THE EFFECT OF STRESS ON LATER-LIFE HEALTH: EVIDENCE FROM THE VIETNAM DRAFT

John Cawley
Damien de Walque
Daniel Grossman

WORKING PAPER 23334

NBER WORKING PAPER SERIES

THE EFFECT OF STRESS ON LATER-LIFE HEALTH:
EVIDENCE FROM THE VIETNAM DRAFT

John Cawley
Damien de Walque
Daniel Grossman

Working Paper 23334
http://www.nber.org/papers/w23334

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
April 2017

Cawley gratefully acknowledges an Investigator Award in Health Policy Research from the Robert Wood Johnson Foundation. The findings, interpretations, and conclusions expressed in this paper are entirely those of the authors. They do not necessarily represent the views of the World Bank, its Executive Directors, the countries they represent, or the National Bureau of Economic Research.

The Effect of Stress on Later-Life Health: Evidence from the Vietnam Draft
John Cawley, Damien de Walque, and Daniel Grossman
NBER Working Paper No. 23334
April 2017
JEL No. H56,I1,I12,I14,I18,I31,J1,J18,N32

ABSTRACT

A substantial literature has examined the impact of stress during early childhood on later-life health. This paper contributes to that literature by examining the later-life health impact of stress during adolescence and early adulthood, using a novel proxy for stress: risk of military induction during the Vietnam War. We estimate that a 10 percentage point (2 standard deviation) increase in induction risk in young adulthood is associated with a 1.5 percentage point (8%) increase in the probability of being obese and a 1 percentage point (10%) increase in the probability of being in fair or poor health later in life. This does not appear to be due to cohort effects; these associations exist only for men who did not serve in the war, and are not present for women or men who did serve. These findings add to the evidence on the lasting consequences of stress, and also indicate that induction risk during Vietnam may, in certain contexts, be an invalid instrument for education or marriage because it appears to have a direct impact on health.

John Cawley
2312 MVR Hall
Department of Policy Analysis and Management
and Department of Economics
Cornell University
Ithaca, NY 14853
and NBER
JHC38@cornell.edu

Damien de Walque
The World Bank
Development Research Group
1818 H Street, NW
Washington, DC 20433
ddewalque@worldbank.org

Daniel Grossman
Business and Economics Building, Box 6025
West Virginia University
Morgantown, WV 26506-6025
dan.s.grossman@gmail.com

1. Introduction

Numerous studies have estimated the long term consequences of in utero exposure to stress and illness (see e.g. Almond and Currie 2011; Aizer et al., 2016). In contrast, the long-term consequences of stress experienced during late adolescence and early adulthood has received relatively little attention despite the fact that this is an important developmental time for the brain (NIMH, 2011; Kaestner and Yarnoff 2011, Dahl 2004).

In this paper, we estimate the long-term health consequences of stress during adolescence and early adulthood. We use a novel measure of stress: the risk of being inducted into the military during Vietnam. We exploit the substantial year-to-year variation in induction risk between 1955 (after the Korean War) and 1973 (when the US switched to an all-volunteer force) that resulted from both changes in demand for military manpower and changes in which ages were eligible for the draft. We focus on the entire period of the war (1955-72), not just the period of the draft lottery (1970-72), which is important because the pre-lottery years were a particularly morbid and lethal time for American soldiers.[3] We argue that the prolonged uncertainty about whether one would be conscripted into military service between the ages of 18 ½ and 26 caused large amounts of stress on young men. Highly publicized calls for increased troop levels in Vietnam and increasingly large numbers of U.S. servicemen being killed or wounded were well documented by media outlets, which made this risk particularly salient.

We focus on men who did not serve in the military during the Vietnam War; for these men we can accurately estimate their lifetime exposure to induction risk. For men who did serve we do not know their induction risk because we do not know at what age they were inducted, nor

[3] Over 80 percent of US casualties were suffered before the first draft lottery occurred December 1, 1969. Public outcry and a shift from explicitly pro-US government media coverage to a more nuanced approach covering public dissent and occasionally showing explicit, disturbing war images suggest the salience to risk of being inducted persisted during the draft lottery years as well (The U.S. National Archives and Records Administration, 2013, Griffin, 2010, Hallin, 1984).

whether they volunteered or were drafted. Moreover, those who served faced much greater stress (e.g. due to combat) that is unrelated to their induction risk and is unquantifiable by us.

