Childlessness and Use of Health Care by Older Americans

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Abstract

The study examines the relationship between childlessness and eight measures of health care use by older Americans. The measures are hospital and nursing home admissions and length of stays, ever visiting a physician, number of physician visits, having outpatient surgery, and use of in-home health care services. Descriptive data from the Health and Retirement Survey on persons age 65 and older show that while older childless men have the same probability of entering hospital as fathers, they stay an average of .94 (41%) nights longer. Their probability of receiving in-home health care is .028 (51%) larger than fathers'. Older childless men and women are less likely to visit a doctor. Older childless women are no more likely to enter nursing homes than mothers, but on average spend 0.50 (35%) more nights. Regression and propensity score models that control for confounding factors find strong evidence that older childless men have longer stays in hospital, and good but less strong evidence that they are more likely to receive home health care. The predicted differences in these two outcomes are substantively important, showing a 43 or 47 percent increase in use relative to fathers. Older childless women and mothers consume health care services equally, with the possible exception that the childless are less likely to see a doctor. Including marital status in the regression models usually weakens the association between childlessness and each outcome.

Introduction

In 2006, 20.4% of women age 40-44 were childless by choice or because of infertility problems, compared to 17.5% in 1995 and 10.2% in 1976 (U.S. Census Bureau 2008). For at least the next few decades, rising childlessness will help increase the ratio of older to working age adults. As this ratio rises, either the working age population will need to pay a larger portion of its income to support Social Security and health care for the elderly, or funding for those purposes will need to be reduced. Thus, childlessness is one contributor to the long-term financial pressures on Social Security, public health care programs, and the health care system. These macro impacts of falling fertility have received broad attention from researchers and policy makers (Lee & Skinner 1999).

Besides its macro impacts, childlessness may have important effects on a variety of individual outcomes, including financial status, health status, and use of health care services – the subject of this study.

Significant differences in health care use may have important policy implications. Suppose childless older adults, on average, consume more health care than older parents. If childlessness continues to increase, financial pressures on public programs that provide medical and nursing home care, on the health care system's overall costs, and on associated social services for older Americans will be larger than the rising ratio of elders to working age adults alone would imply.

Alternatively, if childless persons tend to consume less health care, they may place fewer demands on public programs and the health care system. It is also possible that older persons' demands for health care services are independent of parenthood status. If so, changes in the prevalence of childlessness would not affect costs.

To shed light on these issues, this study uses data from the Health and Retirement Survey (HRS) to examine the relationship between childlessness and older Americans' health care use. It contributes to the existing literature in two important ways. First, while most studies of this relationship focus on nursing home use or in-home care, this one examines hospital admission and length of stay, nursing home admission and length of stay, physician visits, outpatient surgery and in-home care. Second, unlike prior research it compares findings from three statistical estimators: regression (OLS or logit depending on the outcome), and two propensity score models. The findings are a useful starting point for understanding the health care consequences of childlessness, and their policy importance.

Linkages among childlessness, health status and behavior, and use of health care

In the domain of health status and behavior, sociological and economic reasoning suggests several routes through which childlessness may matter. Consider possible positive effects. Suppose childless elders enjoyed higher personal consumption, including health care, when younger because a significant portion of their income was not devoted to supporting children. Better health care and higher consumption in general when younger may help childless adults enter their older years in better health. If childless adults feel less pressure to earn income, they may choose less stressful (but less lucrative) jobs that leave more time for relaxation and exercise, with ensuing positive long term effects on health, and that are less likely to lead to health problems induced by stress. Childless adults avoid the stressors associated with parenting and any health problems that they create. They also avoid stress created by adult children, who may have their own health problems as well as emotional, financial and legal crises, who in rare cases die before their parents, or who may treat their older parents badly (Milkie et al. 2008, Umberson, Pudrovkska & Reczek 2010).

Now consider possible negative effects. Adult children typically are central in aging parents' social networks (Kendig et al. 2007). If children provide social support and services to elderly parents that positively affect health outcomes, childless elders will tend to have relatively poorer health. For example, a child's assistance with household tasks may prevent falls that lead to hospitalization, may delay the time until an assisted-living facility or nursing home is necessary, or may prevent the need for either type of out-of-home care entirely (Larsson & Silverstein 2004, Charles & Sevak 2005, Noel-Miller 2010, Sasso & Johnson 2002). Children may monitor their parents' health conditions, help them comply with medication schedules, drive them to clinics, and identify health problems while they are still minor and more easily treated. If a parent requires hospitalization or other institutional care, a child may monitor the quality of care and advocate on the parent's behalf to hospital or nursing home staff, other health care providers, and health insurance companies.

