# Is the Foreclosure Crisis Making Us Sick?

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Abstract

This paper investigates the relationship between foreclosure activity at the zip code level, and the health of residents of the zip code. We use data from Arizona, Florida, and New Jersey, three states that have been hard hit by the foreclosure crisis. We combine foreclosure data for 2005 to 2009 from RealtyTrac with data on emergency room visits and hospital discharges. We find that the presence of Real Estate Owned (REO) properties in the neighborhood is associated with increases in medical visits for mental health (anxiety and suicide attempts); preventable conditions (such a hypertension); and with increases in a broad array of physical complaints that are plausibly stress-related. The effects are much larger for blacks than for whites, consistent with the perception that African-Americans have been particularly hard hit.

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 rise from 2007. While a number of studies have investigated the effect of the foreclosure crisis on home prices, home values, and home sales (Calomiris, Longhofer, and Miles, 2008; Mian, Sufi, and Trebbi, 2011), there has been no large-scale investigation of the effect of the crisis on health.

Home foreclosures might be expected to have negative effects on health through several mechanisms. First, for the individuals directly involved, a home foreclosure is an intensely stressful life event of significant duration. 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; Cooper, 2005; Schneiderman, Ironson, and Siegel, 2005). Second, a high rate of foreclosure in a neighborhood also has negative impacts on those who do not lose their homes as homeowners see the value of their properties fall. This may be especially true if there are many bank-owned properties which remain unsold. Third, financial problems and stress may cause changes in health behaviors, which in turn 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. For example, recent news reports suggest that declines in utilization of medical care have led to record profits for health insurers in the wake of the financial crisis (Abelson, 2011).

In order to investigate these health effects, we assemble quarterly data on all foreclosures, Emergency Room (ER) visits, and hospitalizations from three states (Arizona, 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 then ask whether ER visits and hospitalizations for stress related conditions rise in zip codes that are heavily impacted relative to zip codes in the same county, quarter, and year that are less heavily impacted. We also distinguish between elective hospitalizations and hospitalizations and ER visits for non-elective hospitalizations, as well as analyzing hospitalizations and ER visits for different types of conditions. 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 hospitalizations and ER visits among 18 to 64 year olds, but not among those who are 65 and over, who have health insurance under Medicare. There is a large increase in conditions that are "Prevention Quality Indicators," i.e. conditions which should not result in hospital or ER visits if patients receive proper preventive care. Notably, an increase in REO properties of 28.7, which is the increase experienced in the average zip code in our sample, would increase visits for hypertension by 6.3 percent among those 18 to 64, and would increase visits for diabetes by 3.4 percent. The largest increase in physical health problems is in a category that might be described as "malaise" and which includes "fever of unknown origin", abdominal pain, nausea and so on. For this category, an increase in REOs of 28.7 is associated with a 4 percent increase in visits. We also estimate that an increase in REOs of

this magnitude would increase visits for a number of physical conditions including urinary tract infections, gastro-intestinal problems, skin infections, and others by approximately 2 percent. It is notable that we do not find evidence of any effects of foreclosure activity on visits for cancer, heart attack or stroke. The null finding for cancer is expected, as, while stress may cause cancer over the longer term, it is not expected to do so in the short term. The null finding for heart attacks and stroke may reflect the fact that these conditions typically impact older people whereas we find the largest health effects among those less than 55. We do find considerable evidence of increases in heart problems that afflict younger people such as chest pain and dysrthmias.

Turning to mental health conditions, we find a large effect on visits for anxiety: An increase of 28.7 REOs would be associated with 3.3 percent more visits. We also find that such an increase in REOs would be associated with a very large effect on visits for suicide attempts, an increase of 23 percent. But this finding should be interpreted with caution given the small numbers of visits for suicide attempts in our data.

Since in two states (FL and NJ) the medical records we will examine identify a patient's race and ethnicity, we are able to conduct separate analyses by demographic group. The sharp rise in foreclosures is thought to have disproportionately affected vulnerable minority populations. But these populations may be at "double jeopardy": Both more likely to suffer foreclosure, and more likely to suffer ill health due to foreclosure. We find that the health effects of foreclosure are in fact much greater for blacks than for whites with the exception of suicide, where we only find effects among whites. For example, we estimate that at the mean increase in the number of real-estate owned properties, visits for upper respiratory tract infections among blacks 18-64 increased by 9.2 percent compared to 2.8 percent among whites in that age group.

The rest of the paper is laid out as follows. We first give some background information about the foreclosure crisis, and previous work on the relationship between economic activity and health. We then discuss our data and methods, followed by the results, and a brief conclusion.

**Background:**

An array of explanations have been offered for the foreclosure crisis including a relaxation in underwriting standards and the expansion of mortgage credit to subprime borrowers (e.g., Mian and Sufi, in press; Dell'Ariccia, Igan, and Laeven, 2008; Demyanyk and Van Hemert, 2011), mortgage securitization having an adverse affect 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). A related literature has focused on the economic consequences of foreclosures on a number of economic outcomes, such as home prices, sales, and property values (e.g., Campbell, Giglio, and Pathak, 2009; Calomiris, Longhofer, and Miles, 2008, Harding, Rosenblatt, and Yao, 2009, Lin, Rosenblatt, and Yao, 2009; Immergluck and Smith, 2006a) and the overall economy (e.g., Green, 1997; Leamer, 2007; Gauger and Snyder, 2003).

The implications of the crisis for non-economic domains such as health have been mostly ignored.[1]  Home ownership is positively associated with better physical and mental health for adults and children (Dietz and Haurin, 2004; Dunn and Hayes, 2000; Searle, Smith, and Cook, 2009; Fogelman, Fox, and Power, 1989; Pollack, Knesebeck, and Siegrist, 2004) though this may be in part because richer individuals are both in better health and more likely to own homes on average. However, individuals experiencing difficulty making their mortgage payments experience lower levels of psychological well-being and are more likely to have doctor visits, conditional on financial hardship (Nettleton and Burrows, 1998; Taylor, Pevalin, and Todd, 2007).

Thus, it is possible that foreclosure places demands on a homeowner's health both mentally and physically (Bennett, Scharoun-Lee, and Tucker Seeley, 2009; Fields, Libman, and Saegert, 2010; Bowdler at al., 2010).  These concerns have also been voiced in the media with stories highlighting rising rates of depression, anxiety, and even suicide in high foreclosure communities (Ablow, 2008; Butts, 2010; Sundaram, 2011).

While there have been some qualitative descriptions of the disruption caused by foreclosure, on people's lives (Nettleton and Burrows 2000, 2001; Ross and Squires, 2011) there is little quantitative evidence about the existence or size of these potential impacts.  In fact, a recent article by Bennett, Scharoun-Lee, and Tucker-Seeley (2009) points to the urgent need for credible research investigating the health effects of foreclosures.

In the only previous study to consider this question, Pollack and Lynch (2009) compared the health status of individuals enrolled in mortgage counseling in Philadelphia with participants in a community health survey in Pennsylvania between July and October 2008.  Members of the

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[1] One exception is Immegluck and Smith (2006b) who show that higher levels of foreclosures are associated with increased violent crime, using data from Chicago.  However, this study uses data from 2000, which predates the beginning of the current foreclosure crisis.

foreclosure sample were significantly more likely to have hypertension, heart disease, and a clinician-diagnosed psychiatric condition than the community sample. However, it is possible that poor health causes foreclosure rather than vice-versa (over a quarter of their foreclosure group owed money to medical creditors) and there may be unobserved differences between individuals going through foreclosure and the population at large. Moreover, the treatment group in Pollack and Lynch (2009) were self-selected individuals who were seeking mortgage counseling. Finally, Philadelphia had substantially lower rates of foreclosures than the hardest hit areas in the U.S., ranking 77th among metropolitan areas in foreclosures in 2008.