We find consistent evidence that early adult stress, as measured by induction risk, is associated with worse later-life health. A 10 percentage point increase in induction risk, which is a 2 standard deviation increase, is associated with a 0.2 unit (0.08%) increase in BMI, a 1.5 percentage point (1%) increase in the probability of being obese, a 1 percentage point (1%) increase in the probability of being in fair or poor health and a 2 percentage point (0.3%) decrease in the probability of being in very good or excellent health. This does not appear to be due to cohort effects or other trends; these associations exist only for men who did not serve in the military during Vietnam, not for men who did serve in the military or women.

In Section 2, we review the relevant literature. Section 3 describes the data and in Section 4 we describe our methods. We present our results in Section 5 before concluding in Section 6.

2. Literature Review

2.1 Early-Life Stress and Later-Life Health

A large and growing literature in economics estimates the effect of early life stressors on a wide variety of later-life outcomes, including educational attainment, earnings, and health (see Almond and Currie 2011; Aizer et al., 2016; Camacho, 2008). This literature generally focuses on stressors in utero or during infancy, but other research, examining the long term effects of leaving school during a recession on later life health, has found significant negative effects on health for adult men (Maclean 2013, Maclean et al. 2016).

2.2. Effects of Induction Risk on Health

Our proxy for stress is lifetime induction risk during the Vietnam War; we say "lifetime risk" because the ages at which one was eligible for induction ranged over time from one year to seven and a half years. The armed forces induction system may affect health through at least three routes: 1) increased stress caused by the risk of serving in the armed forces; 2) military service; 3) draft-avoidance behaviors such as attending college or getting married to receive military exemptions. Below, we discuss each of these possible mechanisms.

2.2.1 Clinical Effects of Stress on Bodily Function and Health

Exposure to risk of being inducted into the military during the Vietnam War caused great uncertainty about one's future and may have increased individuals' stress levels for long periods of time. For most of the war, men were at risk of being drafted for seven and a half years: from 18.5 to 26 (see Table 1).

Chronic or repeated stress can lead to harmful health effects (Schneiderman et al. 2005, Lupien et al. 2009; Gardner and Oswald, 2004). Individual response patterns vary based on early life experiences, the age at which stress occurs, coping mechanisms, the type and persistence of stressors, genetic endowments, and personal environment and constitution (Schneiderman et al. 2005, Lupien et al. 2009). The pathways through which stress may affect health are complex, including psychological and biochemical responses, as well as behavioral changes that may be initiated through these channels (Schneiderman et al. 2005).

Exposure to stress leads to biological responses from the nervous, cardiovascular, endocrine, and immune systems (Schneiderman et al. 2005). Stressors lead to the release of hormones such as epinephrine and cortisol, which increase sources of energy through higher blood sugar and the breaking down of fats into useable energy (Schneiderman et al. 2005, Sapolsky et al. 2000). The body diverts this energy to tissues that become more active during stress (skeletal muscles and brain) and away from less critical activities like eating, growth, and sexual activity (Schneiderman et al. 2005). This temporarily increases blood pressure through increased heart rate and stroke volume (the amount of blood pumped with each beat). Chronic mobilization of these processes is associated with high blood pressure, cardiac hypertrophy (the thickening of the heart muscle, which reduces the heart chamber size), damaged arteries and plaque formation, suppressed immunity including atrophied wound healing, slower surgery recovery, higher susceptibility to viruses including upper respiratory infections, worse antibody response to vaccines, and increased inflammation which can exacerbate many of the aforementioned conditions (Schneiderman et al. 2005, Sapolsky et al. 2000). Importantly, stress can lead to psychological problems like anxiety and depression, which are associated with sleep problems, substance abuse, heavier cigarette consumption, and higher alcohol consumption (Schneiderman et al. 2005).