Parents may be more likely to avoid risky health behaviors (e.g. smoking, drunk driving) because of social pressures to be responsible parents, because they wish to set a good example for their children and because they look forward to the rewards of watching their children mature and of being grandparents (Keizer et al. 2010, Kendig et al. 2007). Any such differences in behavior may cause childless elders' health to be worse than parents'.

Three lines of analysis imply that **childless older persons would tend to use more health services**. First, if the net effect of the above influences results in childless older persons having worse health, their demand for health services would be greater. Second, holding health status constant, if childless older persons have more assets and current income than their counterparts with children, they can afford better health care and health insurance, which also would raise their demand for health services. Third, children's assistance may enable parents to use health

care services more efficiently and effectively by getting them care before a condition becomes serious and requires intensive treatment or hospitalization, or by helping them comply with medication regimes, rehabilitation activities, and other treatment. In that case, older parents may consume fewer services than childless older persons with the same health status.

Two alternative lines of analysis imply that **older parents would tend to use more health care**. First, the net effect of the above influences may be that parents have worse health, in which case their demand for health services would be greater. Second, holding health status constant, older parents may use more services if children monitor their health conditions, help them schedule appointments, and otherwise assist them to obtain care (e.g. drive them to health care providers, help them navigate Medicare's and private insurers' rules and paperwork). If parents use more health care services because of their children's involvement, their use may even exceed that of childless persons in worse health.

These considerations yield ambiguous predictions about the relationship between childlessness and health care use. We require empirical analysis to identify the direction and importance of any relationships.

The role of marital status A substantial literature demonstrates that marriage is associated with (or, some argue, causes) better income and health, and has other protective effects (Hu & Goldman, 1990, Mincy et al., 2009, Rendall et al. 2011, Waite & Gallagher, 2000). Some of the hypothesized causal links from marriage to health are similar to the links from childlessness to health. For instance, compared to older never-married or formerly married persons, older married persons are likely to have more extensive social networks (including children but extending beyond them) that can provide social support and services. Married and formerly married persons, like parents, may be more likely to avoid risky health behaviors. If such

linkages are important, estimates of the consequences of childlessness for use of health care that do not control for whether a person is currently married or was ever married may be confounded with the consequences of marriage.

Holding health status constant, being currently married may affect use of health care as well. Just as children's assistance may affect their older parents' use of health care, spouses' assistance in maintaining health, in accessing care and in complying with medication regimes and other treatments may affect an older person's use of health services. These possibilities suggest that models of the relationship between childlessness and health care should control for whether a respondent is currently married.

Prior studies of health care use and childlessness

To be completed

Methods

Data: The Health and Retirement Survey (HRS) provides the data. The HRS is a publicly funded, ongoing panel study started in 1992. It re-interviews subjects biannually, with proxy interviews after death. Initially the HRS included American residents born during 1931-1941 (and their spouses, regardless of age). In 1993 the AHEAD (Assets and Health Dynamics among the Oldest Old) survey started collecting data on persons born in 1923 or earlier. The HRS and AHEAD merged in 1998 and added the War Baby sample of persons born between 1942 and 1947 and the Children of the Depression sample of persons born between 1924 and 1930. The Early Boomer cohort of persons born in 1948-1953 was added in 2004. The expanded HRS is representative of all persons over 50 years old in the United States.

Because propensity score models require one observation per respondent, this study uses outcome information on each person, including nursing home residents, for the first wave in

which he or she appears in the HRS and is age 65 or older. The regression models use the same sample so that any differences with findings from propensity score models are attributable to the estimation method. After dropping respondents with missing data, the sample contains 6,877 men and 9,006 women.[1]

Dependent variables. HRS respondents report use of health care services during the two years prior to the interview. This study examines five dummy variables for whether a respondent ever visited or had a telephone conversation with a physician, had a hospital stay, entered a nursing home, had outpatient surgery, and received in-home health care. It supplements results for 3 of the dichotomous outcomes by examining the number of physician visits, days in hospital, and days in a nursing home.

