban neighborhoods. *The BE Journal of Economic Analysis & Policy*, 9(3), 12.
- Gerdtham, U.G., & Ruhm, C.J. (2006). Deaths rise in good economic times: evidence from the OECD. *Economics & Human Biology*, 4(3), 298-316.
- Goldberger, L., & Breznitz (Eds.), S. . (1993). *Handbook of stress: Theoretical and clinical aspects*. New York: Free Press.
- Government Accountability Office. (2004). *Consumer Protection: Federal and State Agencies Face Challenges in Combating Predatory Lending*. Washington DC: Government Accountability Office.

- Green, R.K. (1997). Follow the Leader: How Changes in Residential and Non residential Investment Predict Changes in GDP. *Real Estate Economics*, 25(2), 253-270.
- Harding, J.P., Rosenblatt, E., & Yao, V.W. (2009). The contagion effect of foreclosed properties. *Journal of Urban Economics*, 66(3), 164-178.
- Hernández, J. (2009). Redlining revisited: mortgage lending patterns in Sacramento 1930–2004. *International Journal of Urban and Regional Research*, 33(2), 291-313.
- Immergluck, D., & Smith, G. (2006a). The external costs of foreclosure: The impact of single family mortgage foreclosures on property values. *Housing Policy Debate*, 17(1), 57-79.
- Immergluck, D., & Smith, G. (2006b). The impact of single-family mortgage foreclosures on neighborhood crime. *Housing Studies*, 21(6), 851.
- Kahn, J.R., & Pearlin, L.I. (2006). Financial strain over the life course and health among older adults. *Journal of Health and Social Behavior*, 47(1), 17.
- Keys, B.J., Mukherjee, T., Seru, A., & Vig, V. (2010). Did Securitization Lead to Lax Screening? Evidence from Subprime Loans. *Quarterly Journal of Economics*, 125(1), 307-362.
- Leamer, E.E. (2007). *Housing is the business cycle*: National Bureau of Economic Research Cambridge, Mass., USA.
- Lin, Z., Rosenblatt, E., & Yao, V.W. (2009). Spillover effects of foreclosures on neighborhood property values. *The Journal of Real Estate Finance and Economics*, 38(4), 387-407.
- Ludy, WH, & Herlitz, J. (2009). *Foreclosures in states and metropolitan areas: Patterns, forecasts, and pricing toxic assets*: Department of Urban and Environmental Planning, School of Architecture, University of Virginia.
- Lusardi, A., Schneider, D.J., & Tufano, P. (2010). *The economic crisis and medical care usage*: National Bureau of Economic Research Cambridge, Mass., USA.
- Lusardi, A., & Tufano, P. (2009). *Debt literacy, financial experiences, and overindebtedness*: National Bureau of Economic Research Cambridge, Mass., USA.
- Mallach, A. (2009). *Stabilizing communities: a federal response to the secondary impacts of the foreclosure crisis*. Washington: Brookings Institution.
- Mayer, Christopher and Karen Pence. (2008). *Subprime Mortgages: What, Where, and to Whom?* NBER Working Paper #14083, June.
- Mayer, C., & Hubbard, R.G. (2008). *House prices, interest rates, and the mortgage market meltdown*. Unpublished Manuscript, Columbia Business School.

- McEwen, B.S. (1998a). Stress, adaptation, and disease: Allostasis and allostatic load. *Annals of the New York Academy of Sciences*, 840(1), 33-44.
- McEwen, B.S. (1998b). Protective and Damaging Effects of Stress Mediators, *New England Journal of Medicine*, Jan. 15, 1998: 171-179.
- Mian, A.R., & Sufi, A. (2010). Household Leverage and the Recession of 2007 to 2009. *IMF Economic Review*, 58, 74-117.
- Mian, Atif, Sufi, Amir, & Trebbi, Francesco. (2010). The Political Economy of the US Mortgage Default Crisis. *American Economic Review*, 100(5), 1967-1998.
- Mian, Atif, Sufi, Amir, & Trebbi, Francesco. (2011). Foreclosures, House Prices, and the Real Economy, NBER Working Paper #16685, Jan.
- Miller, D.L., Page, M., Stevens, A.H., & Filipiski, M. (2009). Are Recessions Really Good for your Health? Understanding Procyclical Mortality. *American Economic Review Papers and Proceedings*, May 99(2), 122-127.
- Nettleton, S., & Burrows, R. (1998). Mortgage debt, insecure home ownership and health: an exploratory analysis. *Sociology of health & Illness*, 20(5), 731-753.
- Nettleton, S., & Burrows, R. (2000). An Investment in Capital and an Emotional Loss: The Health Effects of Mortgage Repossession. *Housing Studies*, 15(3).
- Neumayer, E. (2004). Recessions lower (some) mortality rates::: evidence from Germany. *Social Science & Medicine*, 58(6), 1037-1047.
- Pettit, Kathryn LS, Cunningham, Mary K., Kingsley, G. Thomas, Hendey, Leah, Comey, Jennifer, Getsinger, Liza, & Grosz, Michel. (2009). Foreclosures in the Nation's Capital: Urban Institute.
- Pollack, C.E., & Lynch, J. (2009). Health status of people undergoing foreclosure in the Philadelphia region. *American journal of public health*, 99(10), 1833.
- Pollack, CE, Von Dem Knesebeck, O., & Siegrist, J. (2004). Housing and health in Germany. *Journal of epidemiology and community health*, 58(3), 216.
- RealtyTrac Press Release. (2009). Foreclosure Activity Rises 81 percent in 2008 Retrieved July 25, 2011, from <http://www.realtytrac.com/content/press-releases/foreclosure-activity-increases-81-percent-in-2008-4551>.
- Rogers, W.H., & Winter, W. (2009). The impact of foreclosures on neighboring housing sales. *Journal of Real Estate Research*, 31(4), 455-479.



- Ruhm, C.J. (2000). Are Recessions Good for Your Health? *Quarterly Journal of Economics*, 115(2), 617-650.
- Ruhm, C.J. (2003). Good times make you sick. *Journal of Health Economics*, 22(4), 637-658.
- Ruhm, C.J. (2006). Macroeconomic conditions, health and government policy. In Robert F. Schoeni, James S. House, George A. Kaplan & Harold Pollack (Eds.), *Making Americans Healthier: Social and Economic Policy as Health Policy*. New York: Russell Sage Foundation.
- Ruhm, C.J., & Black, W.E. (2002). Does drinking really decrease in bad times? *Journal of Health Economics*, 21(4), 659-678.
- Sapolsky, R.M. (1993). Endocrinology Alfresco: Psychoendocrine Studies of Wild Baboons, *Recent Progress in Hormone Research*, 48: 438-479.
- Schmidt, Julie. (2011, Jan 27). High Unemployment Drove Foreclosures in 2010, *USA Today*.
- Schneiderman, N., Ironson, G., & Siegel, S.D. (2005). Stress and health: Psychological, behavioral, and biological determinants. *Annual Review of Clinical Psychology*, 1, 607.
- Schuetz, J., Been, V., & Ellen, I.G. (2008). Neighborhood effects of concentrated mortgage foreclosures. *Journal of Housing Economics*, 17(4), 306-319.
- Shelton, A. (2008). *A First Look at Older Americans and the Mortgage Crisis*. Insight on the Issues. AARP Public Policy Institute: Washington D.C.
- Squires, GD. (2008). Do subprime loans create subprime cities? Surging inequality and the rise in predatory lending. *Economic Policy Institute, Briefing Paper*, 197.
- Strully, K.W. (2009). Job loss and health in the US labor market. *Demography*, 46(2), 221-246.
- Sullivan, D., & Wachter, T. (2009). Job Displacement and Mortality: An Analysis Using Administrative Data. *Quarterly Journal of Economics*, 124(3), 1265-1306.
- Sundaram, Viji. (2010). Study Finds Unhealthy Effects of Foreclosures, *The Bay Citizen*, September 3.
- Rugh, Jacob and Douglas Massey. "Racial Segregation and the American Foreclosure Crisis," *American Sociological Review*, 75 #5, October 2010.
- Taylor, M.P., Pevalin, D.J., & Todd, J. (2007). The psychological costs of unsustainable housing commitments. *Psychological medicine*, 37(7), 1027-1036.
- U.S. Department of Housing and Urban Development. (2009). *Interim Report to Congress on the Root Causes of the Foreclosure Crisis*. Office of Policy Development and Research.