There is an extensive literature linking stressful life events like unemployment, job loss, financial strain, and poverty with increased risk for a number of mental and physical health conditions (Catalano, 2009; Currie, 2009; Currie and Lin, 2007; Dooley, Fielding, and Levi, 1996; Gallo et al., 2000; Strully, 2009, Belkic et al., 2005, Kahn and Pearlin, 2006, Woolf, Johnson, and Geiger, 2006, Bosma et al., 1998; Kuhn, Lalive, and Zweimuller, 2009; Sullivan and Wachter, 2009) and it is possible that foreclosure acts in a similar way. The Sullivan and Wachter (2009) paper is especially notable since they were able to use a large sample of individual-level data and follow individuals who had 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. Moreover, there is evidence linking economic crisis to reductions in utilization of medical care (Lusardi, Schneider, and Tufano, 2010; Williams and Collins, 1995; Feinstein, 1993).

On the other hand, there are a number of studies suggesting that recessions are associated with reductions in deaths due to some conditions including heart attacks and accidents (e.g., Ruhm, 2000, 2003, 2007; Ruhm and Black, 2002; Neumayer, 2004; Gerdtham and Ruhm, 2006), and with improvements in infant health (Dehejia and Lleras-Muney, 2003). These patterns have been

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attributed to recession-induced changes in health behaviors. 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, Miller et al. (2009) argue that declines in mortality with recessions are concentrated among the elderly, so that they may reflect reductions in the amount of time working-age people have to care for elderly relatives rather than poorer health behaviors among working-aged people.

In summary, the previous literature has largely ignore the possible link between the foreclosure crisis and population health, though it does suggest that there could be a link. Our work improves on existing work by using a longitudinal data base of all foreclosures, ER visits, and hospitalizations between April 2005 and December 2009 in three large states that are among the hardest hit by the foreclosure crisis. The estimates will constitute an important baseline for future research by providing estimates of the impact of foreclosures on a range of important health problems.

The research will also help to shed light on the relationship between stress and health more generally. Studies of this relationship often suffer from the same limitations as Pollack and Lynch. However, the foreclosure crisis is large and unforeseen, and has had very different impacts on different areas, even within the same county. Hence, it is an ideal "natural experiment" for examining the effects of a stress event like foreclosure on health.

Our research adds to the literature by recognizing and attempting to address the econometric challenges involved in identifying the effect of foreclosures on health. Our detailed longitudinal zip code level data allow us to control for many potential confounders that might create a relationship between neighborhood foreclosure rates and the incidence of morbidity. We control for unobserved characteristics of neighborhoods by estimating models that include zip code level fixed

effects, as well as controls for interactions of each county, quarter, and year. Our analyses are based on all patients and all neighborhoods with any foreclosures in the three states, rather than on selected samples of patients or neighborhoods.

**Data:**

We focus on the states of Arizona, Florida and New Jersey for several reasons. First, we wish to focus on states that have recently had extremely high levels of foreclosures. These three states are in the top 10, posting the 3rd, 2nd, and 10th 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 (for example, the National Inpatient Database has a 20% 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). It is important to include ER visits in addition to hospitalizations, because financial constraints can affect the probability that someone on the margin is admitted to hospital when they 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 documents that RealtyTrac collect have information both about the actual foreclosure auction, which includes filings of a notice of trustee sales (NTS) and/or a notice of foreclosure sale (NFS); and about real-estate owned (REO) properties, which are properties that have gone back to the mortgage lender after an unsuccessful foreclosure auction.  Following instructions from RealtyTrac, we construct measures of foreclosures as NTS+NFS.  We will also examine the effect of REOs, which may be a more potent measure of financial distress.  The presence of many REO properties in the neighborhood may indicate that property values have been severely damaged, so that other families in the neighborhood are more likely to find themselves "under water," i.e. owing more than their property is worth.

Our health measures come from two databases collected by the Healthcare Cost and Utilization Project (HCUP), which services a family of health care databases developed through a Federal-State-Industry partnership and sponsored by the Agency for Healthcare Research and Quality (AHRQ). For ER department visits, we rely upon the HCUP's State Emergency Department Databases (SEDD), which capture discharge information on all emergency department visits that do not result in an admission. Our hospitalization data come from the HCUP's State Inpatient Databases (SID), which hold the universe of inpatient discharge abstracts from individual states.  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 aggregation in both databases is the zip code.[2]

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[2] 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.  In total, there are 2,794 zip codes in our data.  We drop 933 zip codes when we restrict the sample to ZCTAs only, but since the largest zip codes

Foreclosures may be associated with certain health conditions that are more likely to result in ER department visits and others, which may show up as hospitalizations. And, as discussed above, foreclosures may also alter the probability that a given contact results in a hospitalization rather than an ER visit alone. By combining the two sources of data, we provide a more comprehensive picture of the relationship between foreclosures and health. 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 among those over 18, other than those for childbirth, contraception, abortion and other elective procedures. We also look separately at elective procedures (which never occur in ERs).

Figures 1 and 2 show changes in foreclosure rates and changes in non-elective visits (both hospital and ER) for zip codes in New Jersey, one of our sample states. Rates are calculated using zip code population data from the 2000 Census. That is, these rates can be interpreted as the number of foreclosures, REOs, 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 a good deal of variation across zip codes in both types of changes. They also suggest that areas that experienced the sharpest increases in foreclosures also experienced the largest increases in hospitalizations, which is suggestive.

Table 1 explores this relationship further. The table shows means for all zip codes, as well as for those that were in the top and bottom fifths of the distribution of number of foreclosures in 2009. While the average zip code in our sample had 68.7 foreclosures and 31.3 REOs in 2009, zip codes in the top fifth had 202.2 foreclosures and 86.8 REOs which can be compared to only 6 foreclosures and 3.4 REOs in the least impacted zip codes. The table shows that while the "top

are also ZCTAs, this results in a loss of less than 10% of our sample. For ease of understanding we use the term zip code throughout.

fifth" zip codes also had more foreclosures and REOs in 2005, foreclosure or REO activity has increased much faster in the most heavily impacted zip codes.

The rate of foreclosures and REOs increased more than 10 fold in the most highly impacted zip codes, but showed little change in the least impacted zip codes. The latter is consistent with the idea that even in zip codes that were not much impacted by the crisis there were a few individuals who continued to lose their homes for idiosyncratic reasons.

The most interesting fact shown in the table is that non-elective visits (hospital plus ER visits) rates increased by about 10 percent in the most heavily impacted zip codes, and stayed flat in zip codes in the "bottom fifth". Hence the raw data suggests that there may be a relationship between foreclosure activity and health.

The HCUP data sets classify diagnoses using a tool called Clinical Classification Software CCS). More information is available at http://www.hcup-us.ahrq.gov/toolssoftware/ccs/ccs.jsp#download. This software takes thousands of International Classification of Disease 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 Tonsilitis), 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 variable that we consider is an index of "Prevention Quality Indicators" (PQIs). These indicators are published by the Agency for Healthcare Research and Quality and are based on ICD-9-CM diagnosis codes. PQIs are index conditions for which good outpatient care can potentially prevent the need for hospitalization or ER visits, or for which early

intervention can prevent complications or more severe disease.  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 (Sterk, Theall, Elifson, 2002; Virtanen et al., 2006; Cobaugh, 2008), 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 various categories of people and zip codes.  The first column 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, asthma) and those are broken out separately.   The non-elective conditions are quite skewed towards a few diagnoses.  For example, injuries, malaise, and gastrointestinal problems together account for 37% of visits.  Adding in skeletal problems and urinary tract problems increases the total accounted for to 48.5%.  In what follows, we will focus on diagnoses with a mean of 50 or more total visits, as well as on the PQI 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.   It is remarkably that while the difference in population is about 25 percent, zip codes in the top fifth of foreclosure activity have more than

double the number of PQI visits.   In fact, people in these areas experience more than double the number of hospitalizations for most categories of visits.   Visits for suicide attempts stand out since, while rare, they are almost 10 times more prevalent in high foreclosure areas.