Additionally, stress affects individuals' eating patterns. Jackson et al. (2017) find chronic stress, as measured by hair cortisol levels, to be associated with numerous measures of increased body weight, including persistence of obesity. A potential pathway through which stress affects obesity is by diminishing an individual's self-control leading to non-utility maximizing, potentially impulsive food decisions like eating more energy-dense, high-calorie foods (Ruhm 2012, Torres and Nowson 2007).

2.2.2. The Effects of Military Service on Later-Life Outcomes

Researchers have studied the effect of military service on labor market outcomes (Angrist 1990), education outcomes (Card and Lemieux 2001), and violent crimes (Lindo and Stoecker 2014). See Dobkin and Shabani (2009) for a discussion of the health effects of military service, and Gimbel and Booth (1996) for a discussion of stress among veterans. However, we focus on men who did not serve in the military, so the mechanism of actual military service is not relevant.

2.2.3 The Effects of Draft Avoidance Behaviors on Later-life Outcomes

For certain periods of the Vietnam War, otherwise draft-eligible men could receive deferments for being enrolled in college; for this reason, college attendance became a draft-avoidance behavior. This led to an increase in college attendance, and several studies have used induction risk as an instrumental variable for educational attainment (see e.g. Card and Lemieux 2001)[4], in some cases to estimate the effect of college education on later-life smoking (de Walque 2007, Grimard and Parent 2007) or mortality (Buckles et al. 2016). This literature suggests that draft risk is associated with increased education and improved health.

In certain years, deferments were also available for men who were married or had children. As a result, draft avoidance behaviors also included getting married and having children (Kutinova 2009, Hanson 2011). Kutinova (2009) finds evidence of increased first births occurring between 8 and 10 months following an executive order ending marital deferments for childless men because it created an incentive to have children to qualify for the deferment that remained available for fathers. Hanson (2011) finds that young men married at younger ages during periods in which marital deferments existed. While a large literature supports the notion that married individuals are generally healthier than single individuals, this is not necessarily a causal relationship (Wood, Goesling, and Avellar 2007).

To address this mechanism, our models control for education, marital status, and number of children. We are not able to control for age at first marriage or age at first birth, so our controls for these variables may be imperfect. However, to the extent that education and marriage promote health, failure to perfectly control for them should bias our estimates toward finding that exposure to induction risk is associated with better health later in life.

[4] However, whether the increase in educational attainment during the Vietnam War is due to draft avoidance or use of the GI Bill is a matter of debate (Angrist and Chen 2011).

3. Data

The primary data used in this project are: 1) the National Health Interview Survey (NHIS) and 2) induction data taken from Reports of the Director of the Selective Service. In this section, we describe these data and document how we constructed the variables used in our analysis.

3.1. National Health Interview Survey (NHIS)

The NHIS is a cross-sectional, nationally representative data set of the US non-institutional population. Each year, the NHIS interviews approximately 100,000 individuals, asking questions about basic demographic and socioeconomic characteristics, military service, height and weight (from which we calculate body mass index or BMI),[5] and self-reported health. We use data from the 1982-1996 NHIS for our main analysis sample. Based on our sample of interest - men born from 1937 to 1956 - our main analysis sample is aged 25 to 59 during 1982-1996. The sample size varies between 119,000 and 140,000 depending on the regression model specification, due to missing values for certain variables.

Because height and weight measures come from self-reports, they likely suffer from reporting error (Bound et al. 2001; Cawley et al., 2015). We adjust these measures for reporting error using data from the National Health and Nutrition Examination Survey (NHANES) III (1988-1994), which include both self-reports and measurements of weight and height and are from a similar time period as our NHIS data (Burkhauser and Cawley 2008).[6]

---

[5] Body mass index (BMI) is equal to weight in kilograms divided by height in meters squared.