Warren, Elizabeth, David U. Himmelstein MD, Deborah Thorne & Steffie Woolhandler MD MPH. "Medical Bankruptcy in the United States, 2007: Results of a National Study," *American Journal of Medicine*, August.

Williams, D.R., & Collins, C. (1995). US socioeconomic and racial differences in health: patterns and explanations. *Annual review of sociology*, 349-386.

Xu, X., & Kaestner, R. (2010). The business cycle and health behaviors (Vol. Working Paper No. 15737): National Bureau of Economic Research Cambridge, Mass., USA.

## Appendix: Aggregating CCS Single-Diagnosis Codes

We Exclude Induced abortion (178), Normal pregnancy and delivery (196), Live born (218), and Contraception, complications of pregnancy/abortion (codes 176-195).

- 1) Infectious Disease – codes 1-10
- 2) Cancer and Benign Neoplasms– codes 11-45, 46-47
- 3) Diabetes-codes 49,50
- 4) Other Endocrine/Metabolic disorders – codes 48, 51-58
- 5) Hematologic Disorders, disorders of veins -- codes 59-64, 188-121
- 6) Anxiety related Mental Health-codes 651, 657, 660-661
- 7) Suicide-code 662
- 8) All other mental health-codes 650, 652-656, 658, 659, 663, 670
- 9) Headache-code 84
- 10) Other Central Nervous System-codes 76-83, 85, 95
- 11) Eye and Ear-code 86-94
- 12) Heart Attack and Stroke-code 97, 100, 101, 103, 104, 107-117
- 13) Heart valve disorders, Nonspecific Chest Pain, Conduction Disorders, Dysrhythmias– code 96, 102, 105, 106
- 14) Hypertension – code 98, 99
- 15) Upper Resp. Infection (Pneumonia, Influenza, Tonsillitis, Bronchitis, Other)-code 122-126
- 16) Other Resp. excluding Asthma-code 127, 129-134
- 17) Asthma-code 128
- 18) Gastrointestinal including appendicitis-code 135-155
- 19) Kidney and Urinary Tract (including urinary tract infections)-code 156-163
- 20) Genital disorders (including inflammation and menstrual disorders)-code 164-175
- 21) Skin infections, inflammatory conditions, ulcers, other skin-code 197-200
- 22) Bone disease and musculoskeletal disease (including arthritis, lupus)-code 201-212
- 23) Injuries-code 225-244
- 24) Malaise (Miscellaneous symptoms including Fever of unknown origin, lymphadenitis, nausea, abdominal pain, malaise, allergic reactions)-code 245-253
- 25) Other (including rehabilitation care, social admissions, medical evaluation, unclassified)-code 254-259

See <http://www.hcup-us.ahrq.gov/toolssoftware/ccs/AppendixASingleDX.txt> for a complete list of CCS codes and their mapping into ICD codes.

