Online Appendix

Does When You Die Depend on Where You Live? Evidence from Hurricane Katrina

Tatyana Deryugina and David Molitor

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A.1 Data

A.1.1 Medicare Beneficiary Location

Medicare eligibility files provide the ZIP code of each beneficiary's mailing address, which is maintained by the Social Security Administration (SSA). This is the address that is used to deliver cash benefits to the beneficiary (such as Social Security) and is also used by the Centers for Medicare and Medicaid Services (CMS) for premium billing. While the address from SSA may be updated by the beneficiary at any time, the Medicare eligibility files that are made available to researchers only report beneficiary ZIP codes as of a given date in each year.

The format of Medicare's eligibility files have changed over time, including the date on which the location variable is "frozen."[1] For some file years, the location variable reflects a beneficiary's ZIP code as of March of the following calendar year (in these cases, CMS does not specify the exact day in March on which records were frozen). In the remaining file years,

[1]For a description of how Medicare's beneficiary eligibility and enrollment files have changed over time, see https://www.resdac.org/articles/medicare-eligibility-and-enrollment-files-rif-versions (accessed on May 14, 2020).

the location variable reflects a beneficiary's ZIP code as of December 31 of that calendar year. If the beneficiary dies prior to the date on which the location variable is frozen for the Medicare eligibility file, then the location variable will reflect the beneficiary's last location on record prior to his or her death.

The Medicare eligibility files we use, which we access through the National Bureau of Economic Research, span eligibility file formats. The chart below summarizes when the location variable is frozen for each eligibility file that we use.

Medicare eligibility file year t	ZIP code reflects residence as of...
$t \in \{1999, 2007, [2009, 2013]\}$	min(date of death; December 31, t)
$t \in \{[1992, 1998], [2000, 2006], 2008\}$	min(date of death; March $t+1$)

We illustrate how the structure of the Medicare eligibility files affects observations in our sample with two examples. Suppose a beneficiary moves in November 2005 and dies on January 10, 2006. Because she survived until January 1, 2006, she will appear in the 2006 Medicare eligibility file. In both the 2005 and 2006 eligibility files, her ZIP code will correspond to where she moved in November 2005. Suppose another beneficiary who turned 65 in the year 2000 moves in January 2005 and remains alive through 2013. He will appear in each of the 2000–2013 Medicare eligibility files. In the 2000–2003 files, his ZIP code will correspond to his location prior to the move. In the 2004–2013 files, his ZIP code will reflect his new location.

A.1.2 Chronic Conditions

We use end-of-year chronic condition flags from the 2004 Medicare beneficiary summary file to determine whether an individual in the 2004 Medicare cohort has a particular condition at baseline. These flags are based on patterns of services that the beneficiary has received and serve as a proxy for whether the beneficiary is receiving treatment for a particular condition.[2] Because patterns of services are only available for Medicare beneficiaries enrolled in traditional fee-for-service Medicare, our chronic condition flags are only defined for beneficiaries who have been continuously enrolled in fee-for-service for the condition-specific look-back window used to construct the condition flag.

The Medicare data we use include 27 chronic condition flags, which we group into eight categories as follows:

[2]The CMS Chronic Conditions Data Flags Data Dictionary provides details on how each flag is defined, available from https://healthcaredelivery.cancer.gov/seermedicare/medicare/chronic-conditions-flags.pdf (accessed June 20, 2018).

1. **Heart disease and stroke:** acute myocardial infarction, atrial fibrillation, heart failure, ischemic heart disease, hypertension, stroke/transient ischemic attack

2. **Respiratory disease:** chronic obstructive pulmonary disease, asthma

3. **Blood and kidney disease:** chronic kidney disease, anemia, hyperlipidemia

4. **Cancer:** breast cancer, colorectal cancer, prostate cancer, lung cancer, endometrial cancer

5. **Diabetes:** own category

6. **Musculoskeletal:** hip fracture, osteoporosis, rheumatoid arthritis/osteoarthritis

7. **Alzheimer's/dementia:** Alzheimer's disease, dementia

8. **Other:** cataracts, glaucoma, hypothyroidism, benign prostatic hyperplasia, depression

A.1.3 Cause of Death

We use cause of death information, which is available for all Medicare beneficiaries from 1999 to 2008. For beneficiaries who die during this period, Medicare provides the ICD-10 cause of death code from the National Death Index (NDI), a centralized database of death record information compiled from state vital statistics offices and maintained by the National Center for Health Statistics (NCHS).[3]

We first categorize ICD-10 cause of death codes into 39 groups based on the NCHS's list of 39 selected causes of death.[4] For use in our analysis, we further categorize these 39 causes of death into four groups as follows:

1. **Cardiovascular deaths:** hypertensive heart disease with or without renal disease, ischemic heart disease, other diseases of the heart, essential (primary) hypertension and hypertensive renal disease, cerebrovascular diseases, atherosclerosis, other diseases of circulatory system

2. **Cancer deaths:** stomach cancer, colon cancer, pancreatic cancer, lung cancer, breast cancer, ovarian and uterine cancer, prostate cancer, bladder cancer, non-Hodgkin's lymphoma, leukemia, other cancer

[3]For more information about the NDI, see https://www.cdc.gov/nchs/ndi.htm (accessed June 20, 2018).

[4]The list of 39 selected causes of death and the ranges of ICD-10 codes that comprise each cause are available at https://www.cdc.gov/nchs/data/dvs/im9_2002.pdf.pdf [*sic*] (accessed June 20, 2018).

3. **Other internal causes of death:** tuberculosis; syphilis; HIV; diabetes; Alzheimer's disease; influenza and pneumonia; chronic lower respiratory disease; peptic ulcer; chronic liver disease and cirrhosis; nephritis; pregnancy, childbirth, and the puerperium; perinatal conditions; congenital abnormalities; SIDS; abnormal clinical findings; all other diseases

4. **External causes of death:** Motor vehicle accidents, suicide, homicide, other accidents, other external causes

A.1.4 Destination Characteristics

For our analysis of the effect of place on migrant mortality, we relate migrant outcomes to 21 destination county characteristics. The characteristics are derived from various sources and are intended to capture a broad range of environmental, economic, and public health conditions. Summary statistics for these characteristics among the sample of New Orleans movers are shown in Appendix Table A.17. Below, we list all of the characteristics, organized by data source. We then describe how each variable was constructed.

- Medicare administrative records
  - Mortality rate
  - Adjusted mortality rate
  - Medicare spending per beneficiary
- Census
  - Income per capita
  - Poverty rate, 65+
  - Median home value
  - Urban population share
- Area Resource Files
  - Physicians per capita
  - Hospital beds per capita
- CMS Hospital Compare
  - Hospital quality index

- Behavioral Risk Factor Surveillance System
  - Percent obese
  - Percent smoking
  - Percent exercising
- Chetty and Hendren (2018)
  - Upward income mobility (from p25)
  - Upward income mobility (from p75)
  - Social capital index
  - Crime rate
  - Local government spending per capita
  - Income segregation
- Climate
  - $PM_{2.5}$ concentrations
  - Hot days/year (90°F+)

Medicare administrative records We calculate mortality rates and medical spending using the annual Medicare beneficiary summary files (Centers for Medicare and Medicaid Services, 1992–2013). We calculate the raw mortality rate for each county as the annual mortality rate of the county's 2004 Medicare cohort (i.e., of Medicare beneficiaries who lived in that county as of March 2005) averaged over 2006–2013. We construct adjusted mortality rates for each county by demeaning raw mortality by interactions of one-year age bins, race, and sex, using the demographics of the county's 2004 cohort.

We measure local spending analogously to how we measure the raw mortality rate: by averaging the post-2006 Medicare spending across fee-for-service beneficiaries in the county's 2004 Medicare cohort. We exclude beneficiary-years where the beneficiary was not enrolled in fee-for-service Medicare for all twelve months.

Census We measure income, poverty, home values, urban population share, and total population for each county using 2000 Decennial Census data, which we obtain from the IPUMS National Historical Geographic Information System (NHGIS) (Manson et al., 2017).[5] The table and dataset names we refer to below are from the NHGIS.

[5]Data were downloaded from `https://data2.nhgis.org/main` (accessed October 1, 2019).

We measure income as per capita income in 1999 (table *NP082A* of dataset *2000_SF3a*). We measure the poverty share among the 65+ population as the number of individuals aged 65 or older with income in 1999 below the poverty level (table *NP087C* of dataset *2000_SF3a*) as a share of the 65+ population for whom poverty status can be determined (table *NP087C* of dataset *2000_SF3a*). We measure median home values as the median value of owner-occupied housing units (table *NH085A* of dataset *2000_SF3a*). Finally, we use the total population of a county (table *NP001A* of dataset *2000_SF1a*) as the denominator for physicians and hospital beds per capita.

Area Resource File (ARF) We obtain the number of physicians and hospital beds for each county in 2004 from the ARF. For the number of physicians, we use variable *F12129-04*, the total number of active MDs (federal and non-federal) in 2004 from the AMA Physician Master File, as provided in the 2005 release of the ARF (U.S. Department of Health and Human Services, 2005). The variable *F08921-04* reports the total number of hospital beds in 2004 from the AHA Survey Database and is provided in the 2009 release of the ARF (U.S. Department of Health and Human Services, 2009).

We calculate the number of physicians per capita by dividing the total number of active MDs by the total population in the county (from census data, described above). Likewise, we calculate hospital beds per capita by dividing the total number of hospital beds by the county population.

Behavioral Risk Factor Surveillance System (BRFSS) We measure obesity, smoking, and exercise behavior using the BRFSS, a telephone survey that collects information on health-related behaviors and chronic conditions (Centers for Disease Control and Prevention, 1995–2004).[6] We pool survey responses for the period 1995–2004.

We calculate percent smoking in each county as the percent of survey respondents for whom the reported smoking status is either "current, daily" or "current, other than daily". We calculate percent obese in each county as the percent of survey respondents who report a body mass index of 30 or greater. We calculate percent exercising in each county as the percent of survey respondents who report participating in any physical activities or exercises other than their regular job in the past month.

CMS Hospital Compare We measure hospital quality within each county using data from the CMS Hospital Compare Process of Care Scores for 2004, which we obtain from

[6]Data were downloaded from `https://www.cdc.gov/brfss/annual_data/annual_data.htm` (accessed October 1, 2019).

Sacarny (2018). We focus on process of care measures for heart attack (AMI), heart failure (HF), and pneumonia (PN), and restrict to metrics that are reported in at least 1,750 counties. This restriction selects a total of 13 metrics, consisting of four AMI metrics (*ami1_share*, *ami2_share*, *ami5_share*, *ami6_share*), three HF metrics (*hf1_share*, *hf2_share*, *hf3_share*), and six PN metrics (*pn1_share*, *pn2_share*, *pn3_share*, *pn4_share*, *pn5_share*, *pn6_share*).

For each process of care metric, we calculate the share of patients in each county who receive appropriate care according to that metric, among hospitals for whom the metric is reported. We combine these 13 process of care metrics into a single hospital quality index, defined as the county-level mean across all metrics (this mean will be missing if any of the underlying metrics are missing for that county). Thus, this hospital quality index can be loosely interpreted as the share of AMI/HF/PN patients receiving appropriate care in the county.

Chetty and Hendren (2018) We obtain county-level measures of upward income mobility, social capital, crime, local government spending, and income segregation from Chetty and Hendren (2018*b*). For measuring upward income mobility, we use the variables *pct_causal_p25_kr26* and *pct_causal_p75_kr26* from Online Data Table 2, "Preferred Estimates of Causal Place Effects by County."[7] The measures of upward income mobility capture the percentage change in income at age 26 from spending one more year of childhood in the county, for children whose parents were at the 25th or 75th percentiles, respectively, of the US household income distribution.

The measures of social capital, crime, local government spending, and income segregation come from Online Data Table 4, "Complete County-Level Dataset: Causal Effects and Covariates." Specifically, we use the variables *scap_ski90pcm*, *crime_total*, *subcty_total_expend_pc*, and *cs00_seg_inc*.[8]

Climate We measure fine particulate ($PM_{2.5}$) air pollution concentrations and the number of extremely hot days using data recorded by ground monitor stations. We measure the average $PM_{2.5}$ concentration in a county for the period 2006–2013. We obtain $PM_{2.5}$ air pollution data from EPA's Air Quality System database, which provides hourly data at the pollution-monitor level for pollutants that are regulated by the Clean Air Act (U.S. Environmental Protection Agency, 2006–2013). We aggregate monitor readings to the daily level

[7] A description of the variables in Online Data Table 2 can be found at https://opportunityinsights.org/wp-content/uploads/2018/04/online_table2-2.pdf (accessed October 1, 2019).

[8] A description of the variables in Online Data Table 4 can be found at https://opportunityinsights.org/wp-content/uploads/2018/04/online_table4-2.pdf (accessed October 1, 2019).

by averaging across hourly observations and then construct daily ZIP code level pollution measures by calculating the inverse distance-weighted average across all monitors located within 20 miles of the ZIP code centroid. We then average these daily values over the period 2006–2013. Finally, we aggregate ZIP code level average pollution concentrations to the county level by averaging across all ZIP codes matched to a county based on the county recorded for the plurality of Medicare beneficiaries living in that ZIP code.

Our source for daily temperature variables is the Global Historical Climatology Network GHCN-Daily database, which provides weather measurements from land surface stations across the United States (National Oceanic and Atmospheric Administration, 2006–2013). For the period 2006–2013, we calculate daily high and low temperatures for each ZIP code as the inverse distance-weighted average of all available daily maximum and minimum temperatures, respectively, for GHCN stations within a 20-mile radius of the ZIP code centroid. The daily average temperature for a ZIP code is calculated as the midpoint of the daily high and low temperatures. We calculate the number of days per year in which the average daily temperature exceeded 90°F in a ZIP code, and then aggregate to the county level using the same ZIP code to county crosswalk used to construct the pollution measure.

A.2 Supplementary Analyses

A.2.1 Long-Run Effects of Hurricane Katrina

Event Study Specification Appendix Figure A.7 shows the sensitivity of our difference-in-differences event study estimates from equation (2) to adding detailed demographic controls. Controlling for every possible combination of one-year age bins, sex, and race has little impact on either the pre- or post-Katrina estimates for any of the three cohorts we consider. Allowing the year fixed effects to vary by every possible combination of age, race, and sex has a larger effect on the estimates, but the vast majority of them fall within the 95 percent confidence intervals of the original estimates.

We also estimate a proportional hazard model version of equation (2), which allows demographic controls to shift mortality rates proportionally rather than additively. Appendix Figure A.8 reports the estimated hazard ratios for the interactions between year and New Orleans indicators, analogous to the linear model estimates reported in Figures 3–4. Estimates that control for all combinations of one-year age bins, race, and sex (right panels) are similar to those that include no demographic controls (left panels), and both cases reflect effects similar to those estimated by the linearly additive model.

To assess the sensitivity of the event study estimates to our choice of control group, we replicate the mortality results displayed in Figures 3–4 using the entire United States except

New Orleans—not just the ten control cities—to construct control cohorts (see Appendix Figure A.9). Each regression includes at least 340 million observations (the number of individuals times the number of years in which they were alive during the sample period). As with the ten control cities, we see no differential mortality pre-trends with either the 1999 or 1992 cohorts. We obtain similar, but slightly larger, estimates of the post-Katrina reductions in the mortality rate, indicating that the cumulative mortality of the New Orleans cohorts decreased by 2.3–3.3 percentage points by 2013. The similarity of our baseline results to those obtained from using the rest of the United States as the control group demonstrates that our results do not hinge on the particular choice of ten cities as the main controls.

Estimation via Synthetic Control In this section, we probe the robustness of our baseline method of inference, which allows for clustering at the ZIP code level. Because the entire city of New Orleans was affected by Hurricane Katrina, our setting could reasonably be viewed as a case with only one treated unit, presenting a challenge for reliable inference. Test statistics based on cluster-robust standard errors will over-reject when there is only a single treated group (Conley and Taber, 2011), while those based on the wild cluster bootstrap can either over- or under-reject (MacKinnon and Webb, 2017).

An alternative to our baseline approach is to treat the New Orleans cohort as a single unit and compare its survival prospects to those of cohorts from other areas using the synthetic control method (Abadie, Diamond and Hainmueller, 2010, 2015). Because the synthetic control method is not easily adaptable to individual-level controls and is not appropriate for studying how movers' subsequent mortality is related to local mortality, we do not adopt it as our primary specification. Here, we demonstrate that the synthetic control method gives results similar to those of the difference-in-differences event study of equation (2).

We focus on the 1999 cohort, as this provides multiple years of pre-Katrina data to form the synthetic control unit. Because meaningful permutation inference would be difficult to do with only ten control cities, we consider two sets of potential control units: the first includes all counties with a baseline beneficiary population of over 50,000 (yielding 157 counties, including New Orleans), and the second includes the 400 commuting zones (CZs) closest in log Medicare population to the city of New Orleans in 1999.[9] We exclude smaller counties and CZs because their annual death rates are inherently more variable, making them less reliable counterfactuals for New Orleans. Similarly, the largest CZs are less plausible counterfactuals. Whether implementing synthetic controls using control counties or CZs, we

[9]Our results are similar when the set of potential control units consists of 460 counties that are at least as populous as the smallest of our ten control cities (16,469 beneficiaries at baseline); 89 counties with baseline populations of 50,000–100,000; or the 300 CZs that are closest in log number of beneficiaries to the city of New Orleans.

always use the city (not CZ) for the New Orleans region.