The first two columns of table 1 show that women are less likely to have a hospital stay, are hospitalized fewer nights, and are less likely to have outpatient surgery. They are more likely to have a nursing home stay, see a doctor and receive in-home health care. Five gender differences are statistically significant at the one percent level; one at the five percent level. Because of the significant gender differences in most indicators and statistical tests that decisively reject for all outcomes the hypothesis that the regression coefficients for men and women are equal, I present separate models by gender.

[Table 1 about here]

Measuring childlessness. A straightforward definition of a "childless" person is someone who was never a biological parent. I use the HRS question about the number of biological children to create a dummy variable equal to one if the person reports "never a biological parent," and zero otherwise. Information about living biological children allows construction

[1] Regressions that use all available waves of data for each respondent are similar to the one-wave regressions. Because propensity score models require one observation per respondent, I do not estimate them using all waves.

of an alternative dummy variable for having "no living children." Preliminary work indicated that the two measures yield similar results. Because the "never a parent" measure has fewer missing responses, I use it to maximize sample size. Childless persons comprise 10.3 percent of the male sample and 11.2 percent of the female sample.

Other explanatory variables. The regressions, discussed below, include available information on family background and personal characteristics that may be associated with health status and use of health services. There are race and ethnicity dummies for black, white Hispanic, and other race/ethnicity, with white non-Hispanic as the omitted category. The dummies for religious affiliation are Protestant, Catholic, and other, with no religion as the omitted category. There are dummy variables for being born outside the U.S. and veteran status. Because poor child health is likely to lead to worse adult health, the models include a retrospective self-assessment of health as a child using the standard one to five scale (1 = excellent, 5 = poor). Other control variables are age and age squared, years of completed schooling, number of living siblings, and dummies indicating whether the respondent ever smoked, had never married, or was currently married. Because I estimate separate models for men and women, there is no gender dummy.

Since health care has improved over time, we would expect persons born later to have better health and use fewer health care services, other things equal. To control for cohort effects, the models include dummy variables for the birth cohorts 1910-14, 1915-19, …, and 1940-44. The omitted category is born before 1910.

Table 2 reveals several significant differences between parents and childless persons in family background and personal characteristics. Childless men and women are older and much less likely to have ever married or be currently married. Childless men are more likely to be

Hispanic, had worse child health, and are less likely to have ever smoked. Childless women are more likely to be black, have fewer living siblings and 0.4 years more schooling than mothers, and are more likely to be veterans. Foreign birth and religious affiliation exhibit no significant differences between parents and the childless.

[Table 2 about here]

Estimation methods The study first estimates logit models for the five dummy variables and OLS models for the three cardinal variables.[2] The models take the form:

$$y_i = \alpha + \beta X_i + \gamma C_i + \varepsilon_i$$

where y is the outcome, X is a vector of personal, family background and cohort variables, C is the indicator for childlessness, and ε_i is the error term. In the initial regression models, X excludes the dummy variables for having never married and being currently married.

We would expect persons in better health to consume less health care. But persons may be in better health as a result of receiving more health care. Given the simultaneous relationship between these two variables, I chose to estimate a reduced form, so the models do not control for current health status.[3]

Though the regressions include many controls, selection effects may bias the estimates. For example, suppose adults with health problems during their childbearing years could not conceive or decided to forego parenthood. Since such persons are likely to need more health care when older, it would be incorrect to attribute a correlation between childlessness and use only to childlessness. Rather, because persons with health problems when young are likely to be in poorer health when old, an observed correlation would overstate any positive relationship of childlessness to elders' use of health care (or understate a negative relationship). The data

[2] Because the linear measures are truncated at zero, I also used a Tobit specification. Findings were consistent with those from OLS.

[3] More fully addressing this issue is a task for future research.

about child health status may partly mitigate this concern, but because the HRS lacks data on health during respondents' childbearing years, selection bias remains a possibility.

If most childlessness were involuntary because of genetic factors or exogenous health conditions that prevented successful pregnancy, endogenous selection would be minor and likely to have little effect on the estimates. The HRS, though, lacks information to identify persons who were unable to be biological parents.