**Figure 1: Change in Rates of Foreclosure in New Jersey 2005-2009**

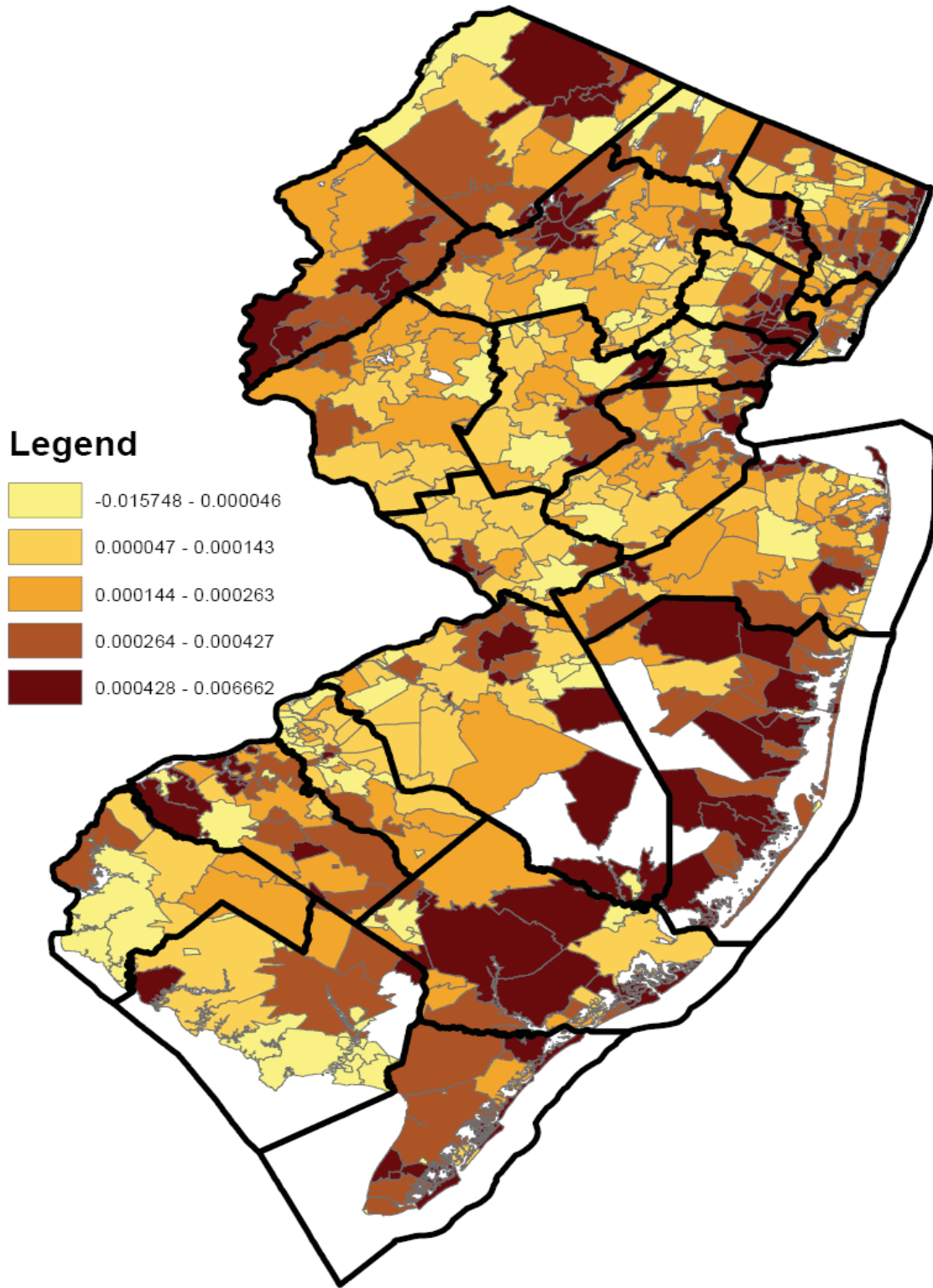
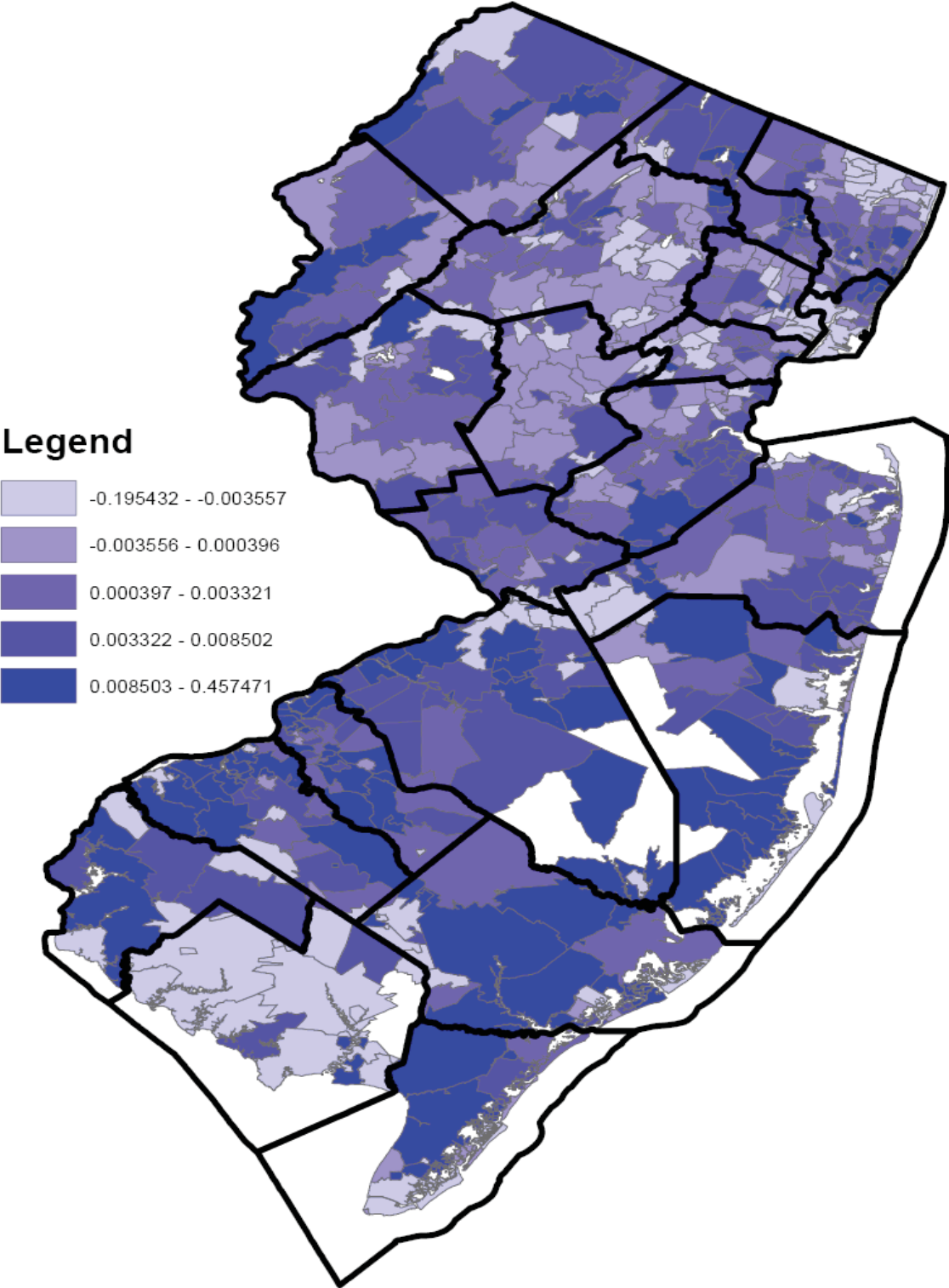
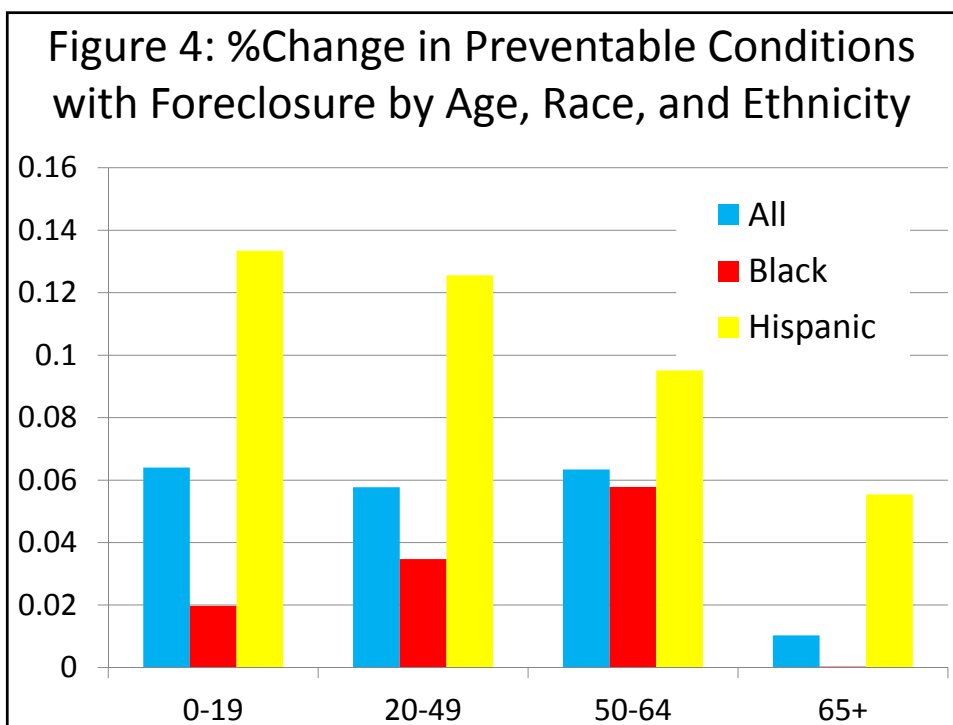
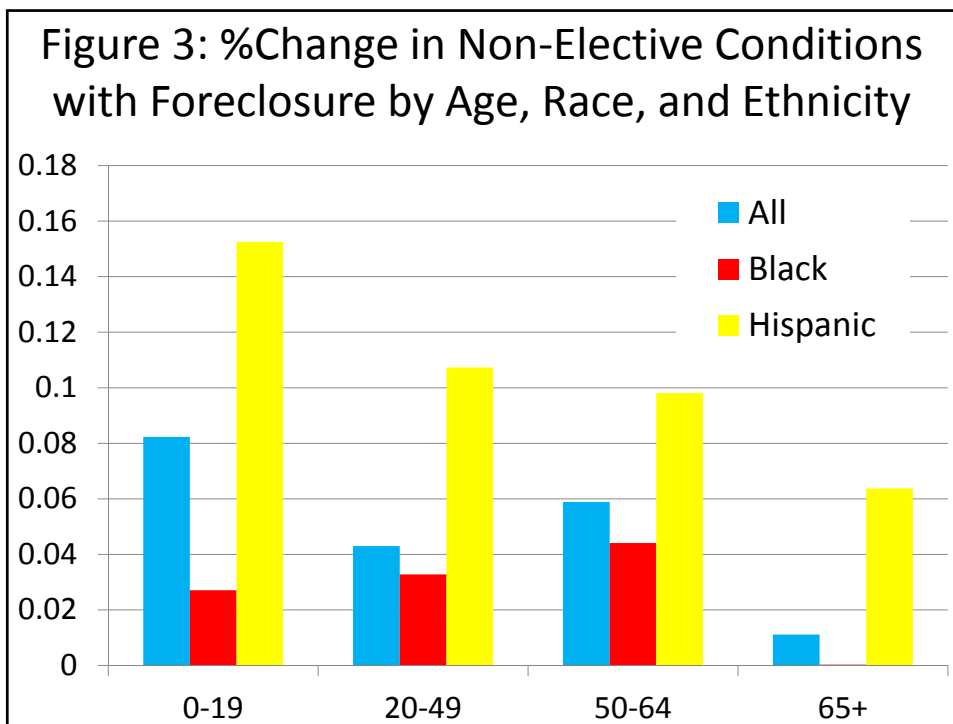
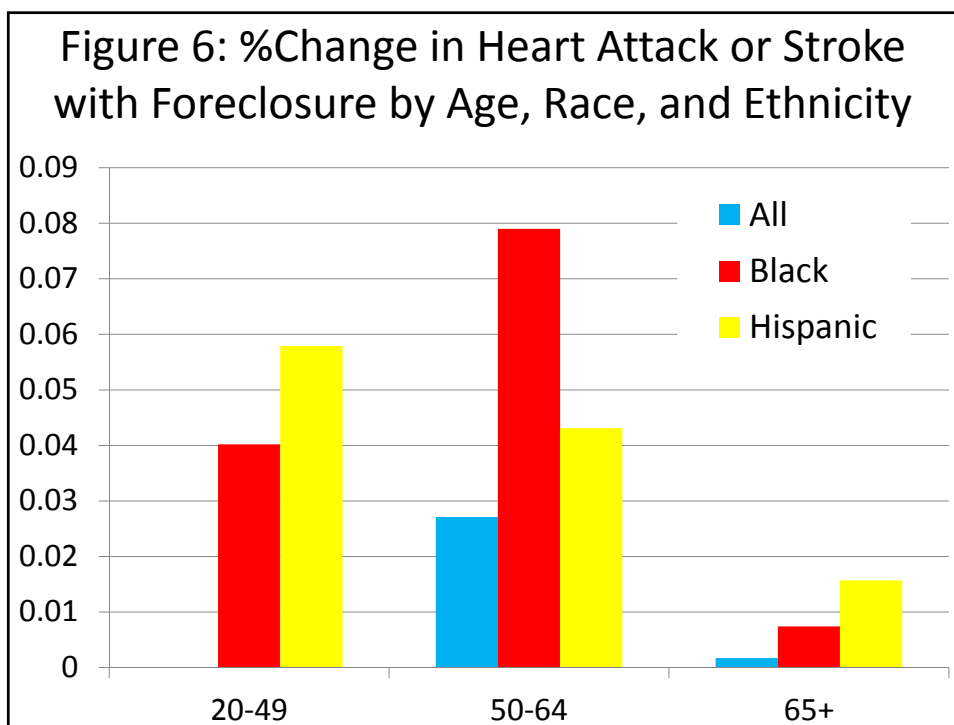
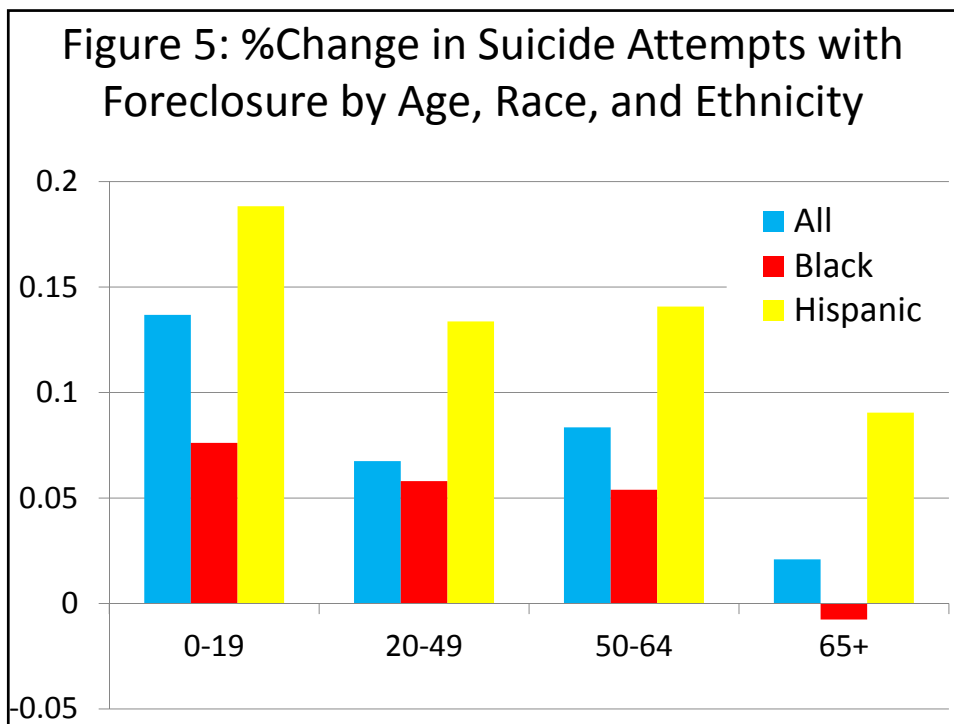