Because we are primarily interested in *changes* in the death rate, our outcome variable is a county's/CZ's annual death rate minus its 1999–2004 average death rate. We use this demeaned death rate in each year between 1999 and 2004 to form the synthetic treatment unit, whose outcomes are used as the counterfactual. The synthetic control algorithm assigns weights to the control units such that the difference between the demeaned death rate of the treated unit (the city of New Orleans) and the weighted average of the control units is minimized in the pre-treatment period. The weighted difference in the post-period is then the estimated treatment effect.

The synthetic control method does not produce standard errors directly. To conduct statistical inference, Abadie, Diamond and Hainmueller (2015) suggest "in-space placebos" tests, where treatment status is assigned to each of the control units one at a time. The same synthetic control methodology is applied in each case to produce a distribution of estimated treatment effects. Statistical inference is based on how often the "effect" for a control unit is more extreme than that of the actually treated unit (in this case, New Orleans). We follow this procedure, fixing the timing of the treatment in 2005.[10]

The results for the annual mortality rate are shown in Appendix Figure A.10. We plot the estimated treatment effect for the New Orleans cohort (black line) as well as the estimated "effects" when assigning each of the other counties/CZs to be the treated unit. The post-2005 New Orleans is an outlier, both with respect to the initial mortality increase in 2005 and the subsequent mortality decreases. Specifically, the 2005 treatment effect is always the largest for New Orleans, the true treated unit. In each year between 2006 and 2013, the estimated change in mortality for New Orleans is smaller than 141–152 of the other 152 counties for which we estimate a placebo treatment effect and 368–399 of the other 400 CZs. The implied p-values thus generally fall between 0 (in cases where the New Orleans mortality change is literally the largest/smallest) and 0.080 (the year when New Orleans has the 33rd smallest mortality change in the sample of CZs). The magnitudes of the estimated treatment effects in 2006–2013 are slightly larger than in our main regression event study, ranging from -0.31 percentage points to -0.93 percentage points.

Using the estimated change in the mortality rate in each period and the empirical survival probability of each county's/CZ's cohort, we calculate the implied change in cumulative mortality by 2013 (equation (3)). We plot the density of these estimates in Appendix Figure A.11. The red line indicates where the true treatment effect (i.e., that of New Orleans) falls in the distribution. We estimate that Hurricane Katrina caused 2013 cumulative mor-

[10]The synthetic control method fails to converge for four of the county permutations. These are thus omitted from the sample, leaving us with 152 permutations where New Orleans is not the treated county.

tality among victims initially living in New Orleans to decline by −2.30 (−2.13) percentage points when using counties (CZs) as synthetic controls. Only five counties and three CZs have larger falls in the 2013 cumulative mortality rate than New Orleans, implying p-values of 0.039 and 0.010, respectively.

Heterogeneous Treatment Effects To systematically investigate heterogeneous treatment effects, we augment the concise difference-in-differences specification (equation (4)) to include interactions between the treatment indicators and an indicator for the characteristic of interest:

$$\begin{aligned} Y_{it} = {} & \beta_{SR}\mathbf{1}(t = 2005) \times NOLA_i + \beta_{SR}\mathbf{1}(t = 2005) \times NOLA_i \times H_i \\ & + \beta_{LR}\mathbf{1}(t \geq 2006) \times NOLA_i + \beta_{LR}\mathbf{1}(t \geq 2006) \times NOLA_i \times H_i \\ & + \gamma NOLA_i \times H_i + [\textit{year-by-}H_i\ \textit{FE}] + [\textit{base ZIP5 FE}] + \varepsilon_{it}, \end{aligned} \tag{A–1}$$

where H_i indicates whether individual i has the characteristic of interest at baseline. Because outcome levels at baseline may differ by the chosen characteristic within New Orleans and between New Orleans and control cities, we also control for each characteristic and its interaction with the New Orleans indicator ($NOLA_i \times H_i$). Furthermore, to allow for differential secular trends, we include full interactions between the characteristic and year fixed effects whenever there is variation in the characteristic within the control cohort, which occurs for all characteristics we examine but one. Because there was no flooding from Hurricane Katrina in the control cities, heterogeneity analysis by the flood level of an individual's residence at baseline includes year and flood level fixed effects rather than flood-by-year fixed effects. Appendix Table A.6 presents the results of this analysis.

A.2.2 The Importance of Rebuilding in New Orleans

In this section, we briefly consider whether improvements in New Orleans following Hurricane Katrina help explain the aggregate mortality improvements we estimate. There are two key challenges for directly testing how the hurricane affected mortality among individuals who remained in New Orleans. First, because the decision to move is observed only for individuals who survived the initial shock of the hurricane, we cannot estimate stayer-specific difference-in-differences mortality effects using pre-Katrina as a reference period. Second, differences in mortality levels between stayers and movers are also unlikely to be informative of the relative effect of staying in New Orleans since, as we show in the paper, the decision regarding whether to leave or stay was highly correlated with observable predictors of mortality risk.

New Orleans infrastructure was devastated following Hurricane Katrina, however, and

therefore it is likely that any health improvements accruing to New Orleans stayers would have developed over time during rebuilding. To empirically test this intuition, we restrict the sample to individuals from the 2004 cohort who survived until at least the beginning of 2006. We then estimate equation (2) with only individuals who were still living in their baseline CZ as of March 2006 ("stayers"). Because survival until 2006 is necessary for inclusion, the reference category is 2006. Appendix Figure A.13a plots the results, which show that stayers' mortality did not improve over time relative to 2006.[11] This pattern suggests it is unlikely that the cohort-level mortality declines among hurricane victims reflect health improvements from remaining in New Orleans.

A.2.3 Movers' Mortality and Local Mortality

In this section, we demonstrate the robustness of our baseline estimates of the relationship between movers' mortality and destination mortality to additional controls, alternative samples, and using cumulative mortality as the outcome. We also explore heterogeneity in our baseline results.

Robustness Appendix Table A.10 demonstrates that our baseline results are robust to controlling for each of the 27 chronic condition indicators separately, controlling for distance between New Orleans and the destination county, or excluding Houston and Baton Rouge (the two most common destinations for New Orleans movers).

Appendix Table A.11 estimates the relationship between the destination mortality rate and the probability that a mover has died by the end of 2013. Each percentage-point increase in the destination mortality rate increases this probability by 3.3–4.0 percentage points or 9–11 percent of the average cumulative mortality rate in the movers' sample. This is comparable to our preferred estimate that considers annual mortality (column (3) of Table 4), which implies that a 1 percentage-point increase in the destination mortality rate increases a movers annual mortality rate by about 15.5 percent of its mean.

In Appendix Table A.12, we estimate the relationship between movers' own mortality and the mortality in their destination county using individuals' locations from the 2006 Medicare eligibility files (i.e., locations as of March 2007). This should exclude any short-term moves and include moves that had not been reported by the beneficiary until later in 2006. The coefficients on local mortality are slightly lower than, but similar to, the baseline estimates.

Heterogeneity In Appendix Table A.13, we use the same sample and set of controls as Table 4, but separate the post-Katrina years into two periods: 2006–2007 and 2008–2013.

[11] Appendix Figure A.13b shows the results of an analogous exercise for movers.

We find a strong relationship between local mortality and movers' mortality as early as 2006–2007, suggesting that changes in migrant mortality rates are not shaped solely by slow-moving channels such as lifestyle changes. More generally, the speed with which individuals' mortality rates reflect the local rate makes it unlikely that this relationship is primarily due to them becoming more or less likely to develop chronic conditions. Rather, faster-moving channels, such as the quality of the local health care system or other environmental factors, appear to be driving both local mortality rates and the mortality rates of new arrivals.

In Appendix Table A.14, we consider how movers' mortality from specific causes varies with destination mortality. We divide causes of death into four comprehensive categories: cardiovascular, cancer, other internal causes, and external causes. For reference, column (1) shows the all causes estimate for the years 2006–2008, as cause of death information is not available for later years. We find that cardiovascular and other internal causes of death are each statistically significantly associated with the destination mortality rate, but we estimate small and statistically insignificant relationships with respect to cancer and external causes.

Appendix Table A.15 shows that a mover's mortality is more correlated with the local mortality of beneficiaries of his/her race (black or not black) and with the local mortality of his/her age group (65 or older versus 64 or younger). Our gender-specific estimates are inconclusive: coefficients on both own-gender and other-gender local mortality rates are sizable and positive, but neither is statistically significant when we estimate them jointly, possibly because of a high correlation between the two mortality rates.[12]

Appendix Table A.16 performs a similar exercise, with destination mortality defined at the movers' 2006 ZIP code, county, or CZ level. Destination ZIP code mortality is strongly related to movers' mortality (column (2)), but the magnitude is about half of our preferred county-level mortality estimate (column (1)). Both ZIP- and county-level mortality are individually significant when included jointly (column (3)). CZ mortality is also significantly correlated with movers' subsequent mortality, with a coefficient of 1.03 (column (3)). However, we lose power when we estimate a specification that includes both county and CZ mortality (column (5)), likely due to the high correlation between county mortality and CZ mortality (0.80 in our sample).[13]

Joint Consideration of Mortality and Other Local Characteristics Appendix Table A.21 shows the results of simultaneously regressing movers' mortality on the local mortality rate and other local characteristics that, according to Appendix Tables A.18 and A.19,

[12]The correlation between the local male and female mortality rates is 0.75 in our sample. By contrast, the correlations between local black and non-black mortality rates and between local mortality rates for those under 65 and those over 65 are much smaller (0.37 and 0.06, respectively).

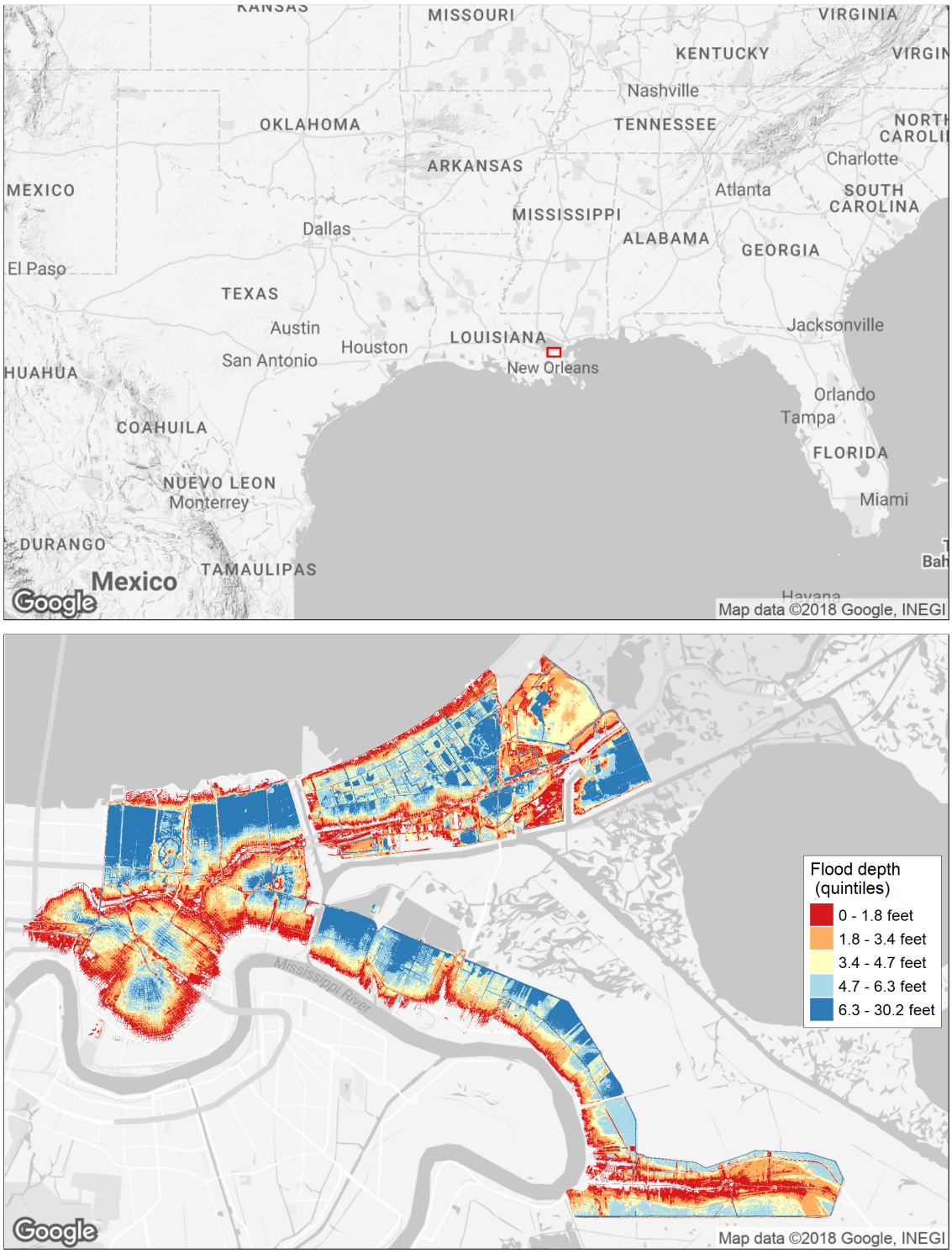
[13]The correlation between ZIP- and county-level mortality is smaller (0.41 in our sample).

are individually large and significant predictors of movers' mortality (e.g., the local smoking rate). To preserve power, we add one other characteristic at a time, reporting coefficients that are normalized by the interdecile range of the given characteristic in the sample of movers (columns (1)–(6)). Nonetheless, jointly considering both the local mortality rate and another local characteristic causes the coefficient on the latter to cease to be statistically significant, likely due to the high correlation between local mortality and these characteristics (see column (3) of Appendix Tables A.18 and A.19).

Column (7) shows the average 2005–2006 change in each local characteristic for the sample of Hurricane Katrina victims who survived past 2005 as a share of the aforementioned interdecile range. The local smoking rate and the median housing values of Hurricane Katrina victims did not change meaningfully, but the local obesity rate and the percent of population living in an urban area decreased, while the local per-capita income and the percent of population exercising increased. For each specification, we also calculate the share of the -0.36 mortality increase that the two variables in question can explain. The answer ranges from 61 percent (when considering local mortality and smoking) to 85 percent (when considering local mortality and exercise rates).

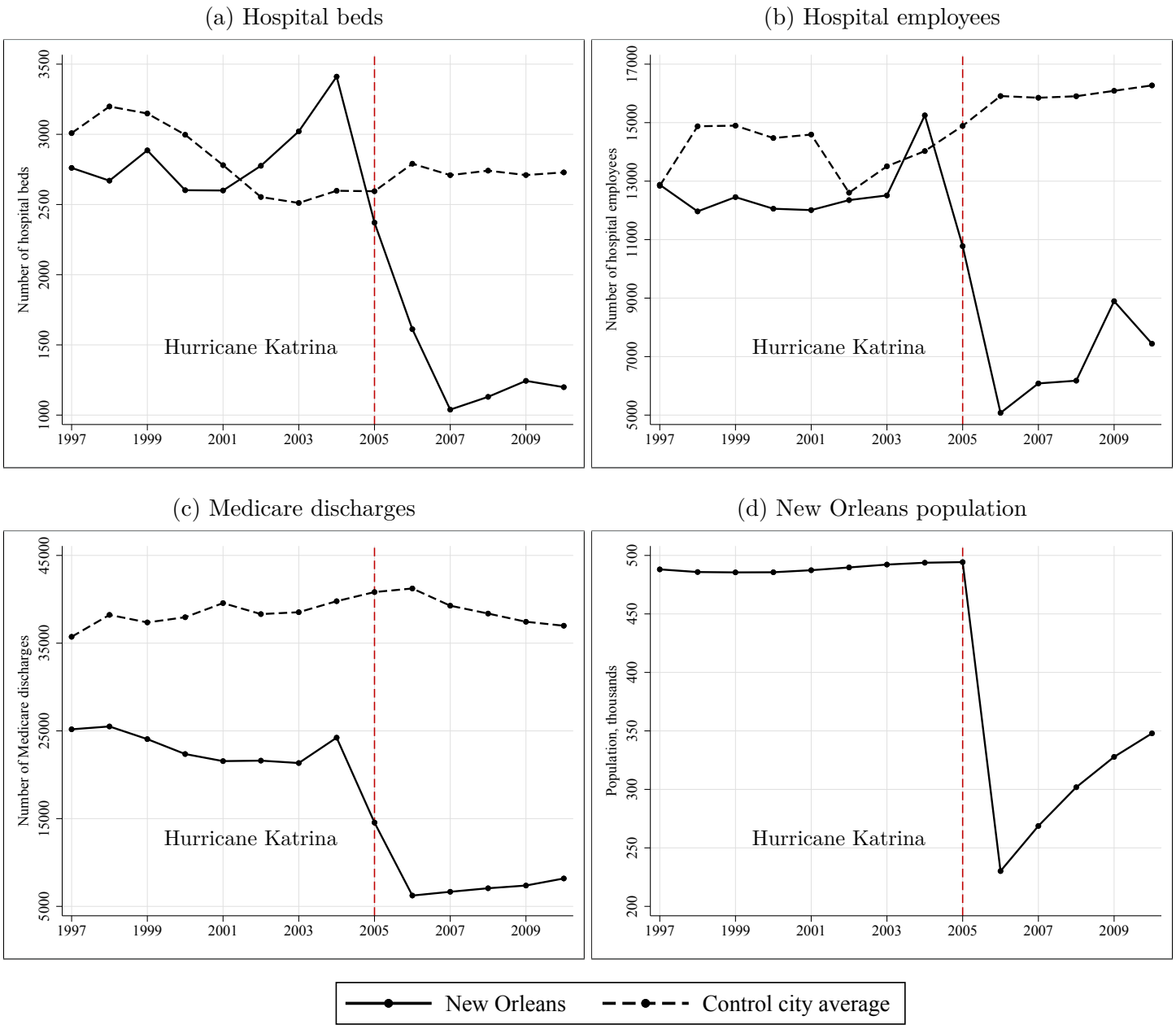
Appendix Figures and Tables

Figure A.1: New Orleans Hurricane Katrina flood map



Notes: The figure shows the location of New Orleans (top panel) and Hurricane Katrina flood depth estimates at a resolution of five meters (bottom panel). Flood data come from the National Oceanic and Atmospheric Administration (NOAA).