It is obviously impossible to conduct an experiment to generate an estimate of γ – the effect of the "treatment" of being childless – that is unbiased by self-selection. Lacking experimental data, a common approach to address selection includes person or family fixed effects. This is infeasible here because childlessness is time invariant for each person and the HRS lacks sibling data on health, health care, and most other characteristics.

As an alternative, I use semiparametric propensity score models (Rosenbaum & Rubin 1985) to explore the results' sensitivity to the linearity assumption of regression. Other studies of the consequences of demographic outcomes have also taken this approach (e.g. Levine & Painter 2003, Gertler, Levine & Ames 2004, Plotnick 2009). One advantage of these models is that they do not impose strong restrictions on the functional form of the relationship between childlessness and the outcomes.

In this context the propensity score is the probability of being childless, conditional on a set of independent variables. I use a logit regression to predict each respondent's propensity score. The logit specification passes the balancing test (Dehejia & Wahba 2002) for both men and women. Once all respondents' propensity scores are calculated, a childless person is matched to one or more parents who have similar propensity scores using one of several established procedures for determining matches. The distribution of propensity scores for

childless persons and those who are parents closely overlap within the region of common support. This indicates that there are ample numbers of parents well matched with each childless person. The mean difference in outcome between each treated case and its match (or matches) provides the estimate of the relationship between childlessness and that outcome.

I estimate the average treatment impact with two alternative propensity matching procedures. "Radius matching" matches a childless case to all cases with children that have propensity scores within .005 of the childless case's score. When multiple control cases fall within the radius, their average outcome is compared to the childless case's outcome. The "Epanechnikov kernel" approach matches a childless case to all cases with children that have scores within the specified bandwidth. When multiple control cases fall within the bandwidth, their kernel-weighted average outcome is compared to the childless case's outcome. Standard errors are bootstrapped. Henry and Yi (2009) report that radius and Epanechnikov kernel matching are among the matching designs that produce the least bias compared to an experimental estimate.

Propensity score methods rely on the "conditional independence assumption": all factors related to receiving a treatment are observed and measured (Black & Smith 2004). Such methods address "selection on observables" but do not fully deal with the selection problem because unobserved characteristics are likely to influence both being childless and health. If parents and childless persons differ in unobserved ways, between-group comparisons may reflect those differences rather than the impact of childlessness.

One way to address selection on unobservables is to use instrumental variables (IV) models. Because most childbearing years of respondents in the HRS sample predated the Supreme Court rulings on contraceptives (Griswold v. Connecticut 1965) and abortion (Roe v.

Wade 1973), this study developed measures of state laws about advertising, selling, and using contraceptives and soliciting, performing, and obtaining an abortion, and of the penalties if convicted of violating these laws. One would expect that living in a state with more stringent laws about obtaining contraception and abortion would be negatively associated with the likelihood of being childless.[4]

Several measures were significantly related in the expected direction to the likelihood that a respondent was childless. However, they were weak instruments, so using them in the second stage was likely to yield biased, imprecisely estimated coefficients on the predicted probability of being childless (Cameron & Trivedi 2005). Consequently, I do not report IV estimates.

Taking account of marital and economic status To address whether the relationship of parental status to use of health care may be confounded with those of marital status, a second set of models adds the never married and currently married dummy variables to *X*. Older persons who never married are likely to differ from those did in a variety of characteristics that are unobservable in the HRS (e.g. willingness to make long term commitments, health as a young adult). Since these characteristics may also be related to fertility choices and later health status, including this dummy variable may also mitigate selection bias.

Differences in the economic status of older parents and childless persons may also confound the relationships between parental status and use of health care. To assess this possibility, I re-estimated the regressions including the logarithm of income, measured in 2006 dollars.

[4] Similar variables have been related to fertility outcomes during post Roe v. Wade decades (Ananat et al. 2007, Ananat et al. 2009, Bitler & Zavodny 2001, Levine et al. 1999).

Results

Columns 3-6 of table 1 compare mean health care use of older parents and childless persons. Childless men are slightly more likely than fathers to enter hospitals and stay an average of .94 (41%) nights longer.[5] Their probability of receiving in-home health care is .028 (51%) larger than fathers'. Childless men are slightly less likely to visit a doctor. Childless men and fathers are equally likely to enter nursing homes and have outpatient surgery. The overall impression is that childless men are heavier consumers of health care.