Figure 2: Change in Rates of Hospitalization and ER Visits in New Jersey, 2005-2009







**Table 1: Zipcode Means by Rate of Foreclosure in 2009**

	<b>All Zipcodes</b>	<b>Zips in Top 5th Foreclosures, 2009</b>	<b>Zips in Bottom 5th Foreclosures, 2009</b>
Number of foreclosures 2009	90.83 (92.92)	201.01 (108.95)	4.74 (4.19)
Number of foreclosures 2005	6.89 (10.75)	13.35 (15.59)	1.29 (1.87)
Number REO 2009	44.38 (49.44)	103.67 (61.99)	2.50 (2.31)
Number REO 2005	1.66 (3.58)	2.08 (2.62)	0.65 (0.82)
Mean Housing Price, 2009	300340 (224948)	179387 (80372)	446468 (287566)
Mean Housing Price, 2005 (\$2009)	461180 (273610)	346170 (142134)	548305 (304108)
Number Addresses Vacant $\geq$ 1Quarter, 2009	2017.25 (2098.02)	3035.81 (2742.75)	923.12 (954.04)
Number Addresses Vacant $\geq$ 1Quarter, 2005	288.95 (324.17)	350.20 (403.95)	170.69 (170.96)
<u>Characteristics of Zip Code in 2000</u>			
Mean population	35536.39 (19637.08)	36384.89 (18697.43)	24735.81 (17974.38)
Median Income	48013.64 (18845.12)	43608.43 (13504.4)	63985.20 (26638.31)
Percent Black	9.7 (14.7)	11.1 (14.7)	6.0 (9.6)
Percent Hispanic	32.3 (23.3)	34.3 (18.0)	10.8 (14.3)
Percent Over 65	12.9 (7.9)	11.7 (7.7)	13.5 (7.7)
Poverty Rate	13.1 (8.9)	14.0 (8.2)	8.9 (10.4)

Notes: All means are weighted using population from the 2000 U.S. Census. Characteristics of zip codes also come from the 2000 U.S. Census. Data on house prices comes from Zillow. Data on vacancie from the U.S. postal service and includes properties marked as vacant more than 90 days by mail carriers. N=3,525 zip codes (ZCTAs).