The rest of Table 2 shows distributions of visit types for different demographic categories. It is worth noting that those 18-64 have many visits in most of our categories, though for certain categories, such as heart attacks and strokes, the sufferers are much more likely to be elderly (unless they are African-American in which case younger people have about the same numbers of heart attacks and strokes as older people).   Turning to injuries, which is the largest category of visit, it is overwhelmingly younger people who suffer.   It is striking that people over 65 have very few visits for mental health problems, relative to younger people, and virtually no suicide attempts.

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 1,861 zip codes with 19 time periods for a total of 35,359 observations.

**Research Design and Methods:**

While some individuals have always wound up in foreclosure, the spike in foreclosures between 2007 and 2009 was due to loose lending standards and questionable banking practices rather than to changes in the health of individual homeowners.   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, 2008; Calomiris, Longhofer, and Miles, 2008). Hence, there is no reason to suppose that the vast majority of foreclosures were caused by health

problems on the part of homeowners, and any relationship between the increase in foreclosures and increased health problems is likely to represent a relationship running from stress and foreclosure to health rather than vice versa.

There are several elements that will assist us in identifying the relationship between foreclosures and health. First, there is substantial variation across zip codes and over time in the rate of foreclosure as illustrated in Figures 1 and 2. Second, while prolonged stress is thought to take a general toll on health (McEwen, 1998), some health conditions may be more immediately sensitive to stress than others. For example, stress has been linked to increased inflammation and depressed immune function. Stress is also closely linked to mental health problems such as depression and anxiety. Thus we might expect to see increases in these conditions relative to conditions such as cancer which might take longer to respond.

Third, as discussed above, financial distress due to foreclosure could have both a direct effect on health, and an indirect effect through reductions in ability to pay for needed medications and medical care. We are able to identify the latter effect by examining PQI visits. We will also compare people over 65, who have health insurance through the public Medicare program, to those 55-64 who do not have public insurance, as discussed further below.

We will estimate a series of models that relate changes in the number of hospitalizations or ER visits to the number of foreclosures:

(1) $\qquad H_{zqy} = \alpha_0 + \alpha_1 \, F_{zqy} + \mu_z + \lambda_{cqy} + \varepsilon_{zqy},$

where $H_{zqy}$ is one of our outcome measures such as the number of ER visits in zip code z in quarter q in year y. The variable of interest in equation (1) is the $F_{zqy}$, which represents one or both of the two foreclosure measures. 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. The use of high frequency zip code level data is an important strength of the research because it allows us to control for many potential confounding factors through the inclusion of fixed effects. Inclusion of zip code fixed effects simulates a difference-in-difference model and allows us to identify the effects of foreclosures by using within-zip code variation in foreclosure activity over time.

The vector $\lambda_{cqy}$ includes an indicator for each county, quarter and year. These indicators control for the effects of local economic conditions. For example, these indicators 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. It is conceivable (and indeed likely) that unemployment varies 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, it is important to recall that while high levels of unemployment are thought to be currently causing foreclosures (Schmidt, 2011), this was not the case during our sample period, when the main cause of foreclosure was questionable mortgage practices and the resulting collapse of the housing market.

The vector $\varepsilon_{zqy}$ represents an idiosyncratic random error term. To adjust for correlations within a zip code, standard errors will be clustered at the zip code level. The unit of analysis in equation (1) is a zip code, quarter, and year.

Note that we have specified (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 foreclosure. 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 (1) is equivalent to an equation 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, and we also weight using zip code population for the relevant demographic group in 2000.

Although we argued above that the sharp rise in foreclosures is not likely to have been caused by a decline in population health, the high-frequency of our data also reduces the probability of reverse causality from health to foreclosures. Specifically, variations in health in a particular quarter are not likely to impact foreclosures in the same quarter.

Our confidence in the estimated the effects of foreclosure on health will be increased if we can show that there is a group of conditions that one would not expect to be affected by the immediate foreclosure crisis. We will treat cancer as this "control" condition. Stress related to foreclosures should not immediately cause cancer, though it is possible that it could, for example, increase infection rates among cancer victims. Still, we expect a smaller impact of foreclosure on ER visits and hospitalizations among cancer patients. The effect could even be negative if patients choose to forego or postpone treatments due to financial constraints.

We also conduct separate analyses by age. An important consideration is that people 65 and over have health insurance through Medicare. Hence, financial constraints should not reduce their access to care. However, if we find weak effects of foreclosure among the elderly, this might also be because they were less impacted by the foreclosure crisis. There is evidence that while overall levels of financial literacy are poor (Lusardi and Tufano, 2009), financial decision making improves with age (Agarwal et al., 2009) and that older people are less likely to borrow on the equity in their homes (Duca and Kumar, 2010). There is little information available about which age groups are most likely to have suffered from the current foreclosure crisis. 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. Lucy and Herlitz (2009) note that the

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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.

Hence, in addition to comparing those 65 and older to those 18-64, we also compare them to those 55-64. Arguably, the 55-64 year olds are more similar in terms of the extent to which they were impacted by the foreclosure crisis, though they still differ in terms of access to Medicare. Thus, comparing these two groups may shed light on the pure effect of Medicare coverage in mitigating the effects of foreclosure.

Finally, we also estimate separate models by race. Minority groups are thought to have been particularly hard hit by the foreclosure crisis. These groups may also have a more difficult time coping with the crisis as they usually have lower savings, poorer labor market prospects, and poorer baseline health than other groups.


**Results:**

Table 3 provides an overview of our results by age. We show models that include only the foreclosure variable, models that include only the REO variable, and models that include both. It is not completely clear a priori which variable would be expected to have larger effects. "Foreclosure" is a flow variable while REO is a stock. Having a large number of real-estate owned properties in the neighborhood is likely to depress everyone's housing values, and may make it more difficult for individuals in financial trouble to sell their homes. It might also suggest that the crisis had been going on a longer time in the neighborhood, and that people were generally more

aware of the impact of the crisis on their lives. We find consistently larger effects of REO than of foreclosure, even when both variables are included in the model. In general, the estimate effect of REO alone is quite similar to the sum of the estimated effects of foreclosure and REO in the models with both variables.

The first three columns show that the effect of foreclosure on the use of elective procedures is consistently negative (as news reports have suggested), though it is not statistically significant for any age group. On the other hand, the next three columns show that non-elective procedures rise for those younger than 65, and that the increases are much larger for those under 55 than for those in the 55-64 year old group, which is consistent with the idea that the younger group is more likely to be impacted. Among 18-64 year olds, there is an additional non-elective visit for each REO property in the zip code and quarter. Comparing the 55-64 year olds and those over 65 suggests that the younger group is more strongly impacted, which suggests that access to medical care may be important in explaining these results. Finally, the last three columns show that PQI conditions also increase among those less than 65, and that once again, the increase is largest for those under 55.