[6] Using the NHANES data for the same age range as our NHIS data (age 25-59), we estimate the following regressions separately by gender:

$$MeasuredWeight_i = \beta_0 + \beta_1 SelfReport_i + \beta_2 SelfReport_i^2 + X_i + \varepsilon_i \qquad (1)$$

Where SelfReport refers to self-reported weight, and X includes age and race (non-Hispanic Black, non-Hispanic other race, and Hispanic). We then save the constant and coefficient estimates from these regressions and create an adjusted measure for weight in the NHIS sample by multiplying the NHIS self-reported weight values and demographic characteristics by their coefficients

From 1982-96, NHIS respondents were asked whether they had ever served in the US military and, if so, during which period (e.g. World War II, Korea, Vietnam). We do not use NHIS data from before 1982 because in those earlier years the NHIS data do not include month of birth, which we use to construct a more accurate measure of induction risk. We do not use NHIS data from after 1996 because in those later years the NHIS only asked whether respondents had been "honorably discharged" from the military, not whether they had served during the Vietnam era (or served at all but without an honorable discharge). We focus only on the years in which we have the most complete military data (1982-96), however we extend our sample through 2012 as a sensitivity analysis.

Our sample is limited to individuals born in the calendar years 1937 to 1956. This is to avoid any contamination of our main analysis sample with individuals serving in the Korean War, which ended in July 1953. Thus any individual born in 1937 would not have been eligible to serve in Korea. de Walque (2007) also imposes this sample restriction.[7] Because we are interested in educational attainment, we limit our sample to those over age 25 at interview as most individuals have completed their schooling by this age. We further restrict our sample to those with valid measurements of height and weight because we use these to create BMI.[8]

In certain analyses, we use a restricted-use version of the NHIS which provides us with data on state of birth (blinded),[9] whether and in which specific year an individual died if he or

---

from NHANES regressions, and adding them together, along with the constant from the regression model. We perform a similar adjustment for self-reported height. Using these constructed values, we create an adjusted measure of BMI and obesity (BMI≥30) which we use throughout the rest of this manuscript. We also estimate all models using the non-adjusted BMI and obesity measures and find slightly larger and more statistically significant results using unadjusted variables.

[7] We also perform analyses using 1930-1956 birth cohorts in sensitivity analyses reported in section 5.4. This sample would have been completely ineligible to serve in WWII, which is an important restriction as we only want to consider the post WWII induction system, created in 1948.

[8] To be consistent across the years of NHIS, we drop individuals below 59 inches and above 76 inches, and those weighing less than 100 pounds and more than 285 pounds, the most restrictive data publishing policies used by NHIS over the years of our sample.

[9] This measure allows us to determine individuals who were born in the same state, permitting us to estimate models including state fixed effects. However, this measure is only available for a subsample of our data.

she died by 2011 (NHIS-Mortality Linked File), and his or her age of death. These mortality data were collected by matching NHIS participants annually to the National Death Index system death certificates by a combination of social security number, gender, first and last name, date of birth, or birth month and year.

3.2.Selective Service Reports

We use annual (1955-1966) and semi-annual (1967-1975) reports of the Director of the Selective Service for induction eligibility, the number of monthly inductions, as well as additional institutional details and troop level data. These induction data are available by month, which we use to construct our measure of induction risk. We calculate risk based on the relevant laws governing both the pre-lottery years and the lottery years of the draft (see Appendix for more details on the history of the draft). We calculate induction risk as the number of inductions in a given 12 month period, using month and year of birth and monthly induction numbers from annual reports to construct a measure of induction risk by month of birth, divided by the number of individuals at risk or:

$$RA_{m,y} = \frac{Inductions\ (12\ Months)}{Size\ of\ Cohort\ at\ Risk} \qquad (2)$$

Where $RA_{m,y}$ is the risk at age 18 for those of age A born in month m in year y. We calculate the denominator, *Size of Cohort at Risk,* using the induction reports for the official number of individuals who have registered for selective service and are between the ages of eligibility (e.g. 18 ½ to 26) for the given period.[10] We calculate risk separately for age 18 ½, 19, …, 26, which we then sum to calculate induction risk from 18 ½ to 26. We focus on 18 ½ to 26 rather than college years (e.g. 19-22) that was the focus of previous research (Card and Lemieux 2001, de

[10] We also perform this calculation using measures of the cohort of age 17 year olds as reported by the Department of Education (and creating measures of those between the ages of 18 ½ - 26, by assuming the cohort of 17 year olds in a given year will be the correct number of 18 year olds in the following year). Our results are robust to these multiple methods so we use the official number of individuals registered via the selective service throughout.