Standard deviations are in parentheses.



**Table 2: Number of Hospitalizations and ER Visits by Type, High or Low Foreclosure Zip Code, and Age**

	<b>All Zips</b>	<b>Zips in Top 5th Fore. in 2009</b>	<b>Zips in Bottom 5th Fore. 2009</b>
Visits for Elective Procedures	154.58	158.59	108.59
Privately Insured Visits for Elective Procedures	60.29	64.05	47.16
<u>Preventable Visits</u>	281.79	344.93	143.98
Diabetes	29.78	38.34	12.28
Hypertension	23.24	27.88	10.99
Asthma	50.85	64.50	22.51
Total Non-Elective	3020.75	3637.57	1590.00
Privately Insured Visits for Non-Elective Procedures	1015.71	1020.44	742.83
<u>Categories of Non-Elective Visits</u>			
Infectious Disease	80.36	91.25	43.58
Cancer and Neoplasms	25.11	26.45	15.79
Other Endocrine Disorders (not Diabetes)	33.70	40.00	19.72
Hematologic and Vein	29.75	34.61	16.05
Anxiety	79.86	86.53	45.38
Suicide Attempt	0.87	1.19	0.27
Other Mental Health	37.25	41.19	16.35
Headache	61.52	78.38	26.79
Other Central Nervous System	64.69	81.93	28.87
Eye and Ear	121.67	149.82	53.93
Heart Attack and Stroke	105.45	115.64	69.64
Chest Pain, Dysrhythmias, and Conduction Disorders	127.17	151.34	73.09
Upper Respiratory Infection (Includes Flu, Pneumonia)	228.72	295.94	94.78
Other Respiratory (not Asthma)	121.24	150.41	64.45
Gastrointestinal	241.29	288.08	126.13
UI Tract	126.87	154.11	66.19
Reproductive Disorders	54.60	71.34	22.81
Skin Infection	105.20	130.88	47.52
Skelatal Disorders (including Arthritis)	157.89	193.27	91.65
Injuries	640.76	741.89	398.59
Malaise (Fever, Nausea, Abdominal Pain, etc.)	275.50	336.31	137.54
Other	101.51	121.41	42.52

Notes: "Other" includes rehabilitation, social admissions, admission for medical evaluation or screenings, and unclassified. Newborns and deliveries are excluded from the sample. Means are weighted by zip code population in 2000. There are 66975 zip code level observations, (3525 zip codes \* 19 quarters).

**Table 3: Effects of Foreclosures on Elective, Non-Elective, and Preventable (PQI) Visits**

<b>Age: 65+</b>	<b>Elective</b>	<b>Non-Elective</b>	<b>PQI</b>	<b>Diabetes</b>	<b>Hypertension</b>	<b>Asthma</b>
Effect of	0.0122*	0.0719*	0.0103*	0.0020	0.0018	0.0018
Foreclosures	(0.006)	(0.023)	(0.006)	(0.002)	(0.002)	(0.001)
Number Visits	84.49	647.78	99.97	8.87	10.2	5.13
<b>% Change</b>	<b>0.0144%</b>	<b>0.0111%</b>	<b>0.0103%</b>	0.0225%	0.0176%	0.0351%
<b>Age: 50-64</b>						
Effect of	0.0058*	0.2390*	0.0273*	0.0077*	0.0044*	0.0027*
Foreclosures	(0.003)	(0.024)	(0.004)	(0.001)	(0.001)	(0.001)
Number Visits	37.1	405.55	43.09	7.31	6.24	5.47
<b>% Change</b>	<b>0.0156%</b>	<b>0.0589%</b>	<b>0.0634%</b>	<b>0.1053%</b>	<b>0.0705%</b>	<b>0.0494%</b>
<b>Age: 20-49</b>						
Effect of	-0.0052*	0.5275*	0.0471*	0.0090*	0.0039*	0.0081*
Foreclosures	(0.003)	(0.052)	(0.006)	(0.002)	(0.001)	(0.002)
Number Visits	35.57	1227.05	81.69	10.88	6.88	17.7
<b>% Change</b>	<b>-0.0141%</b>	<b>0.0430%</b>	<b>0.0577%</b>	<b>0.0827%</b>	<b>0.0567%</b>	<b>0.0458%</b>
<b>Age 0-19</b>						
Effect of	-0.0014	0.7193*	0.0437*	0.0014*	-0.0003	0.0136*
Foreclosures	(0.001)	(0.072)	(0.009)	(0.001)	(0.000)	(0.004)
Number Visits	7.73	874.01	68.32	1.75	0.19	24.76
<b>% Change</b>	-0.0129%	<b>0.0823%</b>	<b>0.0640%</b>	<b>0.0800%</b>	0.0000%	<b>0.0549%</b>

Notes:

Standard errors are clustered at the zip code level and shown in parentheses. An asterisk indicates statistical significance at the 95% level of confidence.

Bold type indicates that the estimated effect used to compute the percent change is statistically significant.

All regressions control for zip code fixed effects, number of real-estate owned properties, and for county\*quarter\*year effects.

Regressions are weighted using 2000 zip code population.

**Table 4: Effects of Foreclosure on Mental Health**

	<b>Anxiety</b>	<b>Suicide</b>	<b>Other Mental</b>
<b>Age: 65+</b>			
Effect of	0.0006	-0.0002	-0.0015
Foreclosures	(0.002)	(0.000)	(0.002)
Number Visits	9.56	0.05	7.29
<b>% Change</b>	0.0063%	0.0000%	-0.0137%
<b>Age: 50-64</b>			
Effect of	0.0193*	0.0004*	0.0036*
Foreclosures	(0.003)	(0.000)	(0.002)
Number Visits	13.25	0.12	5.77
<b>% Change</b>	<b>0.1457%</b>	<b>0.3333%</b>	<b>0.0624%</b>
<b>Age: 20-49</b>			
Effect of	0.0428*	0.0021*	0.0123*
Foreclosures	(0.006)	(0.000)	(0.004)
Number Visits	46.76	0.52	19.48
<b>% Change</b>	<b>0.0915%</b>	<b>0.4038%</b>	<b>0.0631%</b>
<b>Age 0-19</b>			
Effect of	0.0138*	0.0008*	0.0056*
Foreclosures	(0.002)	(0.000)	(0.002)
Number Visits	10.76	0.20	4.61
<b>% Change</b>	<b>0.1283%</b>	<b>0.4000%</b>	<b>0.1215%</b>

## Notes:

Standard errors are clustered at the zip code level and shown in parentheses. An asterisk indicates statistical significance at the 95% level of confidence.

Bold type indicates that the estimated effect used to compute the percent change is statistically significant.

All regressions control for zip code fixed effects, number of real-estate owned properties, and for county\*quarter\*year effects.

Regressions are weighted using 2000 zip code population.