Table 4 shows estimates of the effects of foreclosure and REO on mental health. For the sake of brevity, from here on we show only estimates from models that include both variables. We see the same pattern as in Table 3: There is no impact on those 65 and over, a small impact on those 55-64, and a much larger impact on the 18-64 year old group as a whole, suggesting that most of the impact is on those less than 55. In particular, the estimated effect on visits related to suicide is very large: We estimate that there is a 23 percent increase in such visits with an increase of 28.7 REO properties in the zip code and quarter. There is also a large increase in visits for anxiety of 3.3

percent. 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 heavy toll in terms of mental health.

Table 5 shows separate estimates for those PQI categories that correspond to CCS categories. For diabetes and hypertension, the pattern is similar to that in Tables 3 and 4. For asthma, there is little evidence that foreclosure affects any group, though there is a small negative effect of foreclosures and a very small positive effect of REOs among the elderly. These effects are not significant in models with either variable instead of both, suggesting that the offsetting estimated effects may reflect multicollinearity given small numbers of elderly people with this outcome. The estimates for hypertension are large and imply that there would be a 6.3 percent increase in visits for hypertension with an additional 28.7 REO properties in the zip code and quarter.

Table 6 breaks the remaining non-elective visits 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. Given the previous literature, it is somewhat more surprising that we do not see significant effects on injuries, heart attack, or stroke either. It is possible that the null result for heart attack and stroke reflect the relatively small numbers of younger people who suffer from those maladies, given evidence that foreclosure seems to be having its major health effects among those who are less than 55. We do find large effects on a range of other serious heart problems, such as chess pain, heart valve disorders, and dysrhythmias which are more prevalent among younger people than among older ones (as shown in Table 2). We also find large effects on malaise, as well as significant effects on gastrointestinal problems, urinary tract problems, diagnoses involving skeletal problem, skin infections, upper respiratory infections, and

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other respiratory problems.  Estimates for the smaller categories of visit shown in Table 2 are given in the Appendix.

Table 7 shows estimates by race for those 18-64 and the elderly.  The table can be compared to Tables 3, 4, and 5.  There is little evidence of any effect of foreclosure on elderly whites.  Among 18-64 whites, only the effects on mental health are significant.  It is particularly notable that the effect on suicide appears only for younger whites, and not for blacks.  Among blacks, there appear to be effects of foreclosure even on the elderly.   Elderly blacks suffer an increase in non-elective visits, and have significantly more visits for hypertension.  Blacks 18-64 suffer the largest effects of the four groups, with estimates that imply percentage effects consistently larger than those discussed above.  For example, using the means in Table 2 we can compute that an increase in REOs of 28.7 units would increase the total number of non-elective visits by 5.2 percent.  The number of PQI visits would rise by 3.4 percent overall, and the number of visits for diabetes and hypertension would rise by 4 and 6.9 percent respectively.  Such an increase would also be accompanied by an increase in visits for anxiety of 8.5 percent (compared to 3.3 percent overall).

Table 8 corresponds to Table 6 in that it shows the estimated effect of foreclosure activity by both race and type of visit.  There is little evidence that foreclosure activity increases these classes of visits among whites.  However, there are some significant effects among elderly blacks on injuries, malaise, and gastrointestinal troubles.  There are much larger effects on younger blacks.  Using the increase of 28.7 REOs in the mean zip code once again, the estimates coupled with the prevalences in Table 2 suggest that such an increase in REO activity would increase visits for injuries by 3.3 percent, for malaise by 7.2 percent, for gastrointestinal problems by 5 percent, and for upper respiratory infections by 9.2 percent.

We also estimated models similar to those in Tables 7 and 8 for Hispanics but found little evidence of statistically significant effects.

**Discussion and Conclusions:**

This study constitutes a first look at the question of whether the stress of the foreclosure crisis has been making Americans sick. The results strongly suggest that it has been having extremely negative effects. We find that there are significant effects on mental health, preventable conditions, and a wide range of conditions that are susceptible to stress. However, effects differ strongly by race. Among whites, the main impact is on mental health among those less than 55. The most notable result is an increase in medical visits to treat those who have attempted suicide. Among blacks, the crisis has also taken a physical toll. In particular, increases in real-estate owned (bank owned) properties in a neighborhood increase visits for anxiety, diabetes, hypertension, injuries, general malaise, gastrointestinal problems, and upper respiratory infections. Next steps in this research will include quantifying the dollar magnitude of these effects both in terms of medical costs, and lost quality of life.

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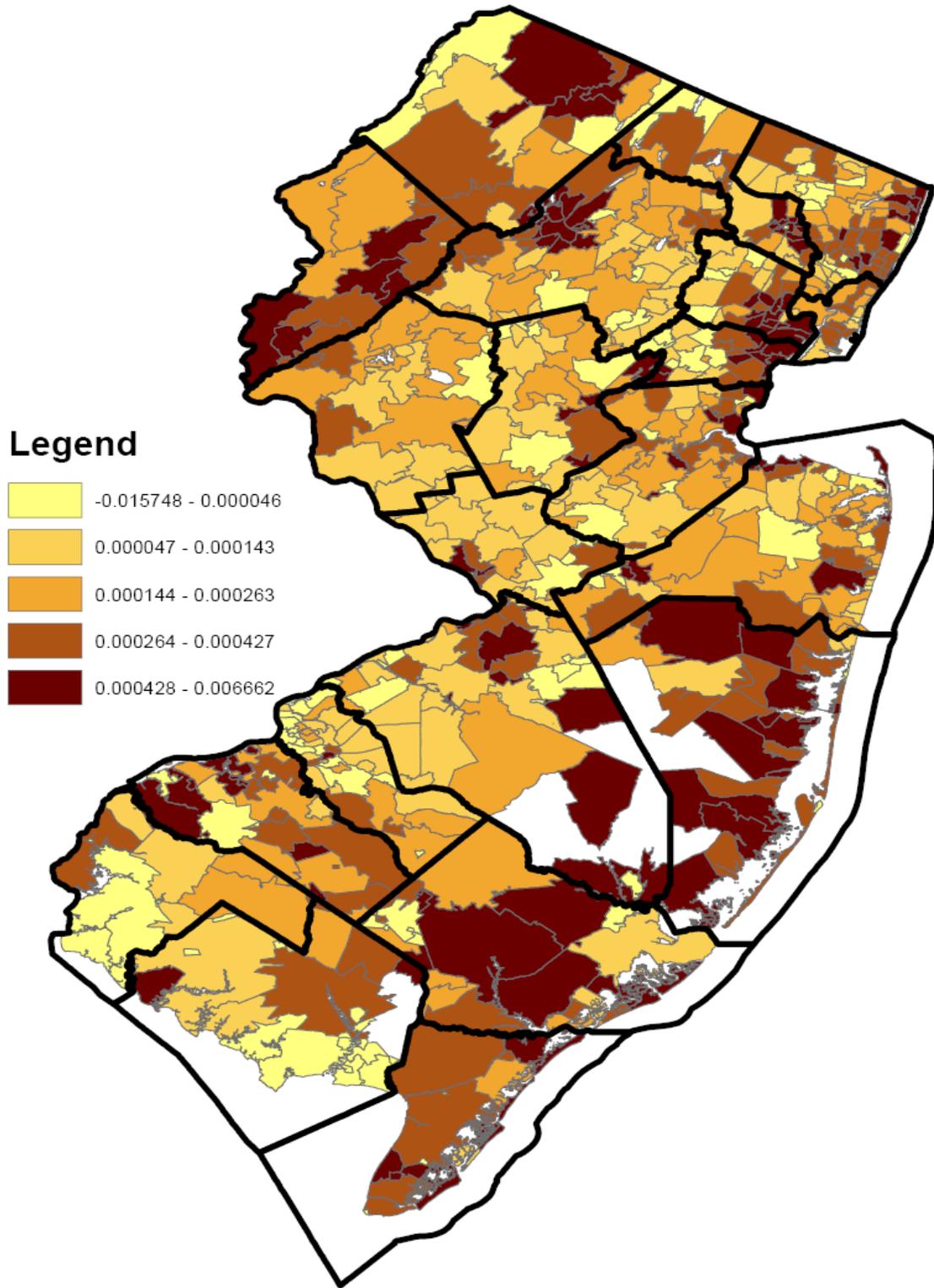**Figure 1: Change in Rates of Foreclosure in New Jersey 2005-2009**