The findings for women differ. Childless women and mothers experience hospitalization equally. Childless women are no more likely to enter nursing homes than mothers, but on average spend 0.50 (35%) more nights.[6] Childless women are significantly less likely to see a doctor. Mothers and childless women do not differ in their use of outpatient surgery or in-home health care.

Tables 3 and 4 present the coefficients on the childless dummy from OLS and logit regressions. They also show the estimated difference in each health care measure between older parents and childless persons derived from the propensity matching estimators. Because logit coefficients show the association of childlessness with the log odds of each measure, for ease of interpretation the tables also present in brackets the predicted change in probability associated with childlessness implied by each logit coefficient, holding all other explanatory variables at their means. For the five dummy variables, the matching estimators directly show the difference between childless persons' and parents' mean probability of each outcome. Positive values indicate a higher probability of use or greater number of nights or visits for the

[5] The mean difference is across all fathers or childless men, not just those who enter hospital. Among those who enter, the mean stay for fathers (childless men) is 9.5 (11.7) days

[6] The mean difference is across all mothers or childless women, not just those who enter a nursing home. Among those who enter, the mean stay for mothers (childless women) is 110 (114) days.

childless. When the regression coefficient is significant, the propensity estimates are slightly larger in absolute value.

Consider the estimates in columns 1-3 from models that do not include marital status. For men (table 3) childlessness is significantly associated greater use of hospitals and in-home health care. Over a two year period, childless men appear no more likely to enter hospital, but their average stay is about one night (43 percent) longer than that of fathers. The difference of one night is across all men, whether they enter or not. A Tobit estimate shows that among men who do enter hospital, the childless stay 3.0 nights longer.

The probability that childless men receive in-home health care is about .026 higher than that for fathers. Since the likelihood that older fathers receive such services during a two year period is only .055, an increase of .026 represents a 47 percent change.

There is some evidence that childless men are less like to see a doctor, but one of the three estimates is not significant, and there is no difference in the average number of visits. Fathers and childless men do not differ in their use of nursing home services or outpatient surgery.

[Table 3 about here]

The findings for women differ markedly. There is little evidence that mothers and childless women differ in their use of the health care services examined here. The exception is doctor visits, for which all models show that childless women are significantly less likely to visit a doctor. The substantive difference is modest since a change in the probability of -.024 represents only a 2.6 percent decrease, and there is no difference in the mean number of visits.

[Table 4 about here]

Addressing the relationship of marital status to childlessness and health The models in column 4 of tables 3 and 4 expand the specification in column 1 by including dummy variables

for having never married and being currently married. Doing so tests whether the negative relationships between childlessness and use of health care persist once the protective effects of marriage are taken into account.

The results confirm that childless men are more likely to enter hospital. Column 4 suggests that childless men actually spend significantly fewer nights in nursing homes, but this finding must be set against the three insignificant estimates in the table and an insignificant Tobit estimate. The difference in use of in-home health care is not robust to the inclusion of marital status. For women, every insignificant coefficient remains insignificant, and the significant relationship with doctor visits becomes insignificant.

I also attempted to take marital status into account in the propensity score models. But when I included the dummy for having never married in the logit model used to construct the propensity score, I was unable to find a specification that passed the balancing test for either men or women. (This failure results from the high correlation between marital and parental status in the sample.) Consequently, there are no results to compare to columns 2 and 3 of tables 3 and 4.

Controlling for income To assess whether the observed relationships might reflect differences in the economic status of older parents and childless persons, I re-estimated the regressions including the log of income. For both men and women, including them has essentially no effect on the significant coefficients in columns 1 and 4.

Controlling for current health status As noted earlier, because of the simultaneous relationship between health status and use of health services, the models omit health status. To explore the sensitivity of the results to this approach, I added the standard self-reported health status measure (1 = excellent, 5 = poor) to the regression models. Doing so for women has a

negligible effect on the magnitude or significance of every regression coefficient in table 4. The same is true for 15 of the 16 regression coefficients for men in table 3. The minor exception is that the coefficient of the "any doctor visit" model in column 1 increases in absolute value by 16 percent and becomes significant.

Turning to the control variables, we find that for men, education is significantly related to six of the eight measures of health care use. Age is significantly related to three, and race/ethnicity to only two. Surprisingly, child health status is related to only one outcome, while being a veteran (hence having access to the VA health system) or having smoked is related to none.