**Table 5: Effects of Foreclosure on Non-Elective Visits, by Category**

<b>Age: 65+</b>	<b>Cancer</b>	<b>Injuries</b>	<b>Malaise</b>	<b>Gastro- Intestinal</b>	<b>UI Tract</b>	<b>Heart Attack or Stroke</b>	<b>Chest pain, etc.</b>	<b>Upper Resp. Inf.</b>	<b>Other Respiratory</b>
Effect of	0.0013	-0.0055	0.0088*	0.0033	0.0047	0.0013	0.0030	0.0083*	0.0122*
Foreclosures	(0.002)	(0.007)	(0.003)	(0.004)	(0.003)	(0.004)	(0.004)	(0.005)	(0.005)
Number Visits	12.84	118.06	42.01	57.58	39.39	75.59	44.13	27.03	42.76
<b>% Change</b>	0.0101%	-0.0042%	<b>0.0209%</b>	0.0057%	0.0119%	0.0017%	0.0068%	<b>0.0307%</b>	<b>0.0285%</b>
<b>Age: 50-64</b>									
Effect of	0.0004	0.0230*	0.0240*	0.0174*	0.0122*	0.0066*	0.0189*	0.0180*	0.0135*
Foreclosures	(0.001)	(0.005)	(0.003)	(0.003)	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)
Number Visits	6.22	74.49	28.75	34.47	18.87	24.38	29.77	14.81	19.86
<b>% Change</b>	0.0064%	<b>0.0309%</b>	<b>0.0835%</b>	<b>0.0505%</b>	<b>0.0647%</b>	<b>0.0271%</b>	<b>0.0635%</b>	<b>0.1215%</b>	<b>0.0680%</b>
<b>Age: 20-49</b>									
Effect of	0.0001	-0.0117	0.0731*	0.0505*	0.0251*	-0.0005	0.0306*	0.0921*	0.0248*
Foreclosures	(0.001)	(0.014)	(0.008)	(0.006)	(0.005)	(0.002)	(0.005)	(0.013)	(0.005)
Number Visits	5.77	258.37	108.22	97.77	53.82	12.57	51.46	62.39	35.96
<b>% Change</b>	0.0017%	-0.0043%	<b>0.0675%</b>	<b>0.0517%</b>	<b>0.0466%</b>	0.0000%	<b>0.0595%</b>	<b>0.1476%</b>	<b>0.0690%</b>
<b>Age 0-19</b>									
Effect of	0.0006	0.0513*	0.1517*	0.0062	0.0133*	-0.0001	0.0042*	0.2580*	0.0433*
Foreclosures	(0.001)	(0.013)	(0.014)	(0.006)	(0.003)	(0.000)	(0.001)	(0.037)	(0.007)
Number Visits	1.45	221.91	110.89	62.58	20.43	1.01	6.77	140.6	28.87
<b>% Change</b>	0.0414%	<b>0.0231%</b>	<b>0.1368%</b>	0.0099%	<b>0.0651%</b>	0.0000%	<b>0.0620%</b>	<b>0.1835%</b>	<b>0.1500%</b>

Notes:

Standard errors are clustered at the zip code level. T-statistics shown in parentheses. An asterisk indicates statistical significance at the 95% level of confidence.

Bold type indicates that the estimated effect used to compute the percent change is statistically significant.

All regressions control for zip code fixed effects, number of real-estate owned properties, and for county\*quarter\*year effects.

Regressions are weighted using 2000 zip code population.

**Table 6: Alternative Specifications**

<b>Age 20-49</b>	<b>Elective</b>	<b>Non- Elective</b>	<b>PQI</b>	<b>Hyper- tension</b>	<b>Suicide</b>	<b>Malaise</b>	<b>Gastro- Intestinal</b>	<b>AMI or Stroke</b>	<b>Chest pain, etc.</b>	<b>Upper Resp. Inf.</b>
Mean #Visits (Zip)	35.57	1227.05	81.69	6.88	0.52	108.22	97.77	12.57	51.46	62.39
Mean #Visits (County)	2212	71879	4849	398	34	6340	569	758	3126	3384
Mean #Visits (Priv. Ins.)	21.84	456.71	29.21	2.38	0.166	46.07	37.54	5.17	24.71	22.59
<i>1. Add Controls for Zip Level Housing Prices and Vacancies, Show Controls for REO</i>										
Foreclosures	-0.0029 (0.003)	0.5005* (0.050)	0.0463* (0.006)	0.0029* (0.001)	0.0017* (0.000)	0.0655* (0.007)	0.0441* (0.006)	0.0001 (0.002)	0.0271* (0.005)	0.0902* (0.013)
REO	-0.0001 (0.003)	0.1897* (0.053)	0.0263* (0.007)	0.0029 (0.002)	0.0000 (0.000)	0.0220* (0.010)	0.0037 (0.007)	-0.0001 (0.002)	0.0087* (0.005)	0.0798* (0.018)
Housing Price (\$1000s)	0.0049* (0.002)	-0.1320* (0.047)	-0.0085* (0.005)	0.0004 (0.001)	0.0008* (0.000)	-0.0148* (0.006)	-0.0052 (0.005)	-0.0020 (0.001)	-0.0045 (0.003)	-0.0182* (0.006)
Vacancies	-0.0017* (0.001)	0.0494* (0.013)	0.0052* (0.001)	0.0011* (0.000)	0.0007* (0.000)	0.0083* (0.002)	0.0053* (0.001)	0.0001 (0.000)	0.0033* (0.001)	0.0081* (0.002)
<b>% Change</b>	-0.0056%	<b>0.0408%</b>	<b>0.0567%</b>	<b>0.0422%</b>	<b>0.3269%</b>	<b>0.0605%</b>	<b>0.0451%</b>	0.0008%	<b>0.0527%</b>	<b>0.1446%</b>
# Obs.	43,006	43,006	43,006	43,006	43,006	43,006	43,006	43,006	43,006	43,006
<i>2. Include 2005 to 2007 Only</i>										
Foreclosures	-0.0102 (0.007)	0.3889* (0.110)	0.0188 (0.015)	0.0094* (0.003)	-0.0003 (0.001)	0.0647* (0.017)	0.0799* (0.015)	0.0003 (0.005)	0.0181* (0.009)	-0.0076 (0.017)
<b>% Change</b>	-0.0287%	<b>0.0317%</b>	0.0230%	<b>0.1366%</b>	0.0000%	<b>0.0598%</b>	<b>0.0817%</b>	0.0024%	<b>0.0352%</b>	-0.0122%
# Obs.	35,250	35,250	35,250	35,250	35,250	35,250	35,250	35,250	35,250	35,250
<i>3. Include Interaction with Unemployment Rate</i>										
Foreclosures * UR	-0.0008 (0.001)	0.0785* (0.012)	0.0066* (0.001)	0.0006* (0.000)	0.0006* (0.000)	0.0080* (0.002)	0.0048* (0.001)	-0.0000 (0.000)	0.0033* (0.001)	0.0203* (0.002)
Foreclosures	0.0031 (0.006)	-0.2435* (0.124)	-0.0179 (0.015)	-0.0021 (0.003)	-0.0036* (0.001)	-0.0052 (0.018)	0.0032 (0.014)	-0.0005 (0.004)	-0.0014 (0.008)	-0.1072* (0.026)
<b>%Change, UR=10</b>	-0.0138%	<b>0.0441%</b>	<b>0.0589%</b>	<b>0.0567%</b>	<b>0.4615%</b>	<b>0.0691%</b>	<b>0.0524%</b>	-0.0040%	<b>0.0614%</b>	<b>0.1536%</b>
<b>%Change, UR=5</b>	-0.0025%	<b>0.0121%</b>	<b>0.0185%</b>	<b>0.0131%</b>	<b>-0.1154%</b>	<b>0.0322%</b>	<b>0.0278%</b>	-0.0040%	<b>0.0293%</b>	<b>0.0125%</b>
# Obs.	63,450	63,450	63,450	63,450	63,450	63,450	63,450	63,450	63,450	63,450
<i>4. Estimate Model at County Level</i>										
Foreclosures	0.0426* -0.089	0.7334* -0.199	0.0656* -0.014	0.0047* (0.001)	0.0110* (0.000)	0.1236* (0.014)	0.0707* (0.008)	-0.0013 (0.002)	0.0499* -0.015	0.1447* -0.064