Legend

- -0.015748 - 0.000046
- 0.000047 - 0.000143
- 0.000144 - 0.000263
- 0.000264 - 0.000427
- 0.000428 - 0.006662

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



Legend

| | |
|---|---|
| | -0.195432 - -0.003557 |
| | -0.003556 - 0.000396 |
| | 0.000397 - 0.003321 |
| | 0.003322 - 0.008502 |
| | 0.008503 - 0.457471 |
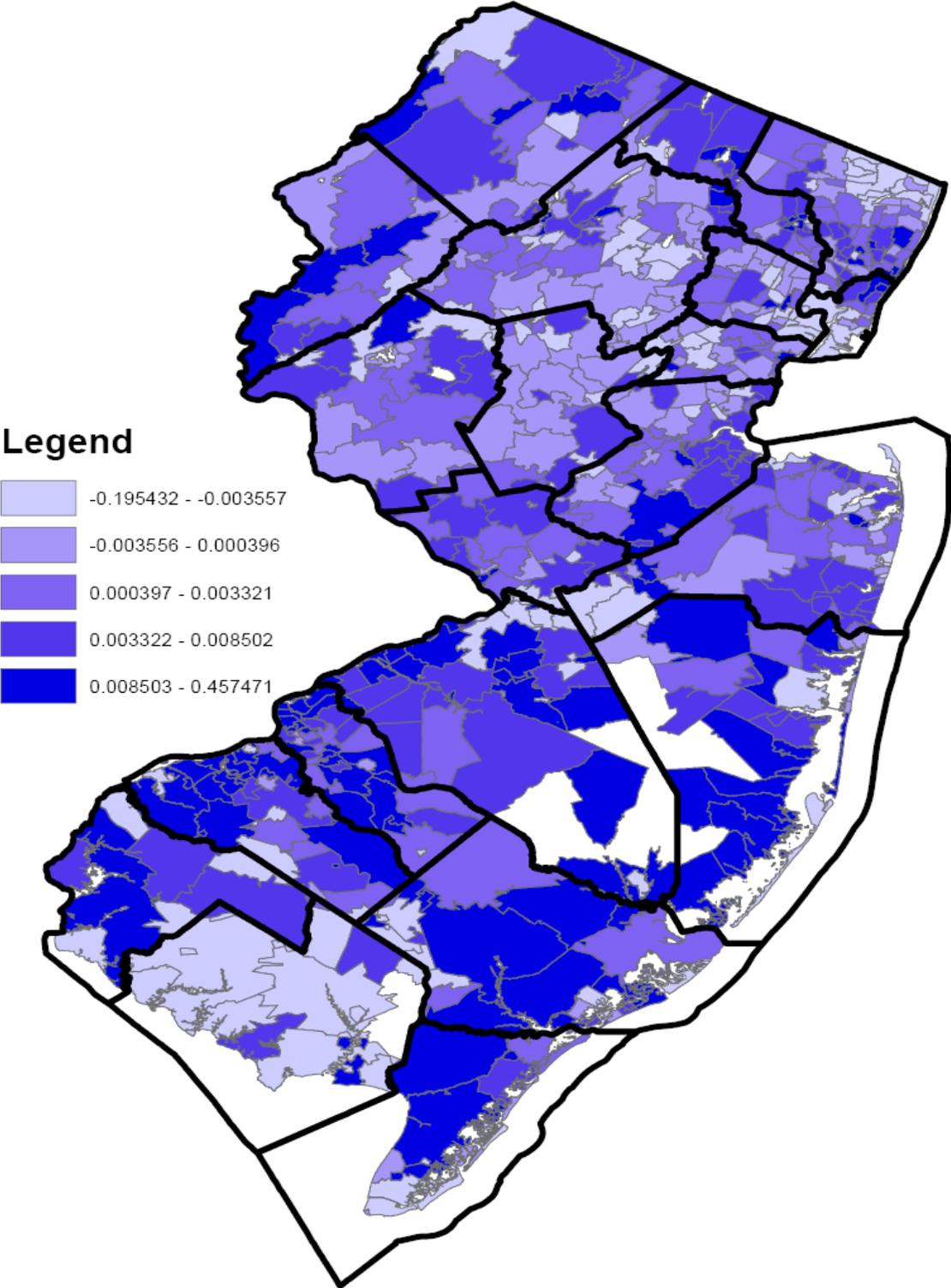
**Table 1: Zipcode Means by Rate of Foreclosure in 2009**

| | All | Top Fifth | Bottom Fifth |
|---|---|---|---|
| Number of foreclosures 2009 | 68.671 | 202.185 | 6.002 |
| | (89.037) | (109.801) | (5.042) |
| Number of foreclosures 2005 | 10.165 | 21.723 | 2.025 |
| | (14.084) | (19.476) | (2.925) |
| Foreclosure Rate 2009 | 0.002 | 0.007 | 0.000 |
| | (0.005) | (0.009) | (0.000) |
| Foreclosure Rate 2005 | 0.0003 | 0.0007 | 0.000 |
| | (0.0004) | (0.0007) | (0.000) |
| Number REO 2009 | 31.268 | 86.802 | 3.422 |
| | (39.095) | (51.102) | (3.149) |
| Number REO 2005 | 2.611 | 2.739 | 1.132 |
| | (4.799) | (3.050) | (1.577) |
| REO Rate 2009 | 0.001 | 0.003 | 0.000 |
| | (0.002) | (0.004) | (0.000) |
| REO Rate 2005 | 0.0001 | 0.0001 | 0.000 |
| | (0.0002) | (0.0002) | (0.000) |
| Number Hospitalizations & ER Visits 2009 | 2404.505 | 2760.061 | 1636.451 |
| | (1505.982) | (1570.256) | (1324.639) |
| Number Hospitalizations and ER Visits 2005 | 2302.475 | 2582.979 | 1585.655 |
| | (1452.633) | (1456.494) | (1282.832) |
| Total Hospitalization & ER Visit Rate 2009 | 0.086 | 0.090 | 0.065 |
| | (0.037) | (0.049) | (0.032) |
| Total Hospitalization & ER Visit Rate 2005 | 0.0813 | 0.0823 | 0.063 |
| | (0.033) | (0.036) | (0.032) |
| | | | |
| Characteristics of Zip Code in 2000 | | | |
| Mean population | 21710.020 | 24088.450 | 18949.400 |
| | (11318.16) | (11544.96) | (12830.78) |
| Median Income | 45827.020 | 43665.450 | 61303.120 |
| | (17836.74) | (14022.96) | (23711.4) |
| Percent Black | 0.123 | 0.098 | 0.079 |
| | (0.176) | (0.149) | (0.118) |
| Percent Hispanic | 0.169 | 0.209 | 0.097 |
| | (0.201) | (0.171) | (0.144) |
| Percent Over 65 | 0.161 | 0.139 | 0.142 |
| | (.104) | (0.094) | (0.085) |
| Poverty Rate | 0.115 | 0.116 | 0.081 |
| | (0.083) | (0.072) | (0.095) |

Notes: All rates are calculated using population from the 2000 U.S. Census. Characteristics of zip codes also come from the 2000 U.S. Census. Standard deviations in parentheses under the means. Sample: ER visits + All hospitalizations - elective procedures - newborns - deliveries - children<18. N=1861 zip codes (ZCTAs).