Walque 2007, Grimard and Parent 2007, Buckles et al. 2016) because 18 ½ - 26 were the actual, legislated ages at which an individual was at risk of induction.[11] We calculate the total risk as follows, taking into account that one remains at risk of induction only if one was not previously inducted:

$$
\begin{aligned}
&InductionRisk18\ 1/2 - 26_{m,y} \\
&\quad = R18_{m,y} + (1 - R18_{m,y})R19_{m,y} + (1 - R18_{m,y})(1 - R19_{m,y})R20_{m,y} \\
&\quad + (1 - R18_{m,y})(1 - R19_{m,y})(1 - R20_{m,y}) * R21_{m,y} \\
&\quad + (1 - R18_{m,y})(1 - R19_{m,y})(1 - R20_{m,y})(1 - R21_{m,y}) * R22_{m,y} \\
&\quad + \qquad \ldots \\
&\quad + (1 - R18_{m,y})(1 - R19_{m,y})(1 - R20_{m,y})(1 - R21_{m,y})(1 - R22_{m,y})(1 \\
&\quad - R23_{m,y})(1 - R24_{m,y})(1 - R25_{m,y}) * R26_{m,y} \qquad (3)
\end{aligned}
$$

Where R18 denotes risk at age 18 ½ while all other measures denote risk for the full year a person is a given age, for month and year of birth m,y. For years in which the US used a draft lottery system, we calculate ex ante risk (i.e. the risk prior to the resolution of the lottery): for those subject to the lottery we set their risk of induction as equal to the number of inductions divided by the number of men of draft-eligible age in that year.[12] We multiply induction risk by 100 in all specifications so that all coefficients can be interpreted as the association of the outcome with a one-percentage-point change in risk.

4. Methods

[11] For years in which the draft lottery system was in place, we only consider eligibility for those in the birth cohorts at risk.

[12] We do not use ex post risk (i.e. whether one's birth date was drawn in the draft lottery) because then those called up would have a risk of one and be dropped from our sample (because they served) while those not called up would have a risk of zero. We assume that the "ex ante" odds of induction (i.e. the risk prior to the lottery being conducted) is a reasonable proxy for the stress faced by such men prior to the lottery.

We estimate a reduced-form model of later-life health as a function of cumulative induction risk during the Vietnam War. We estimate an ordinary least squares models of the form:

$$H_{it} = \beta_0 + \beta_1 InductionRisk_{m,yob} + \beta_2 X_{it} + \delta_{age} + \gamma_t + \varepsilon_{it} \qquad (4)$$

Where H_{it} is the dependent variable denoting various later-life health outcomes including a continuous variable for BMI and an ordinal variable for self-reported health (1 – 5, with 1 denoting poor and 5 denoting excellent health).[13] We estimate probit models for the binary dependent variables obesity (BMI≥30), fair or poor health (self-reported health ≤ 2), and very good or excellent health (self-reported health ≥ 4) of the following form:

$$Pr(H_{it}) = \phi\left(\beta_1 InductionRisk_{m,yob} + \beta_2 X_{it} + \delta_{age} + \gamma_t + \varepsilon_{it}\right) \qquad (5)$$

For each of these models, X_{it} are demographic and human capital characteristics described below, δ are fixed effects for age at interview, γ are fixed effects for year of interview, and ε is an error term. We report marginal effects from the probit models. We limit our main analysis sample to men who did *not* serve in the military during the Vietnam Era.[14] In all specifications, we cluster standard errors at the birth year cohort level.