Foreclosures	-0.0003 (0.006)	-0.0780 (0.052)	-0.0071 (0.009)	-0.0033 (0.002)	-0.0010** (0.000)	-0.0015 (0.006)	-0.0054 (0.007)	0.0124* (0.004)	-0.0016 (0.007)	-0.0132* (0.007)
<b>% Change, UR=10</b>	0.0154%	<b>0.0602%</b>	<b>0.0647%</b>	<b>0.0753%</b>	<b>0.0000%</b>	<b>0.0852%</b>	<b>0.0511%</b>	0.0263%	<b>0.0652%</b>	<b>0.1269%</b>
<b>% Change, UR=5</b>	0.0073%	<b>0.0205%</b>	<b>0.0241%</b>	<b>0.0112%</b>	<b>-0.4167%</b>	<b>0.0400%</b>	<b>0.0177%</b>	0.0008%	<b>0.0299%</b>	<b>0.0189%</b>
# Obs.	63,450	63,450	63,450	63,450	63,450	63,450	63,450	63,450	63,450	63,450

*9. Estimate Model at County Level*

Foreclosures	-0.0194 (0.014)	0.3712* (0.124)	0.0374* (0.017)	0.0077* (0.002)	0.0027* (0.000)	0.0386* (0.010)	0.0235* (0.008)	0.001 (0.005)	0.022 (0.014)	0.024 (0.017)
Unemployment Rate	-18.64 (14.18)	134.01 (186.75)	28.69 (21.16)	6.16* (2.85)	-0.381 (0.455)	7.59 (15.97)	9.29 (14.58)	5.76 (5.06)	16.15 (20.94)	21.82 (21.63)
<b>% Change</b>	-0.0009%	<b>0.0015%</b>	<b>0.0014%</b>	<b>0.0020%</b>	<b>0.0348%</b>	<b>0.0023%</b>	<b>0.0011%</b>	0.0001%	0.0013%	0.0029%
# Obs.	2898	2898	2898	2898	2898	2898	2898	2898	2898	2898

*10. Include Privately Insured Visits Only*

Foreclosures	0.0025 (0.002)	0.0356* (0.010)	0.0051* (0.002)	0.0005 (0.001)	0.0001 (0.000)	0.0042* (0.002)	0.0034* (0.002)	-0.0002 (0.001)	0.0011 (0.002)	0.0067* (0.001)
<b>% Change</b>	0.0104%	<b>0.0197%</b>	<b>0.0319%</b>	0.0203%	0.2083%	<b>0.0291%</b>	<b>0.0204%</b>	0.0000%	0.0067%	<b>0.1060%</b>
# Obs.	63,450	63,450	63,450	63,450	63,450	63,450	63,450	63,450	63,450	63,450

Notes: Standard errors are clustered at the zip code level and shown in parentheses. An asterisk indicates statistical significance at the 95% level of confidence.

Bold type indicates that the estimated coefficient used to compute the percent change is statistically significant.

All regressions except the county-level control for zip code fixed effects, number of real-estate owned properties, and for county\*quarter\*year effects.

County-level models include county and year fixed effects and the number of real-estate owned properties.

Percent changes are calculated using most recently given means in all cases.

Regressions are weighted using 2000 zip code population.

**Appendix 1: Effects of Foreclosure by Race and Ethnicity**

	Elective	Non Elective	PQI	Diabetes	Hypertension	Asthma	Anxiety	Suicide	Other Mental
<b>Black 65+</b>									
Effect of	-0.0002	0.0006	0.0001	0.0030	0.0006	-0.0029	0.0011	0.0001	0.0013
Foreclosures	(0.004)	(0.026)	(0.013)	(0.003)	(0.004)	(0.002)	(0.001)	(0.000)	(0.001)
Number Visits	17.00	202.81	39.05	6.51	6.33	2.74	1.28	0.00	1.92
<b>% Change</b>	0.0000%	0.0003%	0.0003%	0.0461%	0.0095%	-0.0730%	0.0859%	...	0.0677%
<b>Black 50-64</b>									
Effect of	0.0027	0.1091*	0.0203*	0.0019	0.0068*	0.0039*	0.0045*	0.0002	0.0031
Foreclosures	(0.003)	(0.039)	(0.007)	(0.002)	(0.003)	(0.002)	(0.002)	(0.000)	(0.002)
Number Visits	13.14	247.6	35.12	6.97	7.8	6.01	5.08	0.05	4.17
<b>% Change</b>	0.0205%	<b>0.0441%</b>	<b>0.0578%</b>	0.0273%	<b>0.0872%</b>	<b>0.0649%</b>	<b>0.0886%</b>	0.4000%	0.0743%
<b>Black 20-49</b>									
Effect of	-0.0010	0.2267*	0.0190*	0.0039*	0.0033	0.0045	0.0177*	0.0011*	0.0061
Foreclosures	(0.003)	(0.064)	(0.007)	(0.002)	(0.002)	(0.003)	(0.006)	(0.000)	(0.006)
Number Visits	15.06	690.84	54.81	8.32	8.48	15.47	14.3	0.2	11.59
<b>% Change</b>	-0.0066%	<b>0.0328%</b>	<b>0.0347%</b>	<b>0.0469%</b>	0.0389%	0.0291%	<b>0.1238%</b>	<b>0.5500%</b>	0.0526%
<b>Black 0-19</b>									
Effect of	-0.0019*	0.1209*	0.0076	0.0002	-0.0000	0.0039	0.0050*	0.0003	0.0020
Foreclosures	(0.001)	(0.041)	(0.006)	(0.001)	(0.000)	(0.005)	(0.002)	(0.000)	(0.002)
Number Visits	3.2	445.49	38.55	0.91	0.17	21.24	2.97	0.06	2.72
<b>% Change</b>	<b>-0.0600%</b>	<b>0.0271%</b>	0.0197%	0.0220%	0.0000%	0.0184%	<b>0.1684%</b>	0.5000%	0.0735%
<b>Hispanic 65+</b>									
Effect of	0.0104*	0.1460*	0.0228*	0.0016	0.0040*	0.0021*	0.0021*	0.0001*	-0.0003
Foreclosures	(0.004)	(0.040)	(0.008)	(0.001)	(0.002)	(0.001)	(0.001)	(0.000)	(0.001)
Number Visits	23.4	229.02	41.13	5.05	5.08	2.35	1.98	0.01	1.99
<b>% Change</b>	<b>0.0444%</b>	<b>0.0637%</b>	<b>0.0554%</b>	0.0317%	<b>0.0787%</b>	<b>0.0894%</b>	<b>0.1061%</b>	<b>1.0000%</b>	0.0000%
<b>Hispanic 50-64</b>									
Effect of	0.0028*	0.1635*	0.0185*	0.0062*	0.0028*	0.0031*	0.0090*	0.0003*	-0.0004
Foreclosures	(0.002)	(0.020)	(0.003)	(0.001)	(0.001)	(0.001)	(0.002)	(0.000)	(0.001)
Number Visits	10.82	166.65	19.46	4.61	3.2	2.42	4.54	0.02	2.41
<b>% Change</b>	<b>0.0259%</b>	<b>0.0981%</b>	<b>0.0951%</b>	<b>0.1345%</b>	<b>0.0875%</b>	<b>0.1281%</b>	<b>0.1982%</b>	<b>1.5000%</b>	0.0000%