**Table 2: Number of Hospitalizations and ER Visits by Category, Age, Race and Foreclosure Rates**

| | All | Top fifth | Bottom fifth | 18-64 | 65+ | Black 18-64 | Black 65+ | Hispanic 18-64 | Hispanic 65+ |
|---|---|---|---|---|---|---|---|---|---|
| Visits for Elective Procedures | | | | 78.83 | 82.26 | | | | |
| Preventable Visits | 214.92 | 234.76 | 97.96 | 131.47 | 99.48 | 110.53 | 42.44 | 50.60 | 61.84 |
| Diabetes | 24.63 | 28.41 | 9.08 | 17.37 | 8.18 | 18.21 | 7.69 | 6.58 | 5.34 |
| Hypertension | 24.43 | 26.52 | 8.55 | 15.12 | 11.10 | 20.07 | 7.45 | 5.36 | 7.76 |
| Asthma | 28.29 | 28.76 | 11.76 | 25.07 | 4.38 | 27.30 | 2.98 | 10.43 | 3.26 |
| Total Non-Elective (less childbirth) | 2304.60 | 2581.55 | 1032.93 | 1804.42 | 642.91 | 1229.87 | 222.59 | 649.52 | 347.18 |
| Categories of Non-Elective Visits | | | | | | | | | |
| Infectious Disease | 45.86 | 46.98 | 24.68 | 32.61 | 16.25 | 33.84 | 6.98 | 11.69 | 7.93 |
| Cancer and Neoplasms | 23.12 | 24.74 | 11.63 | 11.90 | 13.36 | 8.96 | 5.04 | 6.03 | 8.58 |
| Other Endocrine Disorders (not Diabetes) | 25.57 | 28.70 | 12.74 | 14.26 | 13.38 | 8.96 | 5.99 | 3.91 | 6.44 |
| Hematologic and Vein | 28.42 | 30.40 | 11.94 | 18.54 | 12.16 | 24.33 | 4.68 | 5.98 | 8.73 |
| Anxiety | 79.89 | 79.49 | 41.98 | 75.34 | 6.96 | 33.23 | 1.84 | 25.89 | 3.94 |
| Suicide Attempt | 0.63 | 1.00 | 0.12 | 0.62 | 0.02 | 0.19 | 0.00 | 0.05 | 0.01 |
| Other Mental Health | 30.75 | 27.28 | 12.12 | 25.14 | 7.07 | 25.35 | 3.05 | 11.65 | 5.46 |
| Headache | 51.30 | 65.74 | 19.17 | 48.89 | 4.23 | 32.59 | 2.28 | 16.23 | 2.27 |
| Other Central Nervous System | 45.43 | 55.26 | 17.90 | 36.97 | 10.79 | 25.59 | 4.68 | 10.82 | 5.09 |
| Eye and Ear | 62.47 | 69.68 | 27.79 | 51.52 | 14.51 | 37.95 | 5.17 | 19.67 | 8.65 |
| Heart Attack and Stroke | 107.59 | 110.14 | 54.70 | 39.27 | 82.35 | 29.36 | 28.18 | 14.24 | 44.79 |
| Chest Pain, Dysrythmias, and Conduction Disorders | 120.59 | 137.22 | 55.36 | 85.65 | 44.89 | 56.98 | 14.11 | 36.54 | 23.55 |
| Upper Respiratory Infection (Includes Flu, Pneumonia) | 110.94 | 127.92 | 45.60 | 91.99 | 24.43 | 72.75 | 7.97 | 29.58 | 14.62 |
| Other Respiratory (not Asthma) | 96.69 | 109.28 | 44.42 | 60.45 | 44.00 | 40.52 | 13.53 | 20.92 | 24.87 |
| Gastrointestinal | 187.85 | 210.77 | 85.11 | 142.04 | 58.15 | 83.50 | 18.38 | 56.64 | 36.59 |
| UI Tract | 112.73 | 131.23 | 49.37 | 80.23 | 40.52 | 45.84 | 13.93 | 32.04 | 23.06 |
| Reproductive Disorders | 51.31 | 62.76 | 14.93 | 50.00 | 3.21 | 47.94 | 1.61 | 20.21 | 2.60 |
| Skin Infection | 83.69 | 97.22 | 30.42 | 73.63 | 13.34 | 51.97 | 4.61 | 20.20 | 7.93 |
| Skelatal Disorders (including Arthritis) | 152.50 | 173.49 | 69.33 | 127.13 | 33.61 | 88.97 | 15.13 | 42.87 | 17.08 |
| Injuries | 469.98 | 512.89 | 239.63 | 381.79 | 117.17 | 202.36 | 26.39 | 118.94 | 45.25 |
| Malaise (Fever, Nausea, Abdominal Pain, etc.) | 174.34 | 204.26 | 78.05 | 145.75 | 38.99 | 89.53 | 13.96 | 56.81 | 22.67 |
| Other | 60.53 | 68.80 | 23.64 | 49.76 | 14.31 | 37.28 | 5.02 | 17.97 | 6.57 |
| N | 35359 | 35359 | 35359 | 35359 | 35264 | 27721 | 26068 | 27987 | 26334 |

Notes: Other includes rehabilitation, social admissions, admission for medical evaluation or other screenings and unclassified. Means are for the entire sample. Top 1/5 and Bottom 1/5 refer to the top and bottom zip codes for foreclosure in 2009.

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

| Age: 65+ | Elective | Elective | Elective | Non-Elective | Non-Elective | Non-Elective | PQI | PQI | PQI |
|---|---|---|---|---|---|---|---|---|---|
| Foreclosures | -0.009 | | -0.008 | 0.028 | | -0.023 | -0.009 | | -0.014 |
| | (-0.74) | | (-0.80) | (0.56) | | (-0.46) | (-1.08) | | (-1.48) |
| REO | | -0.012 | -0.002 | | 0.094 | 0.120 | | -0.005 | 0.012 |
| | | (-0.54) | (-0.12) | | (1.27) | (1.71) | | (-0.38) | (0.90) |
| **Age: 55-64** | | | | | | | | | |
| Foreclosures | | | | 0.132*** | | 0.037 | 0.017*** | | 0.010* |
| | | | | (4.87) | | (1.51) | (4.44) | | (2.35) |
| REO | | | | | 0.265*** | 0.220*** | | 0.028*** | 0.016* |
| | | | | | (5.46) | (4.49) | | (4.15) | (2.01) |
| **Age: 18-64** | | | | | | | | | |
| Foreclosures | -0.013 | | -0.002 | 0.829*** | | 0.411** | 0.088*** | | 0.054*** |
| | (-1.54) | | (-0.28) | (5.40) | | (3.05) | (6.14) | | (3.64) |
| REO | | -0.027 | -0.024 | | 1.465*** | 0.960** | | 0.144*** | 0.078* |
| | | (-1.76) | (-1.57) | | (4.84) | (2.97) | | (5.28) | (2.53) |

Notes: There are 35264, 35302, and 35359 observations in the regressions for 65 plus, 55-64, and 18-64, respectively.
Standard errors are clustered at the zip code level. T-statistics shown in parentheses. A *, **, or *** indicates significance
at the 95%, 99% of 99.9% levels, respectively.
All regressions control for zip code fixed effects and for county*quarter*year effects and are weighted using 2000 zip code population.
in the demographic group.