For women the control variables show many more significant relationships with the outcomes. As for men, education is significantly related to six outcomes. But age is now related to five outcomes and race/ethnicity to three. More in line with expectations, child health status is related to six outcomes and having smoked is related to five.

There is strong evidence consistent with marriage having protective effects that reduce the need for care. For six of the eight indicators, the models predict significantly less use by currently married men. For four of the eight, the models predict significantly less use by currently married women. Currently married men and women are both more likely to have visited a doctor, which can also be seen as a protective effect, but do not differ from other men or women in the number of doctor visits.

Though having never married is not nearly as strongly associated with health care use, the associations that do appear are usually consistent with marriage having protective effects. Never married men spend significantly more days in a nursing home. Never married women

are less likely to see a doctor, and have fewer doctor visits. The one exception to this pattern is that never married women are less likely to enter hospital.

Discussion

The conceptual framework is ambiguous whether childless older individuals would tend to consume more or fewer health care services than otherwise similar parents. Either the positive or negative effects of childlessness may dominate, or they may offset each other. Only empirical analysis can shed light on the nature of the relationships.

Overall, the findings suggest that, with the possible exception of seeing doctors, older childless women and mothers consume health care services equally. Among men there is strong evidence that childless men have longer stays in hospital and good but less strong evidence that they are more likely to receive home health care. The sizes of the significant predicted differences in childless men's use relative to fathers are substantively important – a 43 percent increase in hospital days and a 47 percent increase in in-home health care.

The basic logit and propensity score results on in-home care for men are consistent with the idea that some parents can rely on their children to provide support that is a good alternative to professional in-home care. However, this result is not robust to the inclusion of marital status.

The findings have several limitations. The broad agreement across the regression and propensity score models suggests a degree of reliability to the findings and that selection may be minor. But it certainly is not conclusive since the sensitivity of the estimates to possible selection on unobservable characteristics could not be assessed. A related concern is that data collected for older adults suffer from mortality selection effects because people in poor health are less likely to survive to the age when they would be eligible to participate in the survey or,

if they do survive, to participate in a lengthy interview. To the extent that childlessness itself leads to higher mortality (Eisenberg et al. 2011, Spence & Ebenstein 2009, Tamakoshi et al. 2011), such selection may lead to underestimates of childlessness' impact on health care use. One should regard the findings as demonstrating associations rather than as evidence of causality.

Untangling the nature of the relationship between marital status and parenthood and how it is related to health care merits further research. With marital status included, most of the significant coefficients fall in magnitude and significance. Does marital status moderate childlessness' relationship with use of health care? Are both variables directly related to the outcomes, but the high correlation between them makes it difficult to identify either relationship? Are they jointly determined?

This study determined childlessness based on respondents' biological children. In view of today's complex family structures, it would be useful to know whether step and adopted children are related to elders' use of health care. Do stepchildren provide support services and in-home care to step parents but stop doing so when their biological parent dies? Such questions warrant exploration in future research.

The models do not shed light on the mechanisms that underlay differences in outcomes. For instance, to what extent is older fathers' lower use of in-home care attributable to their children's provision of care? If children's care matters for fathers, why is there no difference in use of home care between mothers and childless women? Exploring those mechanisms would be a fruitful line of future research. Future research on the relationship of childlessness to other health care services, including preventive services such as flu shots, mammograms or prostate

exams, and use of prescription drugs and dental services would provide further evidence on this issue.

The policy issue that partly motivated this research is whether childless older persons tend to use more health care services than older parents. Finding that childless men more heavily use hospital and in-home care suggests the answer is "yes, but." Yes, but the lack of differences for other services for men and for nearly all services for women suggests that further increases in childlessness may have little effect on the financial prospects of public programs that provide health and nursing home care for older Americans.

References

Ananat, E., Gruber, J & Levine, P. (2007). Abortion legalization and life cycle fertility. *Journal of Human Resources* 42, 375-397.

_____, Gruber, J, Levine, P. & Staiger, D. (2009). Abortion and selection. *Review of Economics and Statistics, 91*, 124-136.

Bitler, M. & Zavodny, M. (2001). The effect of abortion restrictions on the timing of abortions. *Journal of Health Economics, 20*, 1011-1032.