Figure A.2: Capacity and utilization of the New Orleans health care system following Hurricane Katrina

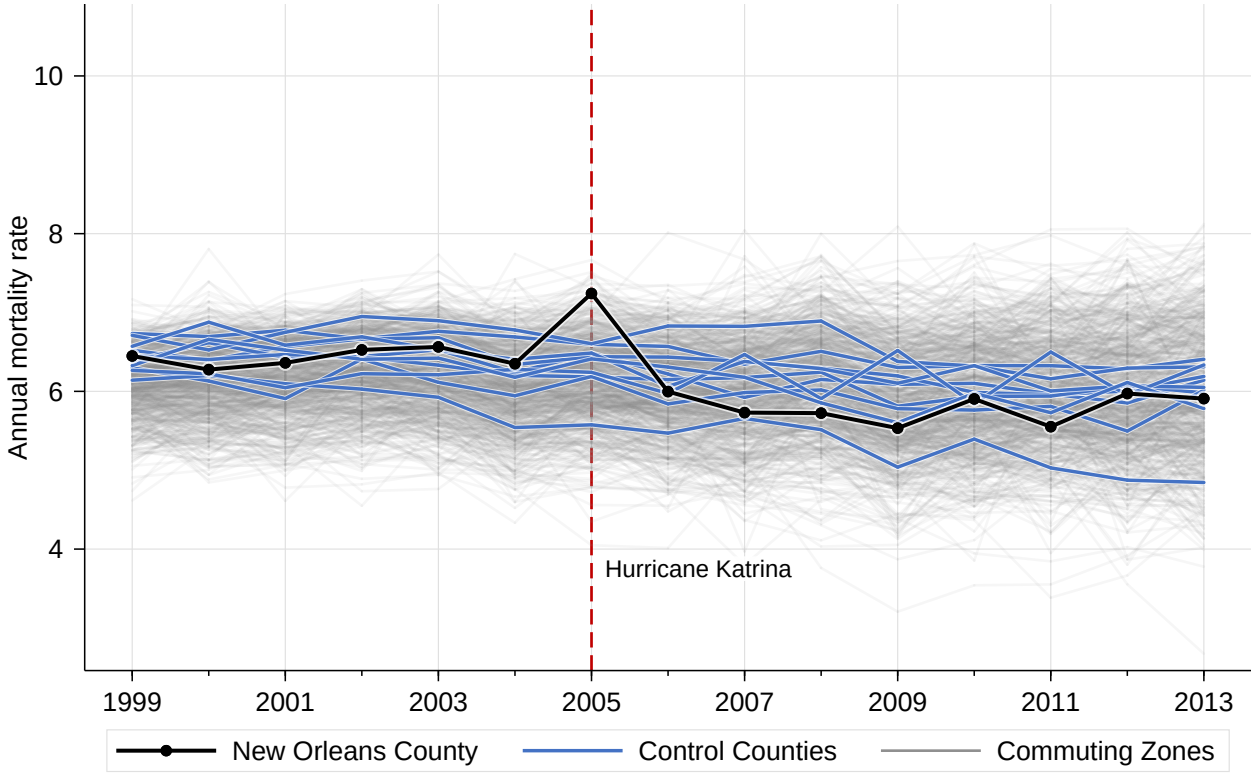


Notes: The figure shows the number of hospital beds (panel (a)), the number of hospital employees (panel (b)), and the number of Medicare discharges (panel (c)) in New Orleans and the ten control cities we use for our baseline difference-in-differences analysis. Panel (d) shows the New Orleans population. The vertical dashed red lines indicate the year of Hurricane Katrina (2005). Sources: Centers for Medicare and Medicaid Services Hospital 2552-96 Cost Report Data file; Bureau of Economic Analysis.

Figure A.3: New Orleans and control cities

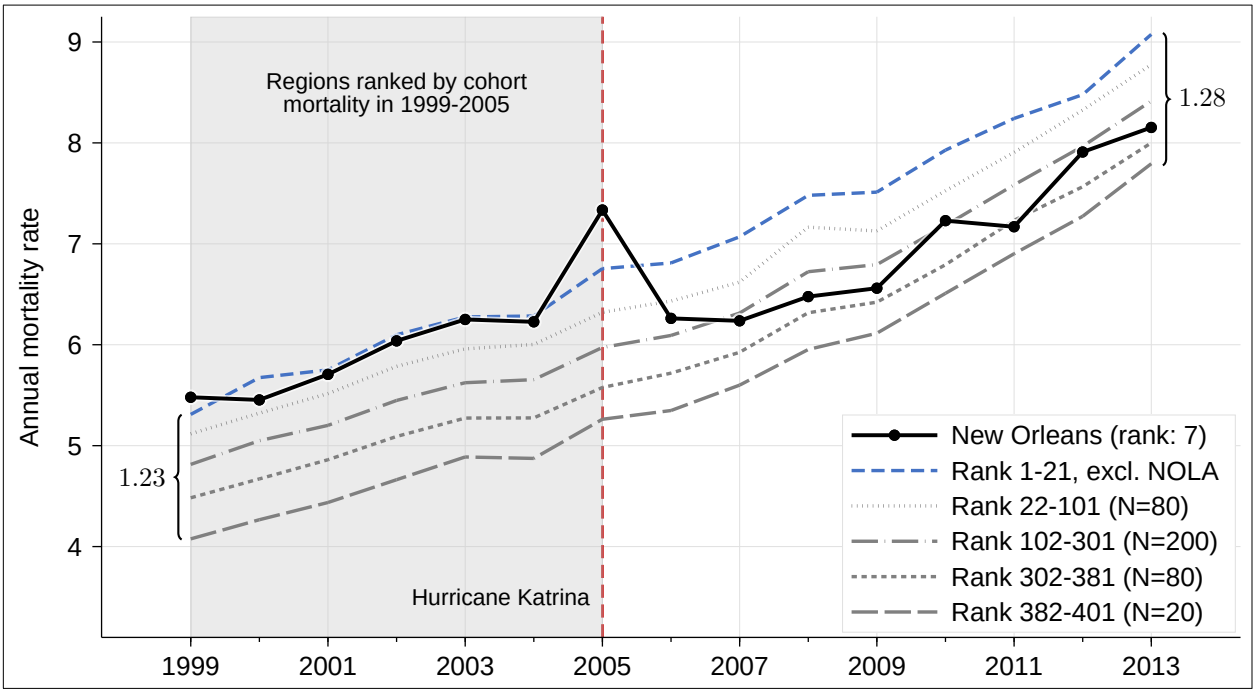
Notes: The figure shows the location of New Orleans and each of the ten control cities used to construct comparison cohorts for identifying the effects of Hurricane Katrina on Medicare beneficiaries initially residing in New Orleans.

Figure A.4: Cohort annual adjusted mortality rates for New Orleans versus other areas

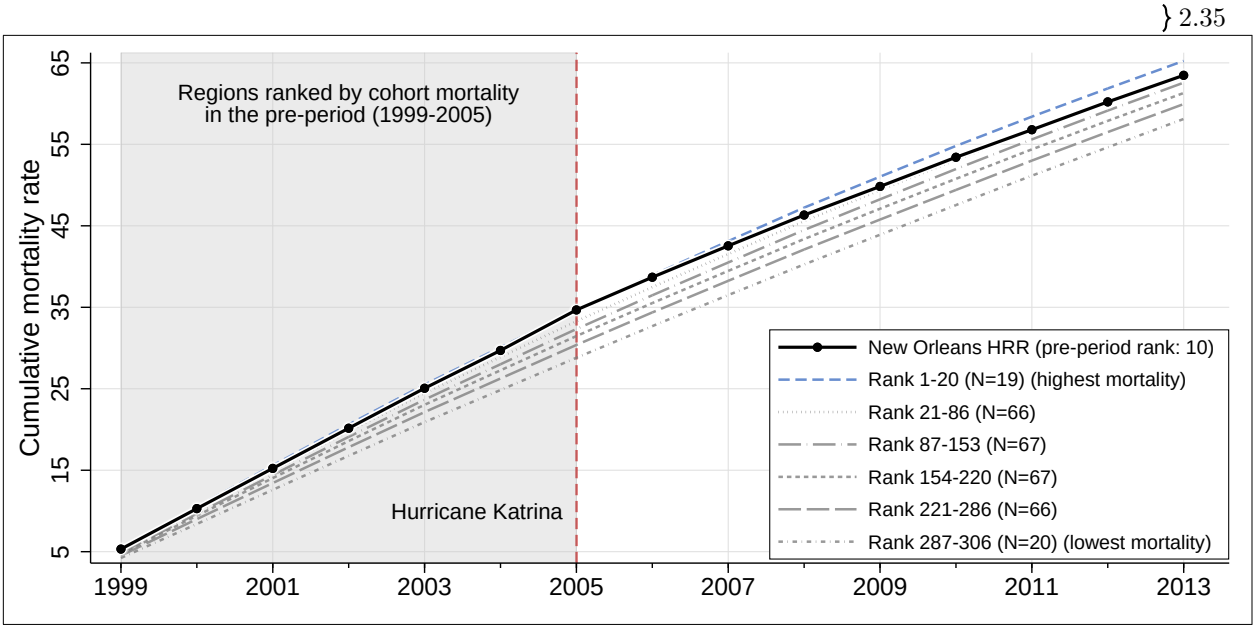


Notes: The figure shows annual death rates for the 1999 Medicare cohort, by initial region of residence, after adjusting for all combinations of beneficiaries' current age (in one-year bins), race, and sex and adding the overall mean mortality rate to the results. Mortality rates for the New Orleans county cohort are plotted in black, and mortality rates for the ten control county cohorts are plotted in blue. The light gray lines plot mortality rates for each US commuting zone cohort with at least 1,000 beneficiaries, except for the New Orleans commuting zone.

Figure A.5: Mortality rates by regional cohort mortality rank in 1999–2005



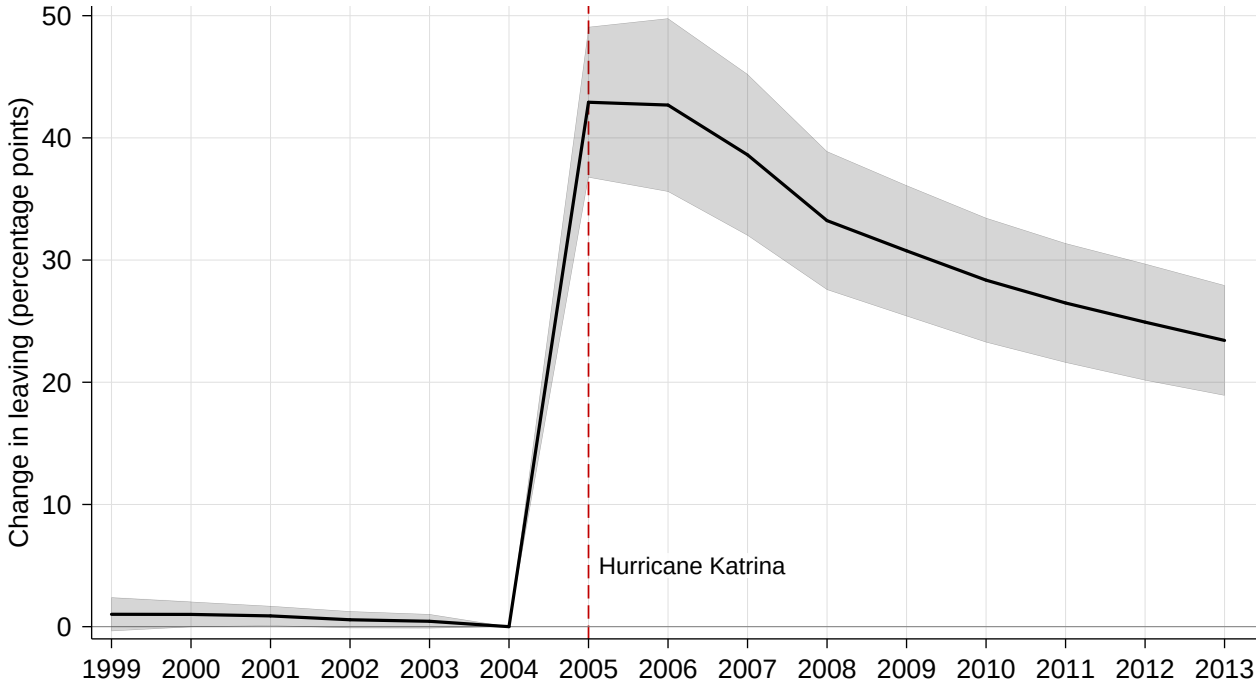
(a) Annual mortality rates



(b) Cumulative mortality rates

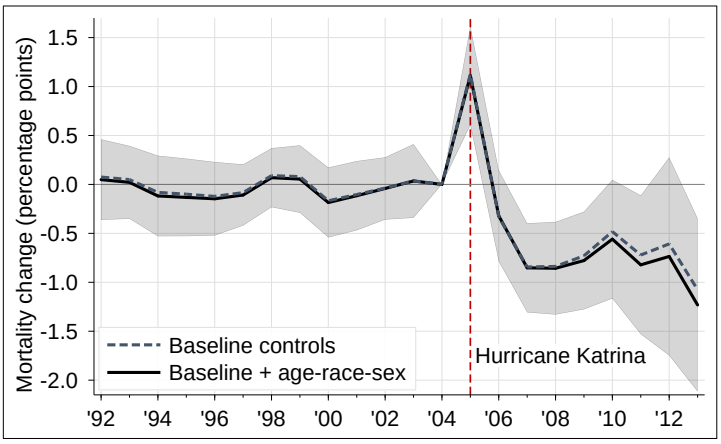
Notes: The 400 commuting zones closest to New Orleans county in 1999 Medicare population are ranked and grouped by the average mortality rate of their 1999 cohort over the period 1999–2005. New Orleans county is reported as its own group (solid black line). The next 20 highest mortality regions—those of rank 1–21, excluding New Orleans—correspond to the dashed blue line. Panel (a) shows average mortality across cohorts in each group, by year. Panel (b) shows cumulative mortality across cohorts in each group, by year.

Figure A.6: Long-run relocation effects of Hurricane Katrina (1999 Medicare cohort)

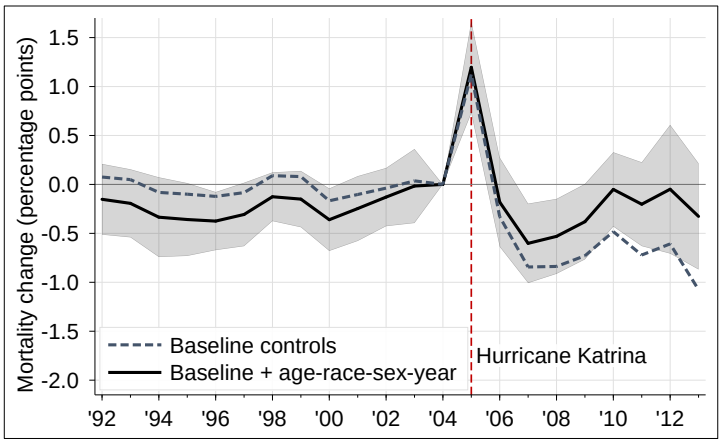


Notes: The figure shows estimates of changes in the probability that an individual is living outside of their 1999 CZ of residence. The black line plots estimates from equation (2), where the dependent variable is a relocation indicator equal to zero if a beneficiary was living in his or her 1999 CZ of residence in that year and is equal to one if the beneficiary was living in a different CZ. The gray shaded areas represent 95 percent confidence intervals based on standard errors that are clustered by beneficiary baseline ZIP code. Coefficients and confidence intervals have been scaled by 100 to reflect changes in percentage points. Appendix Table A.5 reports numerical values of these point estimates and their standard errors.