<b>Hispanic 20-49</b>									
Effect of	0.0016	0.6224*	0.0506*	0.0066*	0.0037*	0.0087*	0.0228*	0.0009*	0.0076*
Foreclosures	(0.002)	(0.071)	(0.006)	(0.002)	(0.001)	(0.002)	(0.005)	(0.000)	(0.002)
Number Visits	12.57	579.81	40.3	6.29	2.87	7.77	20.69	0.15	8.61
<b>% Change</b>	0.0127%	<b>0.1073%</b>	<b>0.1256%</b>	<b>0.1049%</b>	<b>0.1289%</b>	<b>0.1120%</b>	<b>0.1102%</b>	<b>0.6000%</b>	<b>0.0883%</b>
<b>Hispanic 0-19</b>									
Effect of	-0.0004	0.9825*	0.0680*	0.0018*	-0.0006*	0.0208*	0.0070*	0.0000	0.0024*
Foreclosures	(0.002)	(0.112)	(0.010)	(0.001)	(0.000)	(0.005)	(0.002)	(0.000)	(0.001)
Number Visits	4.35	644.15	50.96	0.88	0.13	16.33	5.97	0.09	2.25
<b>% Change</b>	0.0000%	<b>0.1525%</b>	<b>0.1334%</b>	<b>0.2045%</b>	<b>0.0000%</b>	<b>0.1274%</b>	<b>0.1173%</b>	0.0000%	<b>0.1067%</b>

Notes: Only zip codes for CA, NJ and FL are included. AZ does not identify race and ethnicity. Standard errors are clustered at the zip code level and shown in parentheses. An asterisk indicates statistical significance at the 95% level of confidence. Bold type indicates that the estimated effect used to compute the percent change is statistically significant. All regressions control for zip code fixed effects, number of real-estate owned properties, and for county\*quarter\*year effects. Regressions are weighted using 2000 zip code population.

**Appendix 2: Effects on Visits by Type, Race, and Ethnicity**

	<b>Cancer</b>	<b>Injuries</b>	<b>Malaise</b>	<b>Gastro- Intestinal</b>	<b>UI Tract</b>	<b>Heart Attack or Stroke</b>	<b>Chest pain, etc.</b>	<b>Upper Resp. Inf.</b>	<b>Other Respiratory</b>
<b>Black 65+</b>									
Effect of	0.0006	-0.0012	-0.0017	0.0063*	0.0026	0.0019	0.0010	-0.0020	-0.0054*
Foreclosures	(0.002)	(0.004)	(0.003)	(0.003)	(0.003)	(0.006)	(0.003)	(0.003)	(0.003)
Number Visits	4.29	23.58	13.17	16.83	12.58	25.67	13.21	7.18	13.21
<b>% Change</b>	0.0140%	-0.0042%	-0.0076%	<b>0.0374%</b>	0.0207%	0.0074%	0.0076%	-0.0279%	<b>-0.0379%</b>
<b>Black 50-64</b>									
Effect of	0.0013	0.0105*	0.0083*	0.0072*	0.0050*	0.0131*	0.0063	0.0080*	0.0120*
Foreclosures	(0.001)	(0.005)	(0.004)	(0.004)	(0.003)	(0.004)	(0.006)	(0.004)	(0.005)
Number Visits	3.74	36.38	15.41	17.4	8.48	16.58	16.66	10.32	12.52
<b>% Change</b>	0.0348%	<b>0.0289%</b>	<b>0.0539%</b>	<b>0.0414%</b>	<b>0.0590%</b>	<b>0.0790%</b>	0.0378%	<b>0.0775%</b>	<b>0.0958%</b>
<b>Black 20-49</b>									
Effect of	0.0009	0.0122	0.0310*	0.0227*	0.0109*	0.0036	0.0157*	0.0190*	0.0069*
Foreclosures	(0.002)	(0.014)	(0.008)	(0.007)	(0.005)	(0.002)	(0.006)	(0.009)	(0.003)
Number Visits	3.78	117.39	53.43	46.99	25.65	8.95	29.5	42.03	21.75
<b>% Change</b>	0.0238%	0.0104%	<b>0.0580%</b>	<b>0.0483%</b>	<b>0.0425%</b>	0.0402%	<b>0.0532%</b>	<b>0.0452%</b>	<b>0.0317%</b>
<b>Black 0-19</b>									
Effect of	-0.0008	0.0069	0.0374*	-0.0082*	0.0011	-0.0005	-0.0014	0.0418*	0.0114*
Foreclosures	(0.001)	(0.010)	(0.009)	(0.004)	(0.002)	(0.000)	(0.001)	(0.016)	(0.004)
Number Visits	0.47	95.82	49.17	29.92	9.13	0.51	4.2	72.81	15.48
<b>% Change</b>	0.0000%	0.0072%	<b>0.0761%</b>	<b>-0.0267%</b>	0.0120%	0.0000%	-0.0238%	<b>0.0574%</b>	<b>0.0736%</b>
<b>Hispanic 65+</b>									
Effect of	0.0031*	0.0230*	0.0141*	0.0142*	0.0117*	0.0043	0.0099*	0.0081*	0.0129*
Foreclosures	(0.002)	(0.007)	(0.004)	(0.005)	(0.004)	(0.005)	(0.003)	(0.003)	(0.005)
Number Visits	4.93	31.12	15.58	23.9	15.34	27.43	14.39	9.86	15.24
<b>% Change</b>	<b>0.0629%</b>	<b>0.0739%</b>	<b>0.0905%</b>	<b>0.0594%</b>	<b>0.0763%</b>	0.0157%	<b>0.0688%</b>	<b>0.0822%</b>	<b>0.0846%</b>
<b>Hispanic 50-64</b>									
Effect of	0.0013	0.0151*	0.0183*	0.0122*	0.0087*	0.0040*	0.0107*	0.0123*	0.0089*
Foreclosures	(0.001)	(0.003)	(0.003)	(0.003)	(0.003)	(0.002)	(0.003)	(0.002)	(0.002)
Number Visits	2.77	25.16	13	16.49	8.97	9.28	11.25	6.24	6.74
<b>% Change</b>	0.0469%	<b>0.0600%</b>	<b>0.1408%</b>	<b>0.0740%</b>	<b>0.0970%</b>	<b>0.0431%</b>	<b>0.0951%</b>	<b>0.1971%</b>	<b>0.1320%</b>

<b>Hispanic 20-49</b>									
Effect of	0.0013	0.0403*	0.0722*	0.0430*	0.0338*	0.0027*	0.0230*	0.0882*	0.0263*
Foreclosures	(0.001)	(0.014)	(0.009)	(0.007)	(0.006)	(0.001)	(0.004)	(0.012)	(0.004)
Number Visits	3.34	106.94	54.02	51.7	28.32	4.66	22.79	28.43	15.66
<b>% Change</b>	0.0389%	<b>0.0377%</b>	<b>0.1337%</b>	<b>0.0832%</b>	<b>0.1194%</b>	<b>0.0579%</b>	<b>0.1009%</b>	<b>0.3102%</b>	<b>0.1679%</b>
<b>Hispanic 0-19</b>									
Effect of	0.0008	0.1224*	0.1645*	0.0342*	0.0238*	0.0010*	0.0094*	0.2984*	0.0468*
Foreclosures	(0.001)	(0.019)	(0.020)	(0.009)	(0.004)	(0.001)	(0.002)	(0.049)	(0.009)
Number Visits	1.25	135.13	87.34	54.52	15.92	0.62	4.29	119.96	21.78
<b>% Change</b>	0.0640%	<b>0.0906%</b>	<b>0.1883%</b>	<b>0.0627%</b>	<b>0.1495%</b>	<b>0.1613%</b>	<b>0.2191%</b>	<b>0.2487%</b>	<b>0.2149%</b>

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