We estimate three models, adding progressively more covariates in each specification. We start with the most exogenous set of regressors and then add regressors that control for ways in which induction risk could affect later-life health (e.g. education, marital status). We interpret any remaining association of induction risk with later-life health, after controlling for education and marital status, as the result of stress, although we acknowledge that we cannot measure stress directly.

[13] We also estimate regressions with self-reported health as the dependent variable using an ordered probit and find qualitatively similar results; the results are available upon request.

[14] We can calculate the aggregate probability of induction for men who did not serve in the military. We cannot do this for men who did serve - we do not know when they enlisted or whether they were drafted or in what year they were drafted. Moreover, the relevant measure of stress for them is likely not their risk of induction but their experiences during the war, about which we have no information.

The basic specification is limited to the most exogenous regressors: race (non-Hispanic Black, non-Hispanic other race, and Hispanic, with non-Hispanic Whites the omitted reference group), a birth cohort specific trend, defined as birth year minus 1937, and indicator variables for age and year. Specification 2 adds covariates for family size and marital status at the time of NHIS interview. These additional covariates reflect the fact that the Vietnam War has been linked to increased marriage and fertility rates (Kutinova 2009, Hanson 2011). While stress may affect later life health directly, in the form of induction risk, stress will also affect health through an increased likelihood of marriage and having children. Specification 3 additionally includes years of education past high school, and log income, which are endogenous variables but possible mechanisms through which induction risk may affect health (see e.g. Card and Lemieux 2001).

We also investigate the effect of stress in early adulthood on the risk of mortality, using a restricted-use version of the NHIS that contains data on mortality. Using a Cox proportional hazards model, we estimate time to death for men who never served during the Vietnam War. This equation takes the form:

$$\lambda(D_{it}) = \lambda_0(D_{it})\, e^{\beta_1 InductionRisk_{m,yob} + \beta_2 X_{it} + \delta_{age} + \gamma_t + \varepsilon_{it}} \quad (6)$$

where $\lambda(D_{it})$ is the hazard of dying by 2011, the year in which NHIS-Mortality linked file follows individuals. Induction risk and other covariates are exactly the same as described above and we perform the same three specfications.

As a falsification test, we also estimate our models for male veterans. Men who served in the military during Vietnam at some point joined the military (we do not know whether they voluntarily enlisted or were drafted, or at what age they joined the military) and were then no longer at risk of being inducted. Moreover, those who served in the military during Vietnam faced many other stressors during these ages (e.g. combat, separation from loved ones, injury, deaths of fellow soldiers); we have no way of quantifying this stress but there is no reason to believe that it is correlated with induction risk for others of the same age who did not serve.

As an additional falsification test, we estimate models for women. Women were at zero risk of induction throughout this era, so as a falsification test we assign them the induction risk experienced by men of the same month and year of birth. This is a strong falsification test in that women of this age cohort may have experienced stress due to the risk that their brothers, boyfriends, or husbands might be inducted. However, the induction risks of those people would be based on their own birth month and year, not the birth month and year of the woman. Still, women may have experienced stress about their classmates, who are of similar age.

If we find a similar correlation between induction risk and later-life health for these placebo samples (veteran men, women) as we find for our main sample of men who did not serve in the military during Vietnam, that would suggest that the correlation is due to cohort effects or other trends at the time. In contrast, if we find a considerably different pattern between induction risk and later-life health for non-veteran men than for the placebo samples, that would be consistent with stress affecting later-life health. Falsification tests are never conclusive; one cannot prove the null hypothesis of no bias, but failure to reject the null is informative.

4.1.Sample Selection

A potential concern with this study is that there will be sample selection on health status in who serves in the military based on the level of induction risk. This selection arises because of potential composition effects caused by variation in military force needs. As the need for more soldiers increases, the induction risk also increases, leading to more inductions and thus potentially culling more of the healthier individuals into service. In this case, during periods in time in which induction risk was particularly great, the health composition of men not inducted into the armed forces might be slightly lower, which would bias us towards finding a correlation of induction risk on health. We look for evidence of this in the results of the regression models estimated for veterans; if induction takes place in order of healthiness, then when induction risk is higher, it should be associated not only with lower average health among the non-Vietnam-veterans, but also lower average health among the veterans, who had less healthy individuals join their ranks.