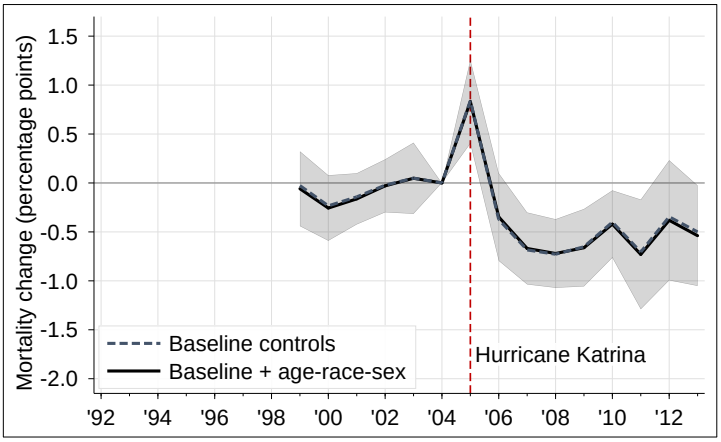
Figure A.7: Annual mortality event studies with demographic controls



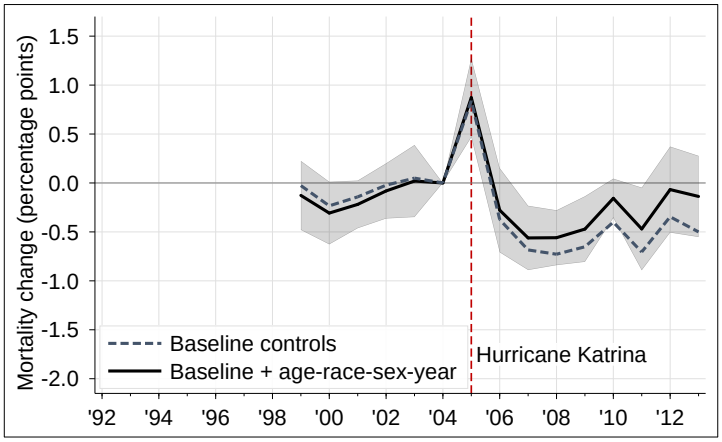
(a) 1992 Medicare cohort: age-race-sex controls



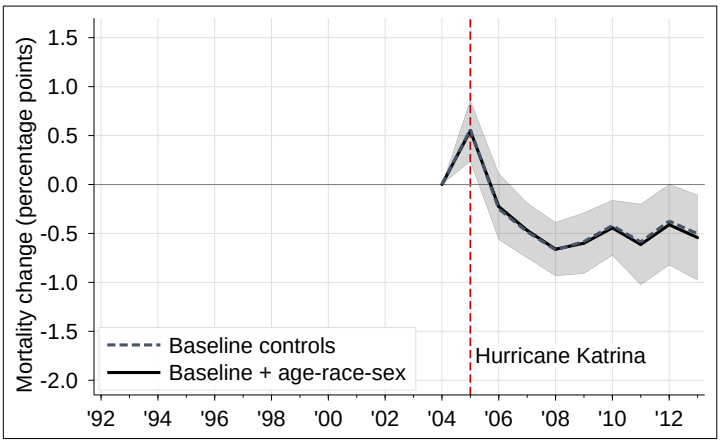
(b) 1992 Medicare cohort: age-race-sex-year controls



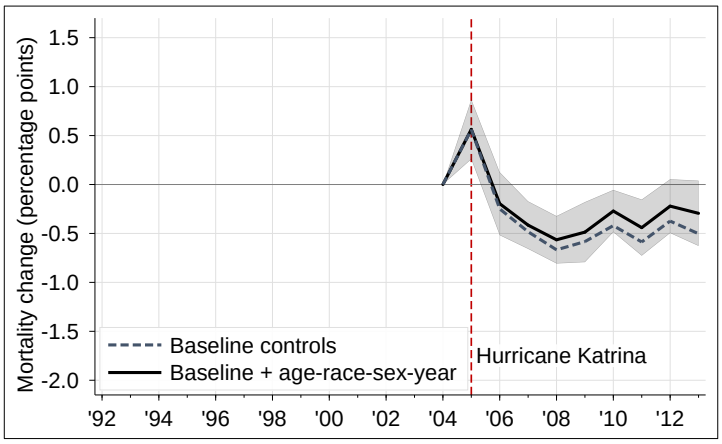
(c) 1999 Medicare cohort: age-race-sex controls



(d) 1999 Medicare cohort: age-race-sex-year controls



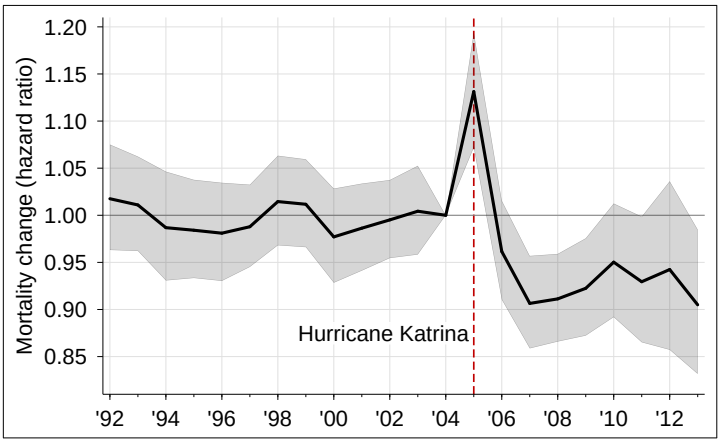
(e) 2004 Medicare cohort: age-race-sex controls



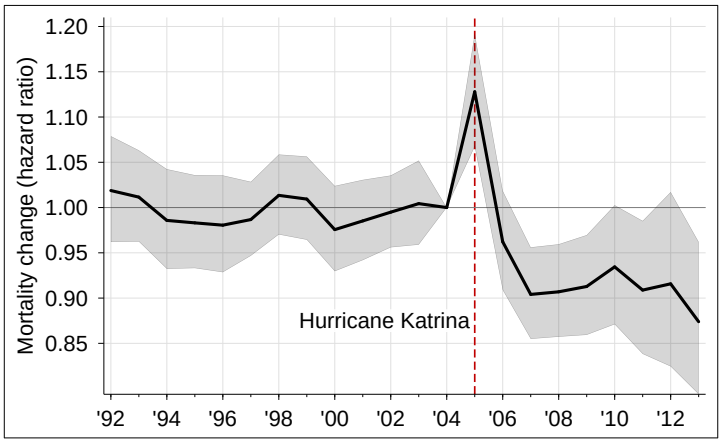
(f) 2004 Medicare cohort: age-race-sex-year controls

Notes: The black lines plot difference-in-differences event study estimates from equation (2) but is modified to include demographic controls. Panels in the left column control for all combinations of baseline age (one-year bins), race, and sex. Panels in the right column further control for age-race-sex effects by year. The gray shaded areas represent 95 percent confidence intervals based on standard errors that are clustered by beneficiary baseline ZIP code. For reference, the dashed lines show the baseline estimates reported in Figures 3 and 4.

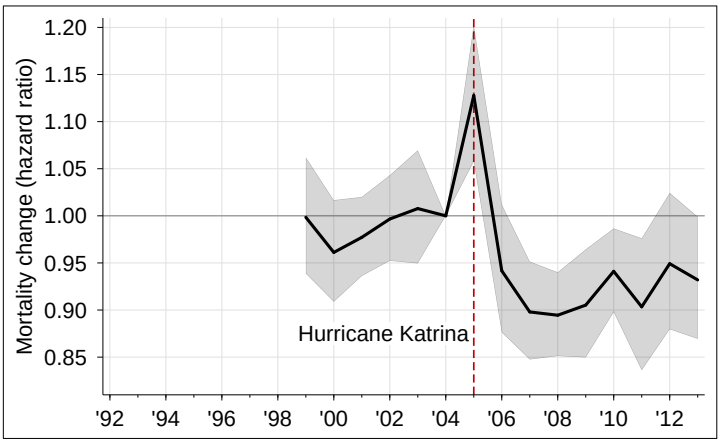
Figure A.8: Survival analysis of Hurricane Katrina



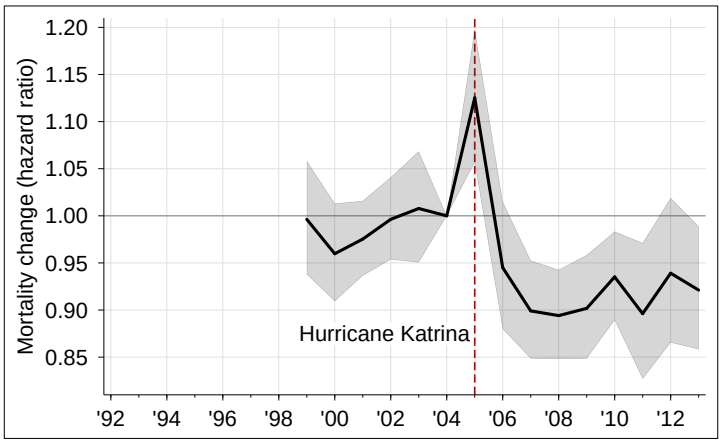
(a) No demographic controls (1992 cohort)



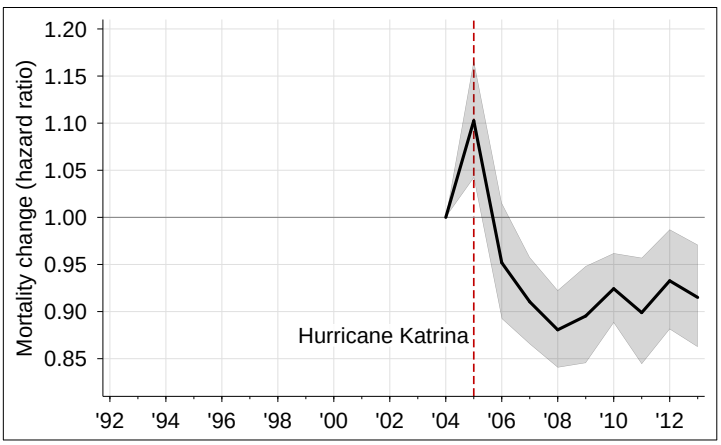
(b) Baseline age-race-sex controls (1992 cohort)



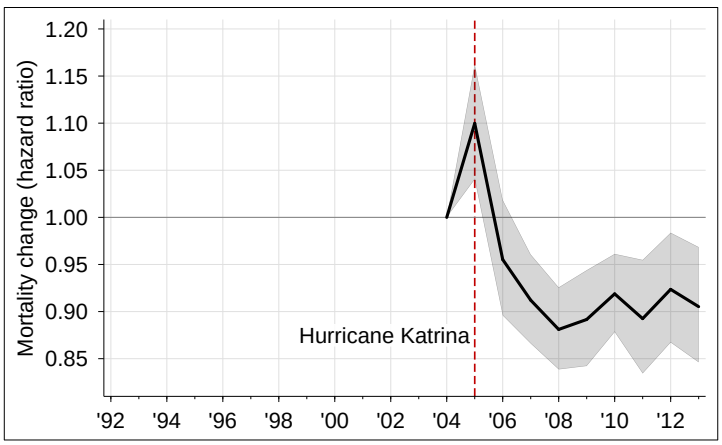
(c) No demographic controls (1999 cohort)



(d) Baseline age-race-sex controls (1999 cohort)



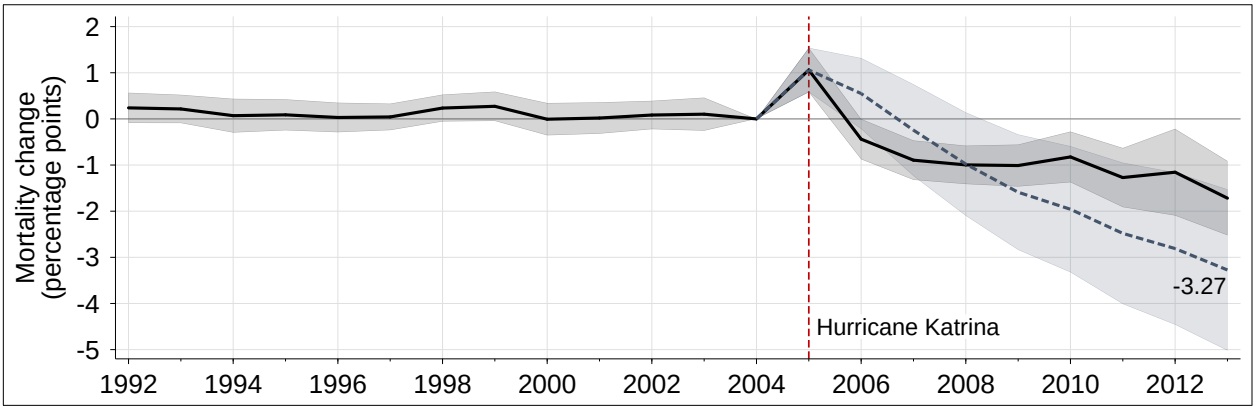
(e) No demographic controls (2004 cohort)



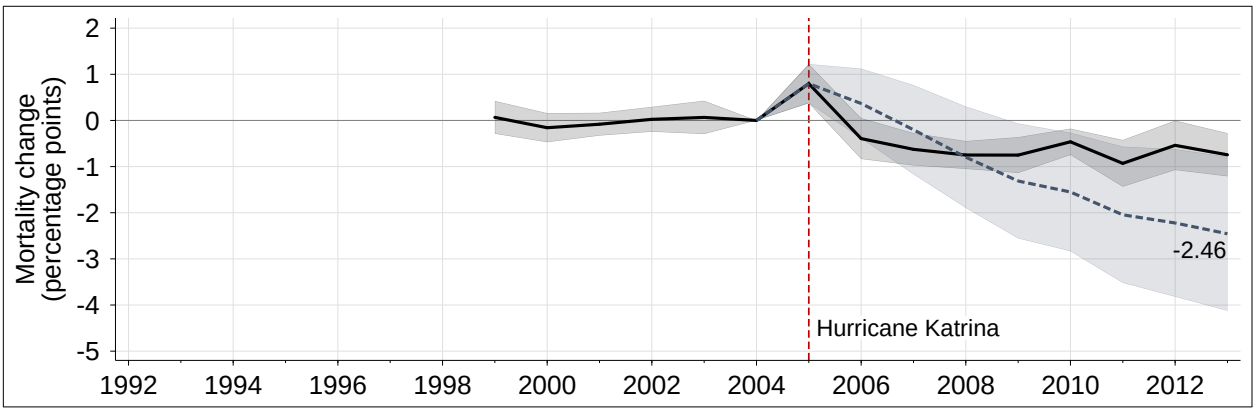
(f) Baseline age-race-sex controls (2004 cohort)

Notes: Each panel reports results from a discrete time (annual) survival analysis of Hurricane Katrina. We fit proportional hazard models that include interactions of year and New Orleans fixed effects, allowing the hazard rate to vary arbitrarily over time for New Orleans and control counties. The panels report estimated hazard ratios (exponentiated coefficients) for the year and New Orleans interactions using 2004 as the reference year, analogous to the difference-in-differences estimates reported in Figures 3–4. Proportional hazard models with no other controls (reported in the left column) are equivalent to the linearly additive hazard model in equation (2) with no demographic controls. Proportional hazard models that also control for all combinations of baseline age (one-year bins), race, and sex are reported in the right column. The gray shaded areas represent 95 percent confidence intervals based on standard errors that are clustered by beneficiary baseline ZIP code. Estimates are provided for the 1992, 1999, and 2004 Medicare cohorts, as indicated in the caption to each panel.