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

| Age: 65+ | Anxiety | Suicide | Other |
|---|---|---|---|
| Foreclosures | 0.000 | -0.000 | -0.003 |
| | (0.12) | (-1.30) | (-1.63) |
| REO | 0.003 | 0.000 | 0.002 |
| | (1.22) | (1.12) | (0.51) |
| Age: 55-64 | | | |
| Foreclosures | -0.003 | 0.000 | 0.000 |
| | (-1.36) | (0.61) | (0.16) |
| REO | 0.020*** | 0.000 | 0.009** |
| | (4.59) | (1.37) | (3.20) |
| Age: 18-64 | | | |
| Foreclosures | -0.002 | 0.001 | 0.004 |
| | (-0.22) | (1.09) | (0.83) |
| REO | 0.087*** | 0.005* | 0.039*** |
| | (4.52) | (2.00) | (3.38) |

Notes: There are 35264, 35302, and 35359 observations in the regressions for 65 plus, 55-64, and 18-64, respectively. Standard errors are clustered at the zip code level. T-statistics shown in parentheses. A *, **, or *** indicates significance at the 95%, 99% of 99.9% levels, respectively. All regressions control for zip code fixed effects and for county*quarter*year effects and are weighted using 2000 zip code population in the demographic group.

**Table 5: Effects of Foreclosure on Example PQI Conditions**

| Age: 65+ | Diabetes | Hypertension | Asthma |
|---|---|---|---|
| Foreclosures | 0.001 | 0.001 | -0.003* |
| | (0.37) | (0.39) | (-2.03) |
| REO | -0.001 | 0.003 | 0.005* |
| | (-0.23) | (0.54) | (2.46) |
| Age: 55-64 | | | |
| Foreclosures | 0.002 | 0.003* | 0.001 |
| | (1.62) | (2.10) | (1.30) |
| REO | 0.005* | 0.012*** | 0.003 |
| | (2.24) | (4.56) | (1.27) |
| Age: 18-64 | | | |
| Foreclosures | 0.010** | 0.005 | 0.007 |
| | (2.98) | (1.59) | (1.58) |
| REO | 0.021** | 0.033*** | 0.015 |
| | (2.97) | (4.24) | (1.67) |

Notes: There are 35264, 35302, and 35359 observations in the regressions for 65 plus, 55-64, and 18-64, respectively.
Standard errors are clustered at the zip code level. T-statistics shown in parentheses. A *, **, or *** indicates significance
at the 95%, 99% of 99.9% levels, respectively.
All regressions control for zip code fixed effects and for county*quarter*year effects and are weighted using 2000 zip code population.
in the demographic group.

**Table 6: Effects of Foreclosure on Non-Elective Visits, by Category**

| Age: 65+ | Cancer | Injuries | Malaise | Gastro-Intestinal | UI Tract | Skeletal | Skin Infection | Heart Attack or Stoke | Chest pain, etc. | Upper Resp. Inf. | Other Respiratory |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Foreclosures | 0.000 | -0.005 | 0.007 | -0.004 | 0.003 | -0.003 | 0.006* | -0.014 | -0.007 | 0.006 | -0.004 |
| | (0.08) | (-0.36) | (1.08) | (-0.42) | (0.42) | (-0.48) | (2.10) | (-1.54) | (-0.89) | (0.81) | (-0.53) |
| REO | 0.003 | 0.019 | 0.011 | 0.014 | 0.000 | 0.024* | -0.005 | -0.004 | 0.013 | -0.016** | 0.024* |
| | (0.87) | (1.09) | (1.22) | (1.42) | (0.02) | (2.08) | (-0.85) | (-0.32) | (1.33) | (-2.59) | (2.01) |
| **Age: 55-64** | | | | | | | | | | | |
| Foreclosures | 0.001 | 0.007 | 0.004 | 0.010** | 0.003 | 0.005 | 0.003 | -0.001 | 0.005 | 0.003 | 0.002 |
| | (0.36) | (1.30) | (1.48) | (3.09) | (1.36) | (1.40) | (1.89) | (-0.31) | (1.67) | (1.47) | (0.87) |
| REO | 0.001 | 0.015 | 0.030*** | 0.010 | 0.018*** | 0.025** | 0.006 | -0.000 | 0.013* | 0.008* | 0.015** |
| | (0.43) | (1.66) | (4.96) | (1.61) | (3.49) | (3.14) | (1.74) | (-0.07) | (2.33) | (2.09) | (3.02) |
| **Age: 18-64** | | | | | | | | | | | |
| Foreclosures | 0.002 | 0.000 | 0.081*** | 0.051*** | 0.023* | 0.043** | 0.022** | 0.004 | 0.035*** | 0.088*** | 0.021** |
| | (0.81) | (0.01) | (4.70) | (3.79) | (2.53) | (2.94) | (2.74) | (0.82) | (3.52) | (5.19) | (2.64) |
| REO | 0.004 | -0.071 | 0.198*** | 0.098** | 0.087*** | 0.092** | 0.048*** | -0.014 | 0.051* | 0.064* | 0.059** |
| | (0.80) | (-1.20) | (4.60) | (3.26) | (4.53) | (2.60) | (3.51) | (-1.48) | (2.45) | (2.01) | (3.12) |

Notes: There are 35264, 35302, and 35359 observations in the regressions for 65 plus, 55-64, and 18-64, respectively.
Standard errors are clustered at the zip code level. T-statistics shown in parentheses. A *, **, or *** indicates significance
at the 95%, 99% of 99.9% levels, respectively.
All regressions control for zip code fixed effects and for county*quarter*year effects and are weighted using 2000 zip code population.
in the demographic group.

**Table 7: Effects of Foreclosure by Race**

| White 65+ | Elective | Non Elective | PQI | Diabetes | Hypertension | Asthma | Anxiety | Suicide | Other Mental |
|---|---|---|---|---|---|---|---|---|---|
| Foreclosures | | -0.0545 | -0.0115 | 0.00137 | -0.00254 | -0.00151 | -0.00143 | -0.000195 | 0.00144 |
| | | (-0.96) | (-0.98) | (0.51) | (-0.73) | (-1.00) | (-0.52) | (-1.65) | (0.68) |
| REO | | -0.186 | 0.00206 | -0.00228 | 0.00719 | 0.00408 | 0.00154 | 0.000194 | -0.0100** |
| | | (-1.91) | (0.08) | (-0.42) | (1.31) | (1.86) | (0.39) | (0.91) | (-3.00) |
| **White 18-64** | | | | | | | | | |
| Foreclosures | | -0.244 | -0.00108 | 0.000633 | 0.000349 | -0.00880 | 0.00818 | 0.000323 | 0.00373 |
| | | (-0.79) | (-0.07) | (0.24) | (0.20) | (-0.88) | (0.76) | (0.66) | (0.91) |
| REO | | -0.0392 | 0.0421 | 0.00808 | 0.00291 | 0.0185 | 0.0404* | 0.00244** | -0.00142 |
| | | (-0.09) | (1.47) | (1.46) | (0.77) | (0.92) | (2.09) | (2.65) | (-0.16) |
| **Black 65+** | | | | | | | | | |
| Foreclosures | | -0.0228 | -0.0107 | -0.00130 | 0.000161 | -0.000792 | 0.00102 | 0.0000773 | -0.000941 |
| | | (-0.53) | (-0.75) | (-0.27) | (0.04) | (-0.29) | (0.46) | (1.72) | (-0.43) |
| REO | | 0.303*** | 0.0102 | -0.0104 | 0.0186* | -0.00162 | -0.00492 | -0.0000516 | 0.00495 |
| | | (3.84) | (0.42) | (-1.16) | (2.22) | (-0.28) | (-1.39) | (-0.53) | (0.96) |
| **Black 18-64** | | | | | | | | | |
| Foreclosures | | -0.711 | -0.000638 | -0.00190 | -0.00109 | -0.00266 | -0.0238 | 0.000333 | -0.0138 |
| | | (-1.63) | (-0.02) | (-0.30) | (-0.09) | (-0.22) | (-1.56) | (0.51) | (-1.07) |
| REO | | 2.225*** | 0.129* | 0.0256* | 0.0479* | 0.0363 | 0.0982*** | -0.000145 | 0.0542* |
| | | (3.84) | (2.47) | (2.15) | (1.99) | (1.83) | (4.51) | (-0.10) | (2.02) |

Notes: Only zip codes for NJ and FL are included.