Angrist, J. & Pischke, J-S. (2009). *Mostly Harmless Econometrics*: *An Empiricist's Companion*. Princeton NJ: Princeton University Press.

Cameron, A.C. & Trivedi, P. (2005). *Microeconometrics: Methods and Applications*. New York: Cambridge University Press.

Dehejia, R. and Wahba, S. (2002). Propensity score matching methods for nonexperimental causal studies. *Review of Economics and Statistics*, 84, 151-161.

Eisenberg, M.; Park, Y; Hollenbeck, A.; Lipshultz, L.; Schatzkin, A. & Pletcher, M. (2011). Fatherhood and the risk of cardiovascular mortality in the NIH-AARP Diet and Health Study. *Human Reproduction* 26, 3479-3485.

Gertler, P., Levine, D. & Ames, M. (2004). Schooling and parental death. *Review of Economics and Statistics* 86, 211-225.

Henry, G. & Pan Yi (2009). Design matters: A within-study assessment of propensity score matching designs, Paper presented at the Association for Public Policy and Management, Washington DC, November 7, 2009.

Hu, Y. R., & Goldman, N. (1990). Mortality differentials by marital status: An international comparison. *Demography*, 27, 233–250.

Keizer, R., Dykstra, P. & Poortman, A-R. (2010). Life outcomes of childless men and fathers. *European Sociological Review, 26*, 1-15.

Lee, R. & Skinner, J. (1999). Will aging baby boomers bust the federal budget? *Journal of Economic Perspectives, 13*, 117-140.

Levine. D. & Painter, G. (2003). The schooling costs of teenage out-of-wedlock childbearing: An analysis with a within-school propensity-score matching estimator. *Review of Economics and Statistics, 85*, 884-900.

Levine, P., Staiger, D., Kane, T. & Zimmerman, D. (1999). Roe v. Wade and American fertility, *American Journal of Public Health*, *89*, 199-203.

Milkie, M., Bierman, A., & Schieman, S. (2008). How adult children influence older parents' mental health: Integrating stress-process and life-course perspectives. *Social Psychology Quarterly*, *71*, 86 – 105.

Mincy, R., Hill, J. & Sinkewicz, M. (2009). Marriage: Cause or mere indicator of future earnings growth? *Journal of Policy Analysis and Management*, *28*, 417-439.

Plotnick, R. (2009). Childlessness and the economic well-being of older Americans. *The Journals of Gerontology: Social Sciences*, *64B(6)*, 767–776.

Rendall, M., Weden, M., Favreault, M. and Waldron, H. (2011). The protective effect of marriage for survival: A review and update. *Demography 48(2).* 481-506.

Rosenbaum, P. R. & Rubin, D.B. (1985). Constructing a control group using multivariate matched sample methods that incorporate the propensity score. *The American Statistician*, *39*, 33-38.

Spence, N.J. & Eberstein, I.W. (2009). Age at first birth, parity, and post-reproductive mortality among white and black women in the US, 1982-2002. *Social Science and Medicine 68*, 1625-1632.

Tamakoshi, A., Tamakoshi, K., Lin, Y., Mikami, H., Inaba, Y., Yagyu, K, & Kikuchi, S. (2011). Number of children and all-cause mortality risk: results from the Japan Collaborative Cohort Study. *European Journal of Public Health 21*, 732-737.

U.S. Census Bureau. (2008) *Fertility of American women*. (Current Population Reports, series P20-558). http://www.census.gov/population/www/socdemo/fertility.html#hist, Table SF1 (Accessed 14 February 2009).

Umberson, D., Pudrovkska, T. & Reczek, C. (2010). Parenthood, childlessness, and well-being: A life course perspective. *Journal of Marriage and Family, 72*: 612-629.