Premature mortality due to stress is another potential source of selection bias. If those who were severely stressed by the possibility of being inducted into the military during the Vietnam War were more likely to die before our sample period then our analyses would be biased away from finding that stress worsens later-life health. We explore this possibility by estimating models of mortality for the time period we can observe.

Finally, those with higher socioeconomic status may have been more adept at avoiding military service either through family connections or greater resources. If higher socioeconomic status individuals tend to have better later-life health (Grossman, 2015), and were more likely to avoid military service during periods of increased induction risk, then our estimates would be biased against finding a negative health effect of induction risk later in life. However, those of higher SES may have consistently used any advantages to avoid military service; i.e. that such avoidance did not vary with the overall induction risk.

5. Empirical Results

We report summary statistics in Table 2. The average of military induction for all NHIS men is 7.7 percent. For some birth cohorts, namely 1946 and early 1947, induction risk surpassed 15 percent. Predictably, the men who ultimately served in the military during the Vietnam War were at higher induction risk than those who did not serve, 10.3 compared to 6.9 percent. Over 24 percent of the male NHIS sample served in the military during the Vietnam War. An additional 14 percent of men who did not serve in the military during the Vietnam War era served in the military at some other point in time.[15] For women, true induction risk is zero throughout the war, but in Table 2 the induction risk listed for women is that for men of the same birth month and year; this is used as a falsification test later in the paper.

Table 2 also shows that the mean body mass index in the male sample is 26.5, with 19 percent classified as obese (BMI>=30). Over 70 percent of the male sample reported very good or excellent health with only 8.3 percent reporting fair or poor health.

Figure 1 displays total inductions by month over the Vietnam era. Inductions over this time period are driven by manpower needs of the army. There was a brief increase in inductions caused by the Berlin Wall crisis (1961), then another large spike from 1966-1968 because of combat needs in the Vietnam War. Following the election of Richard Nixon, inductions dropped sharply as the US switched to a "Vietnamization" policy in which the US began withdrawing troops and turning over control of combat operations to South Vietnamese soldiers (Gartner 1998). Importantly, inductions fluctuate greatly over this time period and move in a non-linear pattern. Figure 2 shows induction risk by birth month and year cohort over our study period. This figure presents our actual measure of induction risk for each birth month and year as calculated using equation (3). The extreme variation and non-monotonicity in induction risk is very useful, as it implies that our regressor of interest is unlikely to be correlated with omitted variables such as general trends in health.

[15] We remove these individuals who served in the military at any time in a subsequent sensitivity analysis, but these men are included in our main sample because they may have been stressed by the risk of being inducted during the Vietnam War.

Table 1 shows the years and ages at which a birth cohort was at risk of induction and provides a clearer picture of the source of variation in risk due to the number of years a given birth cohort was at risk of military induction. It also separately identifies the type of induction system being used during the cohorts age-eligible years, with ages in italics denoting that the draft lottery system was in place from 1970-1972.

5.1.Results: Men Who Did Not Serve in Vietnam

Table 3 presents results for men who did not serve during Vietnam, controlling for time trends, race and ethnicity, and age and year of survey fixed effects, while Table 4 also includes controls for family size and marital status at the time of interview. Results from these models are similar so we discuss only Table 4 results. Among male non-Vietnam-veterans, a ten percentage point (2 standard deviation) increase in induction risk is associated with a 0.5 percentage point (3%) increase in obesity, a 0.7 percentage point (8%) increase in fair or poor health and a 0.5 percentage point (1%) decrease in the probability of being in very good or excellent health. All these results are statistically significant at least at the 10 percent level.