Standard errors are clustered at the zip code level. T-statistics shown in parentheses. A *, **, or *** indicates significance at the 95%, 99% of 99.9% levels, respectively.

All regressions control for zip code fixed effects and for county*quarter*year effects and are weighted using 2000 zip code populatio in the demographic group.

There are 28443, 28519, 26068, and 27721 observations in panels 1, 2, 3, and 4, respectively.

**Table 8: Effects on Visits by Type**

| White 65+ | Cancer | Injuries | Malaise | Gastro-Intestinal | UI Tract | Skeletal | Skin Infection | Heart Attack or Stoke | Chest pain, etc. | Upper Resp. Inf. | Other Respiratory |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Foreclosures | 0.00164 | -0.0126 | 0.00734 | -0.00165 | 0.00913 | 0.00913 | 0.00203 | -0.0233 | 0.000714 | 0.000478 | -0.00754 |
| | (0.52) | (-0.89) | (1.13) | (-0.23) | (1.32) | (1.32) | (0.61) | (-1.77) | (0.10) | (0.13) | (-0.93) |
| REO | -0.00887* | -0.0218 | -0.0307** | -0.00136 | -0.0289* | -0.0289* | -0.000235 | -0.0261 | -0.00529 | -0.0177** | 0.00706 |
| | (-2.26) | (-0.85) | (-2.83) | (-0.10) | (-2.18) | (-2.18) | (-0.03) | (-1.62) | (-0.52) | (-3.02) | (0.41) |
| **White 18-64** | | | | | | | | | | | |
| Foreclosures | 0.00574** | -0.0701 | -0.00210 | 0.00102 | 0.0105 | 0.0105 | -0.0700 | -0.00283 | -0.0193 | 0.00558 | 0.0115 |
| | (2.69) | (-1.22) | (-0.07) | (0.04) | (0.76) | (0.76) | (-0.94) | (-0.70) | (-0.71) | (0.20) | (1.24) |
| REO | -0.00773* | -0.149 | 0.0554 | 0.00791 | 0.00836 | 0.00836 | 0.0902 | -0.0150* | 0.0356 | 0.0299 | 0.00232 |
| | (-2.04) | (-1.37) | (1.24) | (0.23) | (0.33) | (0.33) | (1.04) | (-2.07) | (0.91) | (0.66) | (0.17) |
| **Black 65+** | | | | | | | | | | | |
| Foreclosures | 0.00587 | -0.00211 | 0.00330 | -0.00433 | 0.0100 | 0.0100 | 0.00574 | -0.0135 | 0.00812 | -0.0149 | -0.00207 |
| | (1.60) | (-0.33) | (0.54) | (-0.71) | (1.53) | (1.53) | (1.78) | (-1.68) | (1.54) | (-1.67) | (-0.31) |
| REO | -0.00486 | 0.0472** | 0.0413*** | 0.0436*** | -0.000999 | -0.000999 | -0.00132 | 0.0278 | 0.0113 | 0.0194 | 0.00741 |
| | (-0.80) | (2.76) | (4.00) | (3.61) | (-0.09) | (-0.09) | (-0.33) | (1.64) | (1.07) | (1.27) | (0.57) |
| **Black 18-64** | | | | | | | | | | | |
| Foreclosures | -0.00145 | -0.166* | 0.0355 | -0.0214 | -0.0160 | -0.0160 | 0.0336 | 0.0131 | 0.00556 | -0.0757 | -0.0221 |
| | (-0.33) | (-2.45) | (0.46) | (-1.05) | (-0.93) | (-0.93) | (0.56) | (1.42) | (0.14) | (-0.89) | (-1.12) |
| REO | 0.00143 | 0.233* | 0.225*** | 0.145*** | 0.103** | 0.103** | 0.131* | -0.0191 | 0.0724 | 0.233* | 0.0915** |
| | (0.21) | (2.06) | (3.43) | (3.93) | (2.97) | (2.97) | (2.55) | (-1.00) | (1.73) | (2.33) | (3.08) |

Notes: Only zip codes for NJ and FL are included.

Standard errors are clustered at the zip code level.  T-statistics shown in parentheses.  A *, **, or *** indicates significance at the 95%, 99% of 99.9% levels, respectively.

All regressions control for zip code fixed effects and for county*quarter*year effects and are weighted using 2000 zip code population. in the demographic group.

There are 28443, 28519, 26068, and 27721 observations in panels 1, 2, 3, and 4, respectively.

**Appendix Table XX: Effects of Foreclosure on Smaller Categories of Non-Elective Visits**

| Age: 65+ | Infectious Disease | Endocrine Disorder | Hematologic | Central Nervous | Headache | Eye and Ear | Reproductive | Other |
|---|---|---|---|---|---|---|---|---|
| Foreclosures | 0.001 | -0.000 | -0.002 | 0.002 | 0.000 | 0.004 | -0.000 | -0.000 |
| | (0.40) | (-0.03) | (-0.79) | (0.68) | (0.05) | (1.20) | (-0.22) | (-0.04) |
| REO | 0.013* | 0.003 | 0.019*** | 0.009 | 0.006** | 0.009 | 0.004 | 0.001 |
| | (2.19) | (0.89) | (4.21) | (1.79) | (2.77) | (1.72) | (1.61) | (0.16) |
| **Age: 55-64** | | | | | | | | |
| Foreclosures | 0.003 | -0.00 | -0.000 | 0.003 | 0.001 | 0.002 | 0.000 | -0.002 |
| | (1.72) | (-0.50) | (-0.48) | (1.82) | (0.58) | (1.11) | (0.35) | (-1.31) |
| REO | 0.008** | 0.007** | 0.007*** | 0.013*** | 0.007* | 0.009** | 0.004* | 0.014*** |
| | (2.99) | (2.88) | (3.88) | (4.40) | (2.55) | (2.70) | (2.52) | (3.60) |
| **Age: 18-64** | | | | | | | | |
| Foreclosures | 0.021*** | 0.010** | 0.007* | 0.022*** | 0.016 | 0.021*** | 0.017** | -0.001 |
| | (3.56) | (3.13) | (1.99) | (3.56) | (1.83) | (3.75) | (2.68) | (-0.17) |
| REO | 0.036*** | 0.001 | 0.034*** | 0.080*** | 0.076*** | 0.025* | 0.079*** | 0.043* |
| | (3.50) | (0.13) | (4.46) | (5.24) | (4.52) | (2.03) | (5.12) | (1.99) |

Notes: There are 35264, 35302, and 35359 observations in the regressions for 65 plus, 55-64, and 18-64, respectively.
Standard errors are clustered at the zip code level. T-statistics shown in parentheses. A *, **, or *** indicates significance
at the 95%, 99% of 99.9% levels, respectively.
All regressions control for zip code fixed effects and for county*quarter*year effects.

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, Dysrhthmias– 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)  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.