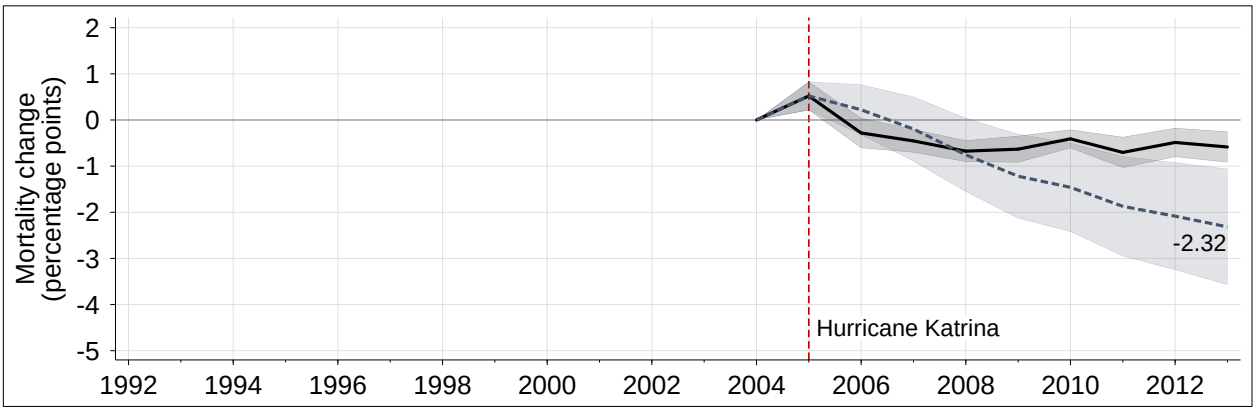
Figure A.9: Long-run mortality effects of Hurricane Katrina using the United States (except New Orleans) as the control group



(a) 1992 Medicare cohort



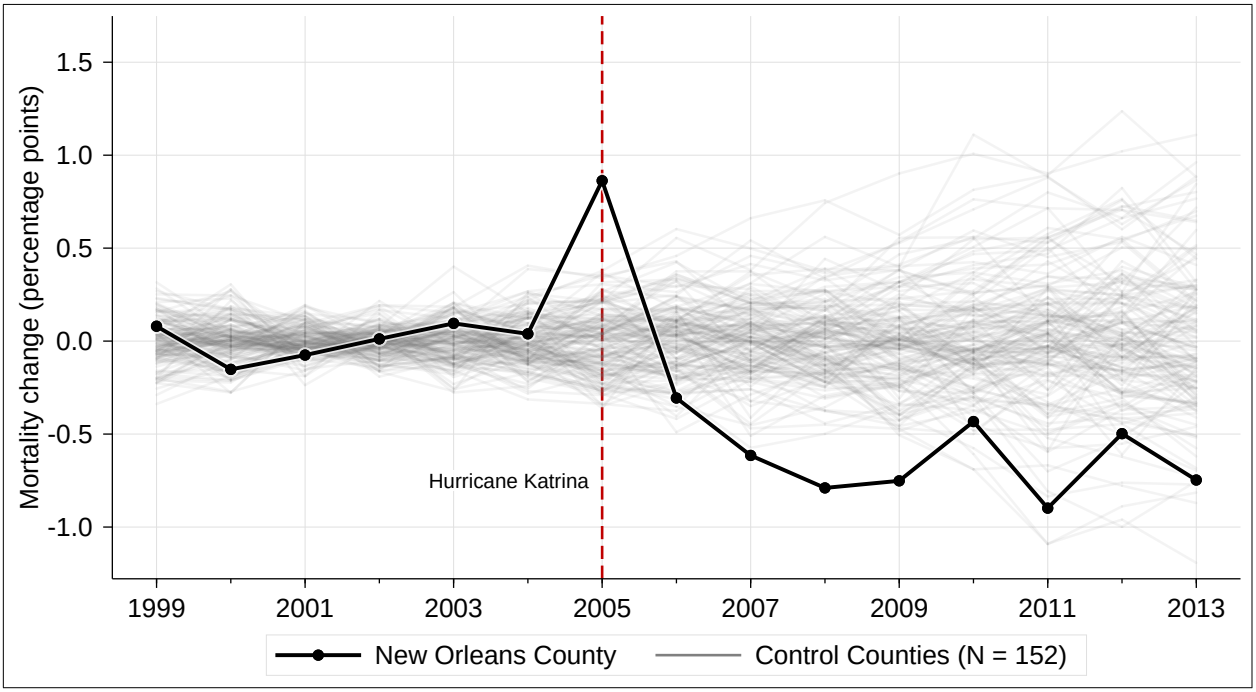
(b) 1999 Medicare cohort



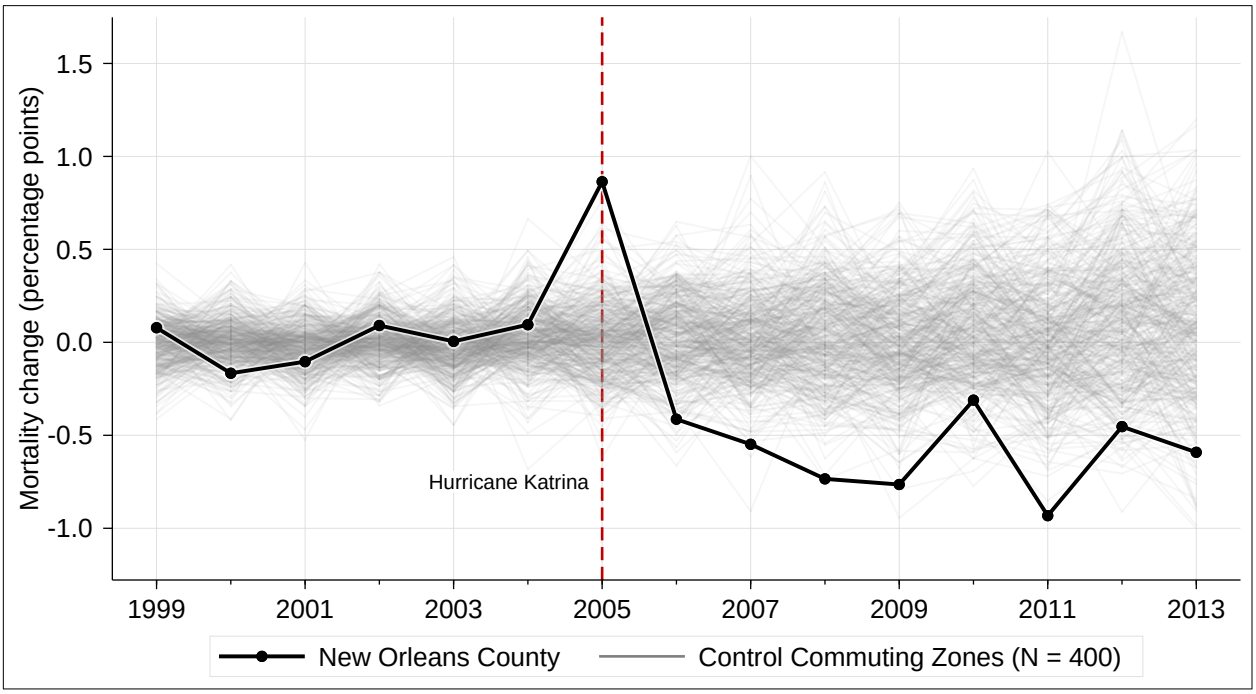
(c) 2004 Medicare cohort

Notes: The black lines plot difference-in-differences event study estimates from equation (2) for the Medicare cohort indicated above each panel. "Treated" beneficiaries are those initially living in New Orleans, and "control" beneficiaries are those initially living in any other part of the United States. The dependent variable is an indicator equal to one if the beneficiary died in a given calendar year and is equal to zero if a beneficiary survived that year. The dashed blue line tracks the implied changes in cumulative mortality probability (equation (3)). The shaded areas represent 95 percent confidence intervals based on standard errors that are clustered by a beneficiary's baseline ZIP code. Coefficients and confidence intervals have been scaled by 100 to reflect changes in percentage points.

Figure A.10: Annual mortality effects of Hurricane Katrina, synthetic control method



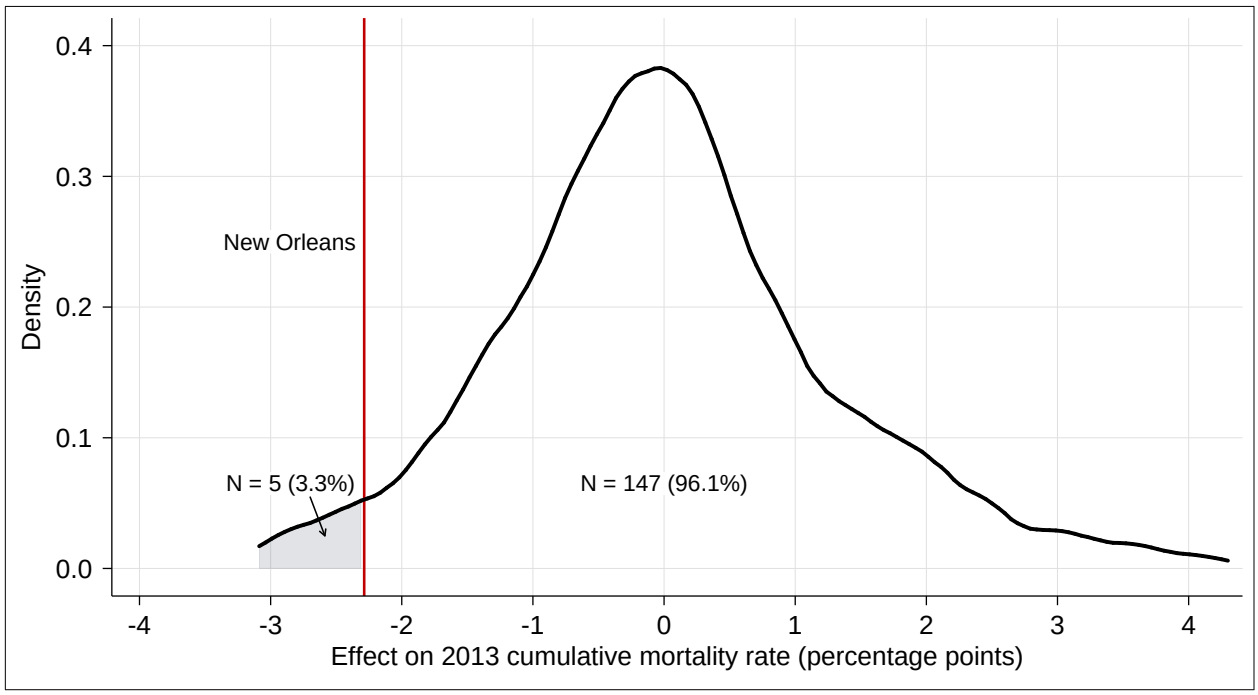
(a) Control units: Counties with 50,000 or more beneficiaries at baseline



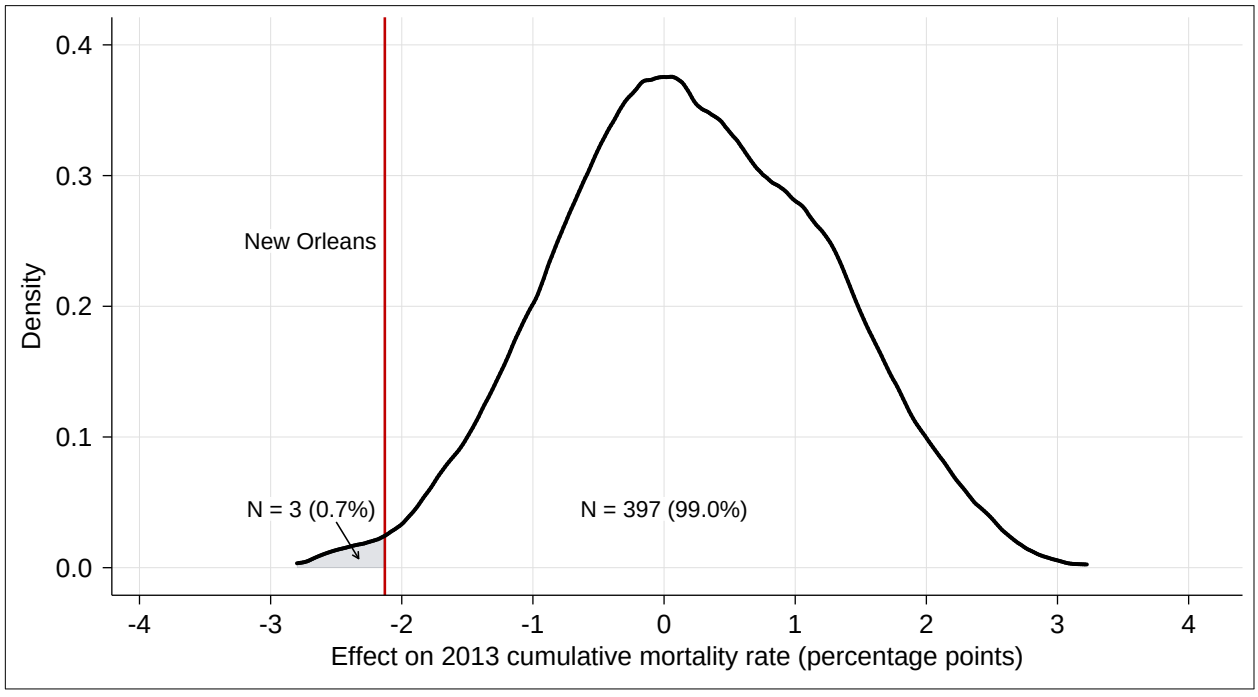
(b) Control units: Commuting zones closest to New Orleans county in baseline population

Notes: The black lines plot the effect of Hurricane Katrina on the annual mortality rate of the New Orleans cohort, estimated using the synthetic control method. The gray lines plot the "effect" of a 2005 event for each non-New Orleans county/commuting zone in the sample, also estimated using the synthetic control method. Estimates have been scaled by 100 to reflect changes in percentage points.

Figure A.11: Cumulative mortality effects of Hurricane Katrina, synthetic control method



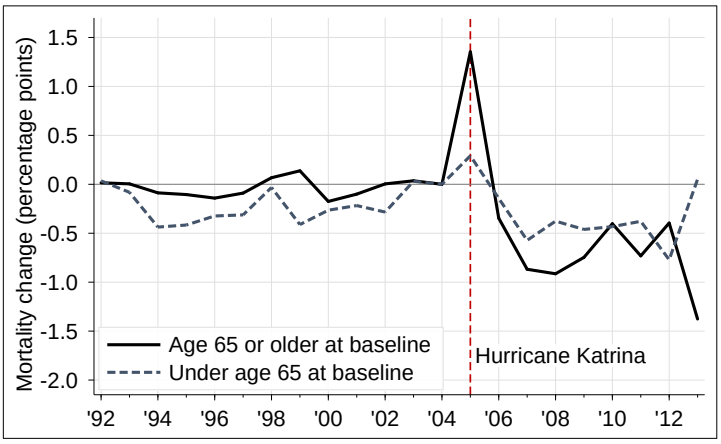
(a) Control units: Counties with 50,000 or more beneficiaries at baseline



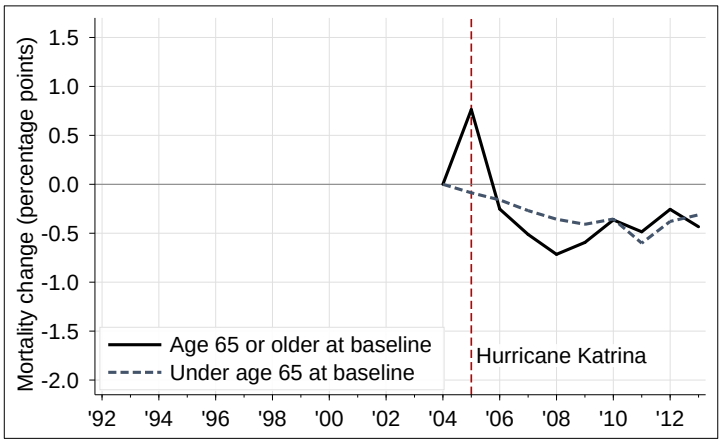
(b) Control units: 400 commuting zones closest to New Orleans county in baseline population

Notes: The black lines plot the density of the effects of a 2005 event on the 2013 cumulative mortality rates of regions in our sample, estimated using the synthetic control method. The red line indicates where the New Orleans county effect falls in that distribution. Text labels describe how many control regions have a cumulative mortality effect that is less or greater than the cumulative mortality effect in New Orleans.