Table 1: Means and standard deviations of outcomes, by gender and parenthood

	All Men	All Women	Men		Women	
			Parents	Childless	Parents	Childless
Any hospital stay	.245	.207**	.242	.271	.209	.189
Hospital nights	2.39	1.80**	2.30	3.24**	1.82	1.63
Any nursing home stay	.009	.013*	.009	.014	.013	.017
Nursing home nights	.83	1.49	.85	.63	1.43	1.93*
Any doctor visit	.91	.93**	.91	.89*	.93	.91**
Number of doctor visits	8.3	8.3	8.3	8.0	8.4	7.5
Outpatient surgery	.197	.169**	.196	.208	.168	.173
In-home health care	.058	.069**	.055	.083**	.069	.065
N =	6,877	9,006	708	6,169	1,008	7,998

* difference with men or parents significant at 5% ** difference with men or parents significant at 1%

Table 2: Means of explanatory variables for parents and childless persons age 65 or older, by gender

	Men		Women	
	Parent	Childless	Parent	Childless
Percent childless	10.3		11.2	
Age	69.8	71.2**	70.6	72.9**
Black	.115	.137	.137	.181**
White Hispanic	.059	.039*	.057	.047
Other race	.031	.025	.030	.033
White	.795	.798	.775	.739**
Foreign born	.093	.073	.093	.097
Protestant	.627	.603	.667	.667
Catholic	.268	.266	.266	.271
Other religion	.039	.037	.037	.036
No religion	.065	.095**	.030	.027
Number of living siblings	2.55	2.44	2.50	2.22**
Child health (5=poor)	1.83	1.96**	1.89	1.94
Education (years)	11.9	11.6	11.5	11.9**
Veteran	.608	.593	.010	.018*
Ever smoked	.742	.705*	.455	.465
Never married	.003	.219**	.008	.203**
Currently married	.832	.569**	.542	.389**
N =	708	6,169	1,008	7,998

* difference significant at 5% ** difference significant at 1%

Table 3: Estimated relationship between childlessness and men's use of health care based on regression and propensity score matching models (N = 6,877)[a]

	Estimator			
Health care service	OLS or logit regression	Radius matching	Epanechnikov kernel matching	OLS or logit with never married and currently married dummies
Any hospital stay	.162 (.091) [.030]	.026 (.018)	.030 (.018)	.189 (.100) [.035]
Hospital nights	.967** (.340)	.959* (.407)	.956** (.350)	.977** (.375)
Any nursing home stay	.005 (.004) [.000]	.006 (.004)	.005 (.005)	.002 (.004) [.000]
Nursing home nights	-.325 (.806)	-.148 (.360)	-.279 (.313)	-1.86* (.890)
Any doctor visit	-.242 (.130) [-.020]	-.032** (.011)	-.025* (.012)	-.095 (.147) [-.008]
Number of doctor visits	-.107 (.776)	-.455 (.798)	-.109 (.713)	-.459 (.857)
Outpatient surgery	.114 (.100) [.018]	.006 (.016)	.014 (.015)	.174 (.110) [.027]
In-home health care	.424** (.150) [.023]	.028** (.009)	.027* (.012)	.298 (.170) [.016]

a. In tables 3 and 4 the regressions in columns 1 and 4 include a constant term and controls for cohort, age, race/ethnicity, religion, foreign birth, number of living siblings, self-rated child health, years of education, veteran status, and ever smoking. The figures in brackets show the change in the linear probability of each outcome relative to the mean implied by the logit coefficient.

* significant at 5% ** significant at 1%

Table 4: Estimated relationship between childlessness and women's use of health care based on regression and propensity score matching models (N = 9,006)

	Estimator			
Health care service	OLS or logit regression	Radius matching	Epanechnikov kernel matching	OLS or logit with never married and currently married dummies
Any hospital stay	-.100 (.086) [-.016]	-.023* (.010)	-.018 (.013)	-.002 (.091) [.003]
Hospital nights	-.159 (.270)	-.247 (.191)	-.177 (.207)	.-340 (.289)
Any nursing home stay	.004 (.004) [.000]	.005 (.004)	.003 (.005)	.002 (.004) [.000]
Nursing home nights	.229 (1.415)	.719 (1.046)	.277 (1.278)	.443 (1.516)
Any doctor visit	-.315** (.120) [-.021]	-.027** (.008)	-.024** (.008)	-.169 (.132) [-.011]
Number of doctor visits	-.272 (.555)	-1.237 (.677)	-.469 (.555)	.195 (.594)
Outpatient surgery	.079 (.090) [.011]	.001 (.012)	-009 (.011)	.096 (.097) [.013]
In-home health care	-.189 (.138) [.012]	-.002 (.008)	-.010 (.008)	-.165 (.146) [.010]

* significant at 5% ** significant at 1%