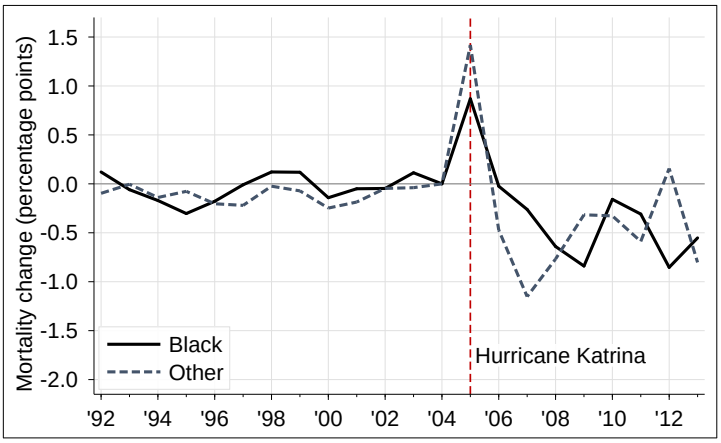
Figure A.12: Annual mortality event studies by baseline demographics



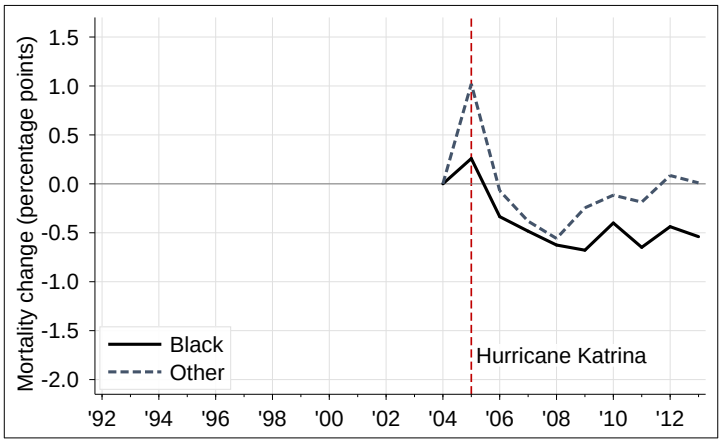
(a) Baseline age (1992 cohort)



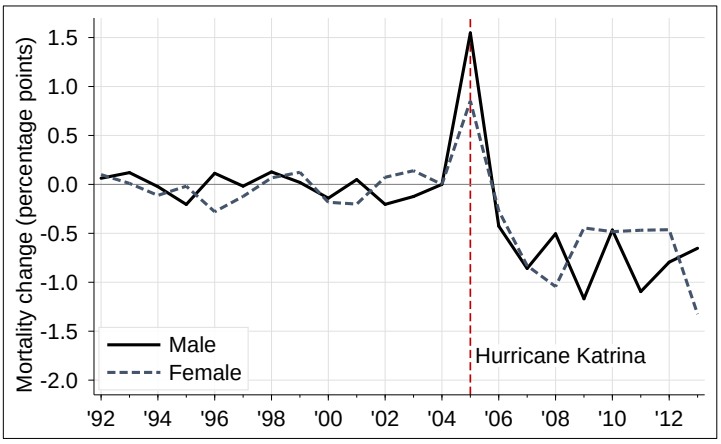
(b) Baseline age (2004 cohort)



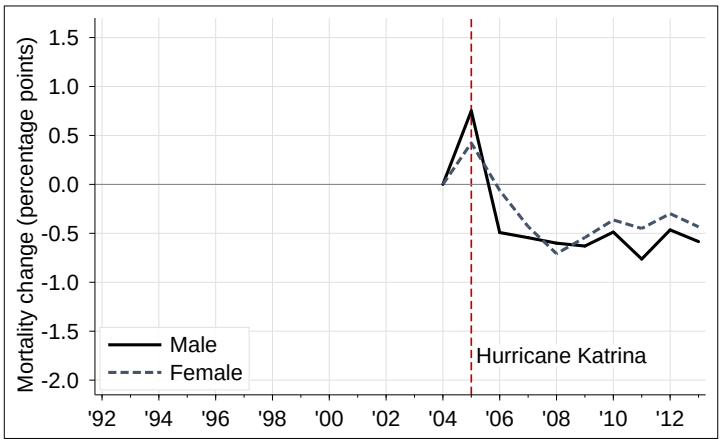
(c) Race (1992 cohort)



(d) Race (2004 cohort)



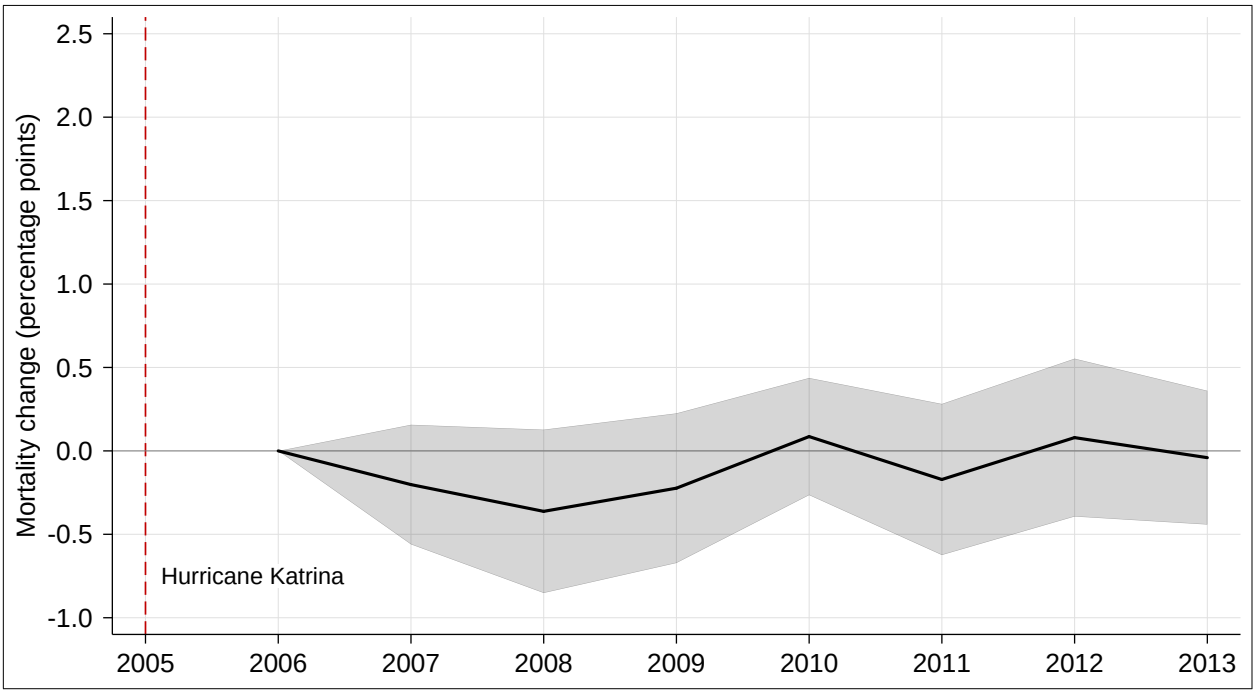
(e) Sex (1992 cohort)



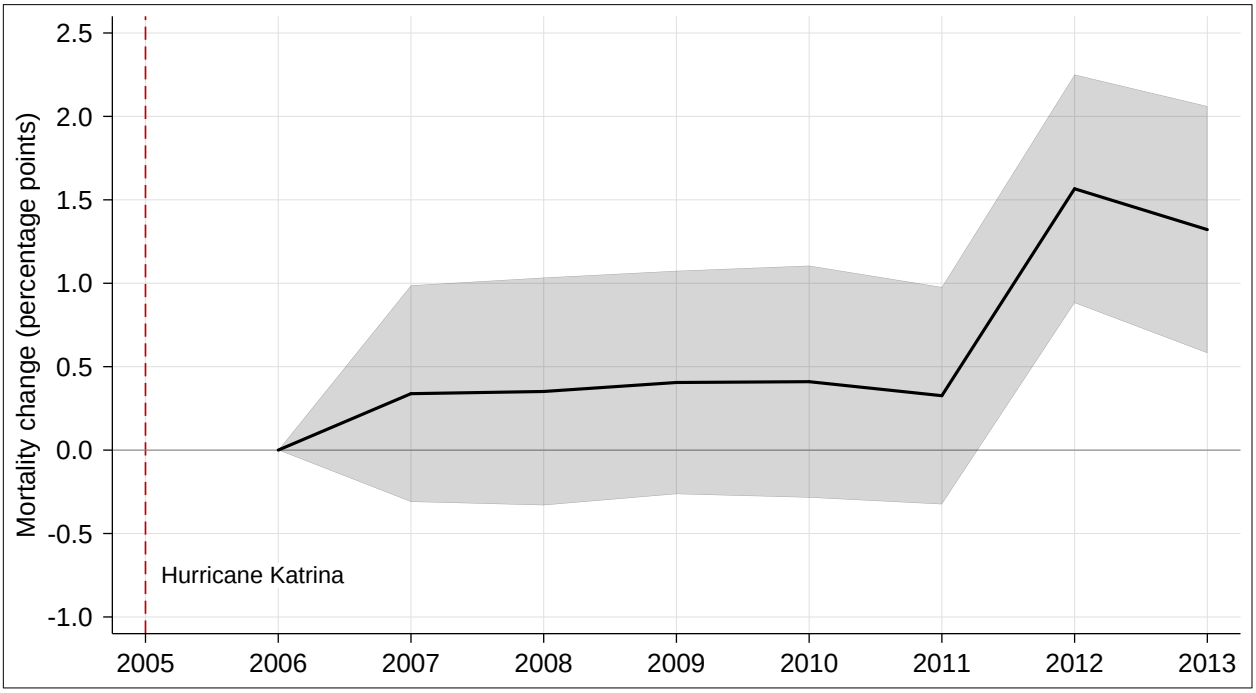
(f) Sex (2004 cohort)

Notes: Each panel reports difference-in-differences event study estimates from equation (2), but they are estimated separately by the baseline demographic group indicated by the legend. Estimates are provided for both the 1992 and 2004 Medicare cohorts, as indicated in the caption to each panel.

Figure A.13: Post-Katrina changes in stayers' and movers' mortality over time



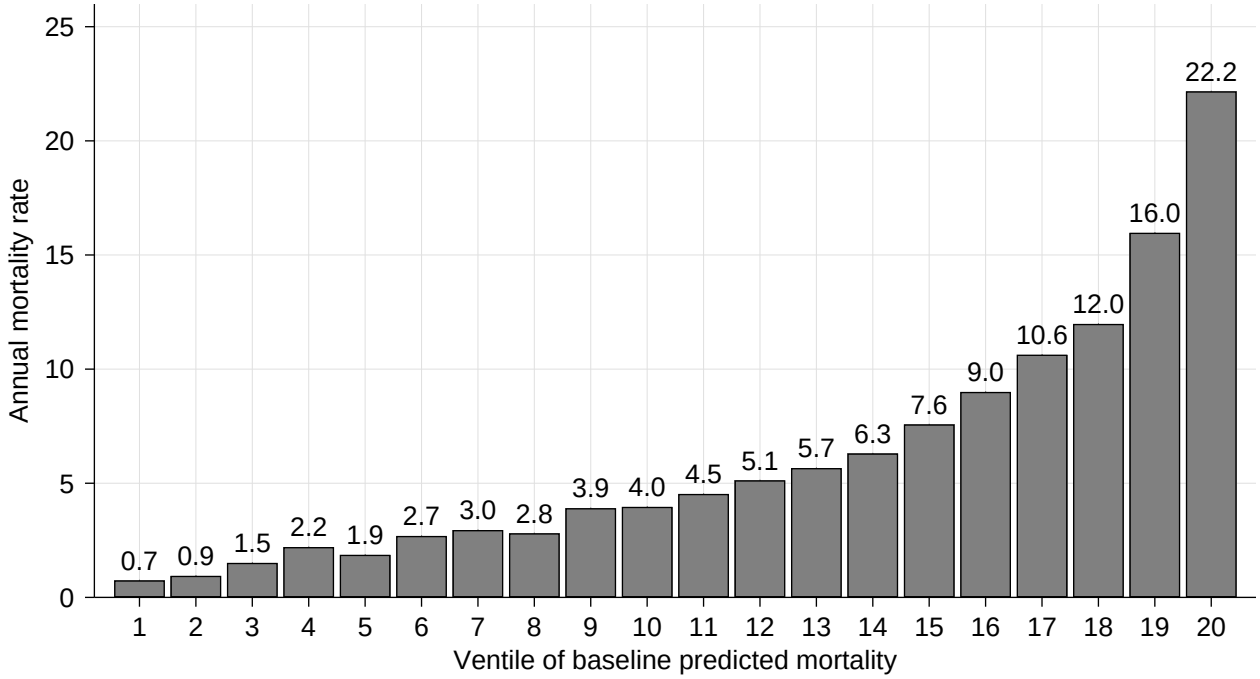
(a) Post-Katrina stayers



(b) Post-Katrina movers

Notes: The figure shows estimates and 95 percent confidence intervals from estimating equation (2) over the period 2006–2013, using 2006 as the reference year. Panel (a) shows results estimated for the sample of stayers, i.e., beneficiaries who, as of March 2006, were living in their baseline (2004) CZ of residence. Panel (b) shows results estimated for the sample of movers, i.e., beneficiaries who, as of March 2006, were living outside of their baseline (2004) CZ of residence. The dependent variable is a mortality indicator equal to zero if a beneficiary is alive during the entire calendar year and is equal to one if the beneficiary died in a given year. Standard errors are clustered by beneficiary baseline ZIP code. Coefficients and confidence intervals have been scaled by 100 to reflect changes in percentage points.

Figure A.14: Movers' realized mortality by ex ante predicted mortality



Notes: The figure shows realized annual mortality in 2006–2013 among Hurricane Katrina movers by ventile of ex ante predicted mortality. The mortality prediction model, described in Section 5.3.1, is estimated using the 2004 control county cohorts over the period 2006–2013. The fitted model is then used to generate out-of-sample mortality predictions for individuals in the 2004 New Orleans cohort, providing a time-invariant index of an individual's ex ante mortality risk over the period 2006–2013.

Table A.1: Top 20 destinations for New Orleans movers

	(1) Number of movers	(2) Percent of movers	(3) Dest. mort. rate	(4) Dest. Medicare spending
Harris, Texas	3,754	14.18	5.27	14,399
East Baton Rouge, Louisiana	2,552	9.64	5.55	12,210
Dallas, Texas	1,211	4.58	5.32	13,509
Bexar, Texas	604	2.28	5.17	12,045
Tarrant, Texas	554	2.09	5.46	13,030
Lafayette, Louisiana	435	1.64	5.35	12,062
Fulton, Georgia	429	1.62	5.36	10,909
Tangipahoa, Louisiana	403	1.52	5.66	15,246
DeKalb, Georgia	391	1.48	5.13	10,592
Travis, Texas	365	1.38	5.01	11,757
Cobb, Georgia	316	1.19	5.1	10,844
Ascension, Louisiana	314	1.19	5.28	12,981
Caddo, Louisiana	311	1.18	5.95	13,227
Shelby, Tennessee	302	1.14	5.64	11,429
Los Angeles, California	292	1.1	4.93	14,495
St. Landry, Louisiana	286	1.08	5.53	13,327
Rapides, Louisiana	282	1.07	5.49	12,014
Hinds, Mississippi	266	1.01	5.35	11,604
Fort Bend, Texas	264	1	4.64	12,701
Gwinnett, Georgia	214	0.81	4.86	10,061
Total	13,545	51.18		

Notes: The table reports the number and percent of movers to each of the top 20 destination counties for New Orleans migrants as well as the destination mortality rate and per-beneficiary Medicare spending. Percentages are relative to the total number of movers.

Table A.2: Annual mortality rates, New Orleans and control cohorts

	(1)	(2)	(3)	(4)	(5)	(6)
	1992 Cohorts		1999 Cohorts		2004 Cohorts	
	New Orleans	Control cities	New Orleans	Control cities	New Orleans	Control cities
1992	5.07	4.92				
1993	5.44	5.32				
1994	5.45	5.46				
1995	5.72	5.75				
1996	5.90	5.94				
1997	6.15	6.15				
1998	6.64	6.46				
1999	7.09	6.93	5.48	5.25		
2000	7.06	7.14	5.45	5.43		
2001	7.37	7.39	5.71	5.59		
2002	7.80	7.74	6.04	5.79		
2003	8.10	7.97	6.25	5.93		
2004	8.10	8.00	6.23	5.96	5.14	4.84
2005	9.67	8.44	7.34	6.22	5.92	5.06
2006	8.38	8.61	6.26	6.36	5.19	5.14
2007	8.28	9.02	6.24	6.64	5.16	5.34
2008	8.77	9.51	6.48	6.93	5.20	5.56
2009	8.91	9.54	6.56	6.93	5.29	5.57
2010	9.72	10.10	7.23	7.35	5.78	5.89
2011	9.93	10.55	7.17	7.59	5.76	6.04
2012	10.59	11.10	7.91	7.97	6.21	6.27
2013	10.70	11.69	8.15	8.37	6.43	6.62
Cohort size	71,433	973,938	67,649	967,062	65,457	941,685

Notes: The table reports the annual mortality rate (in percentage points) of the cohort specified at the top of each column.

Table A.3: Weekly mortality values for Figure 2

Event week	(1) Deaths per thousand (New Orleans)	(2) Deaths per thousand (control)	(3) Effect on death rate per thousand people
-8	0.66	0.86	-0.20*
			(0.11)
-7	0.98	0.87	0.09
			(0.17)
-6	0.66	0.83	-0.18*
			(0.09)
-5	0.91	0.98	-0.08
			(0.10)
-4	0.86	0.87	-0.01
			(0.08)
-3	0.88	0.88	-0.01
			(0.10)
-2	1.12	0.91	0.19
			(0.12)
-1	1.17	0.89	0.27**
			(0.11)
0	5.24	0.95	4.27***
			(0.49)
1	1.38	0.88	0.48***
			(0.11)
2	1.51	0.94	0.56**
			(0.23)
3	1.23	0.91	0.31*
			(0.16)
4	1.30	1.01	0.28**
			(0.13)
5	1.20	0.88	0.31**
			(0.14)
6	1.15	0.93	0.21
			(0.16)
7	1.06	0.92	0.14
			(0.19)
8	1.34	0.94	0.38**
			(0.16)
9	1.32	1.04	0.27*
			(0.14)
10	1.05	0.94	0.10
			(0.13)
Dep. var. mean			1.01
Observations	5,871,017	85,250,118	91,121,135

Notes: Columns (1) and (2) report raw weekly mortality rates for the 2004 New Orleans and control city cohorts, respectively. Column (3) reports estimates of equation (1). Estimates prior to eight weeks before Hurricane Katrina and more than ten weeks after Hurricane Katrina are omitted for space, but estimates for all weeks are plotted in Figure 2. Mortality rates have been scaled by 1,000, implying that each coefficient corresponds to the change in the number of deaths per thousand people. Standard errors (in parentheses) are clustered by beneficiary baseline ZIP code. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table A.4: Point estimates and cumulative survival statistics for Figure 3

	(1) Effect on annual mortality rate	(2) Effect on cumulative mortality	(3) Cumulative survival to beginning of year	(4) Effect on Pr(leaving 2004 CZ)
2005	0.56***	0.56***	100.00	48.3***
	(0.16)	(0.16)		(3.5)
2006	−0.25	0.29	94.86	46.8***
	(0.17)	(0.28)		(3.9)
2007	−0.48***	−0.16	89.24	42.0***
	(0.13)	(0.36)		(3.5)
2008	−0.67***	−0.71*	84.61	35.8***
	(0.12)	(0.42)		(2.9)
2009	−0.58***	−1.14**	80.24	33.1***
	(0.15)	(0.48)		(2.7)
2010	−0.42***	−1.39***	76.07	30.5***
	(0.11)	(0.51)		(2.6)
2011	−0.59***	−1.73***	72.05	28.4***
	(0.18)	(0.57)		(2.4)
2012	−0.37**	−1.88***	67.89	26.6***
	(0.17)	(0.62)		(2.3)
2013	−0.50***	−2.07***	63.98	25.1***
	(0.18)	(0.67)		(2.2)
Dep. var. mean	5.55			10.4
New Orleans individuals surviving until 2005			65,457	
Observations	7,987,100	7,987,100		7,982,773

Notes: Columns (1), (2), and (4) report estimates of equations (2) and (3). Column (3) reports the empirical survival of the 2004 New Orleans cohort. All regressions include baseline ZIP code and year fixed effects. Coefficients, standard errors (in parentheses), and the dependent variable mean have been scaled by 100. Standard errors are clustered by beneficiary baseline ZIP code. Outcome variables are indicated at top of each column. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table A.5: Point estimates for Figure 4 and Appendix Figure A.6

	(1) Effect on annual mortality rate (1992 cohort)	(2) Effect on annual mortality rate (1999 cohort)	(3) Effect on Pr(leaving 2004 CZ) (1999 cohort)
1992	0.08		
	(0.18)		
1993	0.05		
	(0.17)		
1994	−0.08		
	(0.20)		
1995	−0.10		
	(0.18)		
1996	−0.12		
	(0.17)		
1997	−0.08		
	(0.16)		
1998	0.09		
	(0.16)		
1999	0.08	−0.03	1.01
	(0.17)	(0.19)	(0.70)
2000	−0.17	−0.23	1.00*
	(0.19)	(0.17)	(0.53)
2001	−0.10	−0.14	0.88**
	(0.18)	(0.13)	(0.41)
2002	−0.04	−0.02	0.57
	(0.17)	(0.14)	(0.35)
2003	0.04	0.05	0.44
	(0.19)	(0.19)	(0.30)
2005	1.13***	0.84***	42.92***
	(0.25)	(0.22)	(3.14)
2006	−0.33	−0.37	42.69***
	(0.23)	(0.23)	(3.61)
2007	−0.84***	−0.68***	38.61***
	(0.23)	(0.18)	(3.36)
2008	−0.84***	−0.73***	33.23***
	(0.23)	(0.16)	(2.89)
2009	−0.73***	−0.65***	30.76***
	(0.25)	(0.20)	(2.73)
2010	−0.48	−0.40**	28.36***
	(0.30)	(0.16)	(2.59)
2011	−0.72**	−0.71***	26.49***
	(0.34)	(0.27)	(2.49)
2012	−0.61	−0.35	24.92***
	(0.49)	(0.28)	(2.43)
2013	−1.08**	−0.50**	23.42***
	(0.43)	(0.25)	(2.30)
Dep. var. mean	0.07	0.06	0.13
Observations	12,446,594	10,470,951	10,463,469

Notes: The table reports estimates of equation (2) from the main text. The dependent variable is indicated at the top of each column. All regressions include ZIP code and year fixed effects. Coefficients, standard errors (in parentheses), and the dependent variable mean have been scaled by 100. Standard errors are clustered by beneficiary baseline ZIP code. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table A.6: Heterogeneous mortality effects of Hurricane Katrina (2004 Medicare cohort)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Difference-in-differences estimates						
	Short-run (2005)		Long run (2006–2013)				
Baseline var	NOLA x 2005	NOLA x 2005 x var	NOLA x (2006–2013)	NOLA x (2006–2013) x var	Percent var=1 in NOLA, 2004	Mean mortality if var=1 in NOLA, 2004	Observations
All	0.56***		−0.48***		100.0		7,987,100
	(0.16)		(0.12)				
Experienced 2+ feet of flooding	0.29	0.48	−0.42*	0.04	56.5	5.1	7,183,178
	(0.22)	(0.31)	(0.23)	(0.31)			
Below median income	0.83***	−0.58*	−0.13	−0.61**	49.9	5.6	7,183,178
	(0.25)	(0.31)	(0.17)	(0.25)			
64 or younger at baseline	0.76***	−0.85**	−0.45***	0.10	22.3	3.0	7,987,100
	(0.19)	(0.34)	(0.16)	(0.27)			
75 or older at baseline	0.06	1.29***	−0.45***	−0.02	40.7	8.2	7,987,100
	(0.15)	(0.37)	(0.09)	(0.25)			
Black	1.02***	−0.76*	−0.21	−0.30	60.5	5.0	7,987,100
	(0.32)	(0.42)	(0.19)	(0.26)			
Male	0.42**	0.33*	−0.41**	−0.16	43.0	5.5	7,987,100
	(0.19)	(0.19)	(0.16)	(0.22)			
End-stage renal disease	0.58***	−0.09	−0.40***	−2.10	2.1	19.7	7,987,100
	(0.17)	(1.40)	(0.12)	(1.45)			
Heart disease and stroke	0.69***	−0.03	−0.88***	−0.24	64.8	7.8	5,788,235
	(0.25)	(0.36)	(0.18)	(0.36)			
Respiratory disease	0.37**	1.39**	−1.15***	0.06	12.8	12.0	6,300,486
	(0.19)	(0.59)	(0.19)	(0.58)			
Blood and kidney disease	1.07***	−0.88***	−0.63***	−1.01***	46.2	8.7	5,788,235
	(0.19)	(0.28)	(0.14)	(0.32)			
Cancer	0.52***	0.58	−1.12***	0.02	6.8	12.8	6,300,486
	(0.19)	(1.19)	(0.19)	(0.73)			
Diabetes	0.70***	−0.03	−0.86***	−0.48*	27.4	8.8	5,788,235
	(0.21)	(0.29)	(0.16)	(0.27)			
Musculoskeletal	0.43*	0.92	−1.23***	0.84**	28.6	6.5	5,788,235
	(0.26)	(0.56)	(0.19)	(0.35)			
Alzheimer's/dementia	0.51***	3.09***	−0.92***	−0.85	12.4	19.9	5,256,708
	(0.18)	(1.08)	(0.16)	(0.96)			
Other chronic condition	0.53**	0.18	−1.43***	0.98***	39.9	4.5	6,300,486
	(0.23)	(0.31)	(0.21)	(0.25)			

Notes: Each row reports summary statistics along with short-run (2005) and long-run (2006–2013) mortality effects estimated from the difference-in-differences model given by equation (A–1) where the effect may vary by the individual baseline characteristic, var, specified by the row. Observations are at the individual-year level and include all Medicare beneficiaries living in New Orleans or one of the ten control cities in 2004 and who were alive at the beginning of the year of observation. The outcome in each regression is a mortality indicator for whether an individual died that year. All regressions control for baseline ZIP code and calendar year fixed effects. For characteristics that vary within the control cities, regressions further include interactions between the characteristic and calendar year fixed effects. Standard errors clustered by baseline ZIP code are reported in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table A.7: Predictors of leaving New Orleans and of destination mortality

	(1)	(2)	(3)	(4)	(5)	(6)
	Whether moved			Local mortality rate		
Black	21.70***	21.38***	20.02***	−0.001	−0.011	−0.012
	(6.74)	(6.37)	(6.08)	(0.018)	(0.018)	(0.018)
Male	−3.68***	−3.91***	−3.93***	0.016***	0.007	0.007
	(0.62)	(0.67)	(0.66)	(0.005)	(0.008)	(0.007)
64 and younger	12.33***	12.53***	12.30***	−0.014*	−0.016*	−0.015*
	(1.29)	(1.41)	(1.32)	(0.007)	(0.009)	(0.009)
75 and older	0.00	−1.04	−0.73	−0.003	−0.012	−0.013
	(0.55)	(0.78)	(0.83)	(0.007)	(0.010)	(0.010)
Below median income	4.52***	6.45***	5.37***	0.007	0.012	0.014*
	(0.86)	(1.18)	(0.97)	(0.007)	(0.008)	(0.008)
Katrina flood level, feet	2.54***	2.53***	1.16**	0.000	−0.001	−0.001
	(0.73)	(0.83)	(0.56)	(0.001)	(0.002)	(0.002)
End-stage renal disease	0.76	−2.42	−1.61	0.026*	−0.007	−0.007
	(1.25)	(2.19)	(2.12)	(0.015)	(0.019)	(0.019)
2004 medical spending, thousands		0.06***	0.05***		0.000	0.000
		(0.02)	(0.02)		(0.000)	(0.000)
Alzheimer's/dementia		1.14	1.47		0.044***	0.042***
		(1.95)	(2.12)		(0.016)	(0.016)
Respiratory disease		3.49***	3.34***		−0.009	−0.009
		(1.09)	(1.05)		(0.011)	(0.011)
Heart disease and stroke		1.09	1.00		0.005	0.006
		(0.67)	(0.65)		(0.007)	(0.008)
Blood and kidney disease		−0.62	−0.42		−0.004	−0.004
		(0.81)	(0.82)		(0.008)	(0.008)
Diabetes		0.42	0.26		0.010	0.010
		(0.68)	(0.69)		(0.009)	(0.009)
Musculoskeletal		−0.01	−0.10		−0.011	−0.009
		(0.66)	(0.64)		(0.009)	(0.008)
Cancer		−3.51***	−3.53***		−0.024*	−0.024*
		(1.00)	(1.01)		(0.013)	(0.013)
Other		0.79	1.29*		−0.006	−0.007
		(0.71)	(0.68)		(0.007)	(0.007)
Baseline zip code fixed effects	No	No	Yes	No	No	Yes
Dep. var. mean	44.97	45.35	45.35	5.403	5.399	5.399
p-value of joint F-test	<0.001	<0.001	<0.001	0.008	0.047	0.047
Observations	51,104	23,362	23,362	22,981	10,594	10,594

Notes: The table reports how relocation of survivors (columns (1)–(3)) and local mortality in movers' destinations (columns (4)–(6)) relate to baseline (2004) characteristics of the 2004 New Orleans cohort. Local mortality and relocation are expressed in percentage points. Standard errors (in parentheses) are clustered by each beneficiary's 2006 county. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table A.8: Correlation between predicted mortality and leaving New Orleans

	(1)	(2)	(3)	(4)	(5)
Predicted mortality	−0.62***	−0.31***	−0.47***	−0.46***	−0.40***
	(0.13)	(0.09)	(0.11)	(0.11)	(0.10)
Alzheimer's/dementia dropped	No	No	Yes	Yes	Yes
Chronic conditions predictors	None	Grouped	Grouped	Two-way interactions	Individual
Baseline spending predictors	None	Ventiles	Ventiles	Ventiles	Centiles
Dep. var. mean	45.32	45.79	45.88	45.88	45.88
Observations	58,403	26,906	24,560	24,560	24,560

Notes: The table reports shows the relationship between ex ante predicted mortality and leaving New Orleans in 2005–2006 among the 2004 New Orleans cohort. The estimating equation is the same as equation (6), except the dependent variable is a relocation indicator equal to one if a 2004 New Orleans beneficiary was alive but not residing in the New Orleans commuting zone as of March 2006 and is equal to zero if she or he was alive and residing in New Orleans commuting zone as of March 2006. All regressions control for baseline ZIP code fixed effects. Both predicted mortality and the moving decision are expressed in percentage points. Standard errors (in parentheses) are clustered by each beneficiary's 2006 county. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table A.9: Predictors of returning to New Orleans

	(1)	(2)	(3)	(4)	(5)	(6)
	Returned by March of 2007			Returned by December 31, 2010		
Mean death rate in 2006 county (MDR)	0.48	0.55	0.66	0.04	0.21	1.54
	(1.33)	(1.63)	(2.26)	(2.38)	(2.69)	(3.61)
Predicted mortality (PM)		−0.37***	−0.29		−0.54***	0.68
		(0.07)	(0.87)		(0.12)	(1.76)
PM x MDR			−1.39			−22.56
			(15.70)			(31.77)
Dep. var. mean	20.43	18.50	18.50	43.18	41.08	41.08
Observations	26,467	12,319	12,319	21,300	9,671	9,671
R-squared	0.00	0.00	0.00	0.00	0.00	0.00

Notes: The table reports how returning to New Orleans among the movers sample relates to local mortality in movers' initial (2006) destinations. The dependent variable is specified at the top of each column. Predicted mortality, destination mortality, and the decision to return are expressed in percentage points. Standard errors (in parentheses) are clustered by each beneficiary's 2006 county. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table A.10: Migrant mortality by destination mortality (New Orleans movers)

Specification	Chronic condition controls	Estimate	Obs.
All 2006 movers	Individual	0.961***	80,084
		(0.303)	
All 2007 movers	Individual	0.816***	60,058
		(0.300)	
Distance controls	None	1.000***	175,821
		(0.249)	
Distance controls	Interactions	1.104***	80,075
		(0.321)	
Distance controls	Grouped	1.054***	80,084
		(0.325)	
No Houston/B.R.	None	0.932***	118,929
		(0.252)	
No Houston/B.R.	Interactions	1.124***	54,079
		(0.331)	
No Houston/B.R.	Grouped	1.047***	54,142
		(0.336)	

Notes: The table reports estimates of equation (5). The dependent variable is a mortality indicator equal to zero if a beneficiary was alive during the entire calendar year and is equal to one if the beneficiary died in a given year. Coefficients, standard errors (in parentheses), and the dependent variable mean have been scaled by 100. Each specification uses the sample of individuals who survived through 2005 and moved between March 2005 and March 2006, with the exception of the "all 2007 movers" specification, which uses location as of March 2007 instead of 2006. All specifications include fixed effects for baseline ZIP code and all combinations of year, age (one-year bins), race, and sex. Grouped chronic condition controls means that indicators for eight groups of chronic conditions are included. Individual chronic condition controls means that indicators for each of the 27 chronic conditions are included. All specifications that include chronic condition controls also include fixed effects for centiles of baseline Medicare spending. Specifications with distance controls additionally include indicators for deciles of distance between the centroids of New Orleans and of the destination county. No Houston/B.R. means that movers to Houston, TX, or Baton Rouge, LA, are excluded from the sample. Standard errors are clustered by a beneficiary's destination county in the year of the move. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table A.11: Cumulative migrant mortality by destination mortality (New Orleans movers)

	(1)	(2)	(3)	(4)	(5)	(6)
Mean death rate in 2006 county	4.01***	3.31***	3.52**	3.52***	3.50**	3.58**
	(1.49)	(1.06)	(1.40)	(1.33)	(1.49)	(1.40)
Set of fixed effects	A	B	B	B	B	B
Alzheimer's/dementia dropped	No	No	No	No	Yes	Yes
Chronic conditions controls	No	No	Gr.	All int.	Gr.	All int.
Dep. var. mean	36.91	36.92	39.94	39.77	36.74	36.64
Observations	26,461	26,451	12,313	12,254	11,258	11,227
R-squared	0.01	0.19	0.24	0.29	0.21	0.26

Notes: The table reports estimates of the correlation between movers' probability of dying before the end of 2013 and the average mortality rate in their 2006 destination. The dependent variable is a mortality indicator equal to zero if a beneficiary was alive at the end of 2013 and is equal to one if the beneficiary died prior to that date. Coefficients, standard errors (in parentheses), and the dependent variable mean have been scaled by 100. Controls are as follows: A includes baseline ZIP code fixed effects; B also includes fixed effects for each age (one-year bins), race, and sex combination. Gr. means that indicators for eight groups of chronic conditions are included; All int. means that indicators for each possible interaction of the eight groups of chronic conditions are included. All specifications that include chronic condition controls also include fixed effects for centiles of baseline Medicare spending. Standard errors are clustered by a beneficiary's 2006 county. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table A.12: Migrant mortality by destination mortality (2005–2007 New Orleans movers)

	(1)	(2)	(3)	(4)	(5)
Mean death rate in 2007 county	0.73**	0.61***	0.63***	0.71**	0.84***
	(0.31)	(0.22)	(0.22)	(0.30)	(0.31)
Set of fixed effects	A	B	C	C	C
Chronic conditions controls	No	No	No	Gr.	All int.
Dep. var. mean	5.92	5.92	5.91	6.43	6.41
Observations	129,669	129,667	129,581	60,102	60,052
R-squared	0.00	0.04	0.06	0.09	0.10

Notes: The dependent variable is a mortality indicator equal to zero if a beneficiary was alive during the entire calendar year and is equal to one if the beneficiary died in a given year. Coefficients, standard errors (in parentheses), and the dependent variable mean have been scaled by 100. Controls are as follows: A includes baseline ZIP code and year fixed effects; B also includes fixed effects for each age (one-year bins), race, and sex combination. C additionally controls for age-race-sex effects by year. Gr. means that indicators for eight groups of chronic conditions are included; All int. means that indicators for each possible interaction of the eight groups of chronic conditions are included. All specifications that include chronic condition controls also include fixed effects for centiles of baseline Medicare spending. Standard errors are clustered by a beneficiary's 2007 county. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table A.13: Migrant mortality over time, by destination mortality (New Orleans movers)

	(1)	(2)	(3)	(4)	(5)
Mean death rate x (2006–2007)	1.36***	1.28***	1.26***	1.27**	1.23**
	(0.43)	(0.40)	(0.40)	(0.54)	(0.54)
Mean death rate x (2008–2013)	0.63**	0.64***	0.68***	0.89***	0.97***
	(0.31)	(0.24)	(0.24)	(0.33)	(0.34)
Set of fixed effects	A	B	C	C	C
Chronic conditions controls	No	No	No	Gr.	All int.
Dep. var. mean	5.55	5.55	5.54	6.11	6.10
Observations	175,936	175,936	175,821	80,084	80,075
R-squared	0.00	0.04	0.05	0.09	0.09

Notes: The table reports estimates of a version of equation (5), augmented to allow for separate effects in the post-Katrina periods 2006–2007 and 2008–2013. The dependent variable is a mortality indicator equal to zero if a beneficiary was alive during the entire calendar year and is equal to one if the beneficiary died in a given year. Coefficients, standard errors (in parentheses), and the dependent variable mean have been scaled by 100. Controls are as follows: A includes baseline ZIP code and year fixed effects; B also includes fixed effects for each age (one-year bins), race, and sex combination. C additionally controls for age-race-sex effects by year. Gr. means that indicators for eight groups of chronic conditions are included; All int. means that indicators for each possible interaction of the eight groups of chronic conditions are included. All specifications that include chronic condition controls also include fixed effects for centiles of baseline Medicare spending. Standard errors are clustered by a beneficiary's 2006 county. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table A.14: Migrant mortality by cause of death, by destination mortality (New Orleans movers)

	(1) All causes	(2) Cardiovascular	(3) Cancer	(4) Other internal causes	(5) External causes
Mean death rate in 2006 county	1.39***	0.40**	0.08	0.86***	0.021
	(0.32)	(0.17)	(0.12)	(0.22)	(0.035)
Dep. var. mean	5.28	1.97	1.11	1.96	0.133
Observations	75,215	75,215	75,215	75,215	75,215

Notes: The table reports estimates of equation (5) for specific causes of death. The dependent variable is an indicator equal to one if the beneficiary died in a given year from the cause of death specified in the column and is equal to zero if a beneficiary was alive during the entire calendar year or died that year from a different cause. Coefficients, standard errors (in parentheses), and the dependent variable mean have been scaled by 100. All specifications include fixed effects for baseline ZIP code and all combinations of year, age (one-year bins), race, and sex. Standard errors are clustered by a beneficiary's 2006 county. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table A.15: Migrant mortality, by own-group and other-group mortality (New Orleans movers)

	(1)	(2)	(3)
Own-gender mortality	0.48		
	(0.32)		
Other-gender mortality	0.37		
	(0.31)		
Own-race mortality		0.27**	
		(0.13)	
Other-race mortality		0.15	
		(0.12)	
Own-age-group mortality			0.49***
			(0.16)
Other-age-group mortality			0.17
			(0.14)
Dep. var. mean	5.54	5.55	5.54
Observations	175,821	175,770	175,821
R-squared	0.05	0.05	0.05

Notes: The table reports estimates of equation (5) augmented to include both own- and other-group mortality rates. Race groups are black or not black. Age groups are (1) 64 or younger and (2) 65 or older. The dependent variable is a mortality indicator equal to zero if a beneficiary was alive during the entire calendar year and is equal to one if the beneficiary died in a given year. Coefficients, standard errors (in parentheses), and the dependent variable mean have been scaled by 100. Controls include fixed effects for baseline ZIP code and all combinations of year, age (one-year bins), race, and sex. Standard errors are clustered by a beneficiary's 2006 county. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table A.16: Migrant mortality, by more and less local mortality measures (New Orleans movers)

	(1)	(2)	(3)	(4)	(5)
2006 ZIP code mortality		0.37***		0.28***	
		(0.11)		(0.10)	
2006 county mortality	0.86***			0.57**	0.57*
	(0.23)			(0.23)	(0.30)
2006 commuting zone mortality			1.03***		0.46
			(0.30)		(0.40)
Dep. var. mean	5.54	5.54	5.54	5.54	5.54
Observations	175,821	175,245	175,821	175,245	175,821
R-squared	0.05	0.05	0.05	0.05	0.05

Notes: The table reports estimates of equation (5) with mortality rates calculated at the ZIP, county, or commuting zone level. The dependent variable is a mortality indicator equal to zero if a beneficiary was alive during the entire calendar year and is equal to one if the beneficiary died in a given year. Coefficients, standard errors (in parentheses), and the dependent variable mean have been scaled by 100. Controls include fixed effects for baseline ZIP code and all combinations of year, age (one-year bins), race, and sex. Standard errors are clustered by a beneficiary's 2006 county. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table A.17: Summary statistics for destination characteristics

	(1) 10th pctile	(2) Median	(3) 90th pctile
Mortality rate	0.050	0.053	0.058
Adjusted mortality rate	-0.001	0.002	0.008
Income per capita (1,000s)	14.31	20.05	25.40
Poverty rate, 65+ (percent)	7.342	12.19	19.65
Income segregation	0.017	0.091	0.125
Median home value (1,000s)	58.90	87.59	145.3
Upward income mobility (from p25)	-0.778	-0.242	0.178
Upward income mobility (from p75)	-0.191	0.039	0.236
Urban population share	0.469	0.928	0.991
Crime rate (per 1,000)	4.566	8.551	16.64
Social capital index	-1.869	-1.001	0.028
Local gov. spending per capita (1,000s)	1.585	2.343	3.226
Percent exercising	65.62	73.48	78.50
Percent obese	17.48	21.00	27.03
Percent smoking	17.85	20.65	26.72
Medicare spending per beneficiary (1,000s)	10.39	12.20	14.39
Physicians (per 1,000)	0.848	2.975	4.637
Hospital beds (per 1,000)	1.455	3.902	6.304
Hospital quality index	0.723	0.766	0.819
PM 2.5 concentrations ($\mu g/m^3$)	9.020	11.04	12.62
Hot days/year (90° F+)	0	0.239	5.451

Notes: The table shows the 10th, 50th, and 90th percentiles of the given characteristic, as measured in the sample of New Orleans movers in 2006.

Table A.18: Migrant mortality by destination characteristics (New Orleans movers)

	(1)	(2)	(3)	(4)
	Died indicator × 100		Local mortality rate × 100	Predicted mortality rate × 100
Mortality rate	0.76***	0.67***	.	-0.05
	(0.22)	(0.18)		(0.15)
	[75137]	[175821]		[75286]
Percent smoking	0.70***	0.42**	0.34***	0.05
	(0.23)	(0.19)	(0.06)	(0.18)
	[69327]	[160990]	[24209]	[69474]
Adjusted mortality rate	0.60***	0.49***	0.53***	-0.18
	(0.18)	(0.15)	(0.03)	(0.16)
	[75137]	[175821]	[26467]	[75286]
Percent obese	0.60***	0.40**	0.35***	-0.12
	(0.20)	(0.16)	(0.06)	(0.14)
	[69327]	[160990]	[24209]	[69474]
Hospital beds per capita	0.22	0.13	0.14***	-0.17**
	(0.22)	(0.13)	(0.03)	(0.08)
	[74808]	[175095]	[26355]	[74957]
Hot days/year (90° F+)	0.10	0.06	-0.03**	-0.06
	(0.08)	(0.06)	(0.01)	(0.07)
	[75113]	[175739]	[26455]	[75262]
Physicians per capita	-0.05	0.02	-0.13**	-0.08
	(0.23)	(0.16)	(0.05)	(0.12)
	[74808]	[175095]	[26355]	[74957]
Hospital quality index	-0.08	-0.05	-0.01	0.11
	(0.19)	(0.16)	(0.04)	(0.14)
	[66817]	[154840]	[23286]	[66960]
Medicare spending per beneficiary	-0.21	-0.04	0.09	-0.15
	(0.19)	(0.15)	(0.09)	(0.24)
	[75137]	[175821]	[26467]	[75286]
Percent exercising	-0.56**	-0.32	-0.48***	0.01
	(0.23)	(0.20)	(0.04)	(0.16)
	[69217]	[160775]	[24178]	[69365]
PM 2.5 concentrations	-0.65***	-0.31**	-0.05	-0.44**
	(0.17)	(0.14)	(0.06)	(0.19)
	[69333]	[161096]	[24243]	[69489]

Notes: Columns (1) and (2) report estimates of equation (5) with the independent variable listed in each row. The dependent variable in columns (1) and (2) is a mortality indicator equal to zero if a beneficiary was alive during the entire calendar year and is equal to one if the beneficiary died in a given year. Controls in columns (1) and (2) include fixed effects for baseline ZIP code and all combinations of year, age (one-year bins), race, and sex. Column (1) additionally controls for indicators for each possible combination of eight chronic condition groups and indicators for centiles of baseline Medicare spending. Column (3) shows the correlation between the local characteristic specified in the row and the mean death rate in movers' 2006 county, with one observation per mover. Column (4) shows the correlation between the local characteristic specified in the row and the movers' predicted mortality, using a model of mortality that includes demographic characteristics, all two-way interactions of eight baseline chronic condition group indicators, and ventiles of baseline spending. Individuals with Alzheimer's/dementia at baseline are excluded from columns (1) and (4). Standard errors (in parentheses) are clustered by a beneficiary's 2006 county. The number of observations is in square brackets. Coefficients and standard errors in columns have been scaled by 100 and by the difference between the 90th and 10th percentiles of the relevant local characteristic. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table A.19: Migrant mortality by destination characteristics (New Orleans movers)

	(1)	(2)	(3)	(4)
	Died indicator × 100		Local mortality rate × 100	Predicted mortality rate × 100
Social capital index	0.44**	0.29**	0.16***	0.26
	(0.18)	(0.13)	(0.05)	(0.19)
	[75116]	[175774]	[26460]	[75265]
Crime rate	0.31	0.29	0.32***	0.24
	(0.27)	(0.22)	(0.05)	(0.17)
	[72813]	[170173]	[25598]	[72954]
Poverty rate, 65+	0.28	0.14	0.40***	0.03
	(0.24)	(0.18)	(0.04)	(0.13)
	[75137]	[175821]	[26467]	[75286]
Upward income mobility (from p75)	0.05	-0.04	0.20***	-0.33*
	(0.19)	(0.15)	(0.06)	(0.17)
	[75005]	[175507]	[26415]	[75154]
Upward income mobility (from p25)	-0.01	0.03	-0.22***	0.04
	(0.26)	(0.18)	(0.05)	(0.20)
	[75005]	[175507]	[26415]	[75154]
Income segregation	-0.25	-0.00	-0.17**	-0.35*
	(0.22)	(0.18)	(0.08)	(0.17)
	[75137]	[175821]	[26467]	[75286]
Local gov. spending per capita	-0.29**	-0.12	-0.18***	0.04
	(0.14)	(0.11)	(0.05)	(0.12)
	[75137]	[175821]	[26467]	[75286]
Urban population share	-0.46**	-0.15	-0.27***	-0.22
	(0.19)	(0.15)	(0.03)	(0.16)
	[75137]	[175821]	[26467]	[75286]
Median home value	-0.49***	-0.35***	-0.36***	0.40***
	(0.15)	(0.13)	(0.04)	(0.13)
	[75137]	[175821]	[26467]	[75286]
Income per capita	-0.60***	-0.41**	-0.45***	0.07
	(0.20)	(0.16)	(0.04)	(0.14)
	[75137]	[175821]	[26467]	[75286]

Notes: Columns (1) and (2) report estimates of equation (5) with the independent variable listed in each row. The dependent variable in columns (1) and (2) is a mortality indicator equal to zero if a beneficiary was alive during the entire calendar year and is equal to one if the beneficiary died in a given year. Controls in columns (1) and (2) include fixed effects for baseline ZIP code and all combinations of year, age (one-year bins), race, and sex. Column (1) additionally controls for indicators for each possible combination of eight chronic condition groups and indicators for centiles of baseline Medicare spending. Column (3) shows the correlation between the local characteristic specified in the row and the mean death rate in movers' 2006 county, with one observation per mover. Column (4) shows the correlation between the local characteristic specified in the row and the movers' predicted mortality, using a model of mortality that includes demographic characteristics, all two-way interactions of eight baseline chronic condition group indicators, and ventiles of baseline spending. Individuals with Alzheimer's/dementia at baseline are excluded from columns (1) and (4). Standard errors (in parentheses) are clustered by a beneficiary's 2006 county. The number of observations is in square brackets. Coefficients and standard errors in columns have been scaled by 100 and by the difference between the 90th and 10th percentiles of the relevant local characteristic. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table A.20: Migrant spending, by destination spending (New Orleans fee-for-service movers)

	(1)	(2)	(3)	(4)	(5)	(6)
Average medical spending in 2006 county	0.93***	0.87***	0.87***	0.76***	0.66***	0.61***
	(0.11)	(0.10)	(0.10)	(0.13)	(0.13)	(0.11)
Set of fixed effects	A	B	C	C	C	C
Alzheimer's/dementia dropped	No	No	No	No	Yes	Yes
Chronic conditions controls	No	No	No	Gr.	Gr.	All int.
Dep. var. mean	14,616	14,616	14,620	15,969	15,357	15,353
Observations	101,675	101,675	101,544	67,694	63,184	63,178
R-squared	0.01	0.03	0.04	0.16	0.17	0.20

Notes: The table reports estimates of equation (5) with local spending as the independent variable. The dependent variable is the total spending by a beneficiary in a calendar year. Sets of fixed effects are as follows: A includes baseline ZIP code and year fixed effects; B also includes fixed effects for each age (one-year bins), race, and sex combination. C additionally controls for age-race-sex effects by year. Gr. means that indicators for eight groups of chronic conditions are included; All int. means that indicators for each possible interaction of the eight groups of chronic conditions are included. All specifications that include chronic condition controls also include fixed effects for centiles of baseline Medicare spending. Standard errors (in parentheses) are clustered by a beneficiary's 2006 county. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table A.21: Migrant mortality by multiple destination characteristics

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Mortality rate	0.57*	0.59**	0.75**	0.57**	0.59**	0.66**	-0.39
	(0.31)	(0.30)	(0.37)	(0.28)	(0.29)	(0.26)	
Percent smoking	0.48						0.01
	(0.30)						
Percent obese		0.32					-0.13
		(0.25)					
Percent exercising			-0.07				0.15
			(0.33)				
Median home value				-0.25			0.06
				(0.18)			
Median household income, 65+					-0.24		0.14
					(0.25)		
Urban population share						-0.19	-0.16
						(0.21)	
Pct. of 2006–2013 decline explained	60.78	76.29	85.23	66.24	74.13	63.44	
Dep. var. mean	5.47	5.47	5.47	5.48	5.48	5.48	
Observations	69,332	69,332	69,222	75,142	75,142	75,142	

Notes: Columns (1)–(7) report estimates of equation (5). The dependent variable is a mortality indicator equal to zero if a beneficiary was alive during the entire calendar year and is equal to one if the beneficiary died in a given year. Controls include fixed effects for baseline ZIP code and all combinations of year, age (one-year bins), race, and sex. Coefficients and standard errors (in parentheses) have been scaled by 100 and by the difference between the 90th and 10th percentiles of the relevant local characteristic. The dependent variable mean has been scaled by 100. Column (8) reports the mean change in the given local characteristic for New Orleans beneficiaries who survived until the beginning of 2006, as a share of the difference between the 90th and 10th percentiles of the relevant local characteristic. Standard errors are clustered by each beneficiary's 2006 county. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.