In Table 5 we also include controls for years of education completed beyond high school and log income. This is an important change to the model, because college education was a draft-avoidance behavior, and educational attainment is consistently associated with better later-life health (see, e.g., Cutler and Lleras-Muney, 2010). The coefficient on induction risk becomes larger and more statistically significant in this model. A ten percentage point (two standard deviation) increase in induction risk is associated with a 0.2 unit (1%) increase in BMI, a 1.5 percentage point (8%) increase in the probability of obesity, a 0.05 unit (1%) decrease in self-reported health, a 1 percentage point (10%) increase in the probability of being in fair or poor health and a 2 percentage point (3%) decrease in the probability of being in very good or excellent health. Income and education are both associated with better self-assessed health, and education is also associated with a lower probability of obesity (income is negatively correlated with obesity, but it is not statistically significant).

5.2. Mortality

Table 6 presents results from a Cox proportional hazard model of mortality following equation (6). Panel A reports results for men who did not serve in Vietnam, our main analysis sample. The results of specification 1 and specification 2 (which adds controls for marital status and family size) suggest a slight, statistically significant protective role of induction risk on the hazard of death. However, in specification 3, when we include educational attainment and income variables this association becomes smaller and statistically insignificant.

The negative correlation between exposure to stress and later-life mortality is the opposite of what one would expect. In the next section, devoted to falsification tests, we will provide evidence that suggests that these mortality results, but not the results for weight and self-assessed health, are due to cohort effects.

5.3. Falsification Tests: Male Vietnam Veterans and Women

In Table 7 we present results for the same models that were estimated using samples of: male Vietnam veterans (results shown in Panel A) and women (Panel B). In the interests of being concise, only the coefficients on induction risk are shown in the table, but full results of the models are available upon request. The results from these models are substantively different from those for male non-Vietnam-veterans in Tables 3-5. In Panel A for male Vietnam veterans, the coefficient on induction risk for BMI and the marginal effect of induction risk for obesity are very small and not statistically significant. In addition, induction risk is consistently associated with *better* self-assessed health among veterans, which is the opposite of the pattern observed for non-veterans. For example, in specification 2 for veterans, a one percentage point increase in induction risk is associated with a 0.005 unit (0.1%) increase in self-reported health, a 0.14 percentage point (1.8%) decrease in fair or poor health and a 0.24 percentage point (0.3%) increase in very good or excellent health. Adjusting for family income and educational attainment in specification 3, the estimates on fair poor health and very good or excellent health remain statistically significant although they are only about half as large as in specification 2, while the estimate for self-assessed health overall is both smaller and no longer statistically significant.

Results for women in Panel B of Table 7 are somewhat similar to those for Vietnam veterans from panel A, but very different from those of male non-Vietnam-veterans that were shown in Tables 3-5. Induction risk is uncorrelated with BMI and obesity. It is correlated with self-assessed health, but positively, which is the opposite of the pattern found for the male non-veterans in our main sample, but the same pattern as found for the other placebo sample of veteran men. Specifically, the results from specification 2 for women indicate that a one percentage point increase in induction risk is associated with a 0.0025 unit (0.1%) increase in self-assessed health, a 0.07 percentage point (0.6%) decrease in the probability of being in fair or poor health, and a 0.09 percentage point (0.1%) increase in the probability of being in very good health. In the third specification that controls for education, the only statistically significant correlation is that a one percentage point increase in induction risk is associated with a 0.03 percentage point (0.3%) decrease in the probability of being in fair or poor health.

The results of the falsification tests indicate that the correlation between induction risk of men born in a given month and year does not have the same correlation with later-life mortality for the placebo samples of veteran men and all women as we found for our sample of interest who are non-veteran men. In fact, the correlation for the placebo samples was generally of opposite sign; whereas we found that non-veteran men exposed to greater induction risk are in worse later-life health, the opposite was true for the placebo samples. The results of these falsification tests yield no evidence that the results for the sample of interest are due to cohort effects or unobserved trends.

The results of the falsification test do, however, raise the question of why there is a positive correlation for the placebo samples. It is possible that there are birth cohort effects that are visible in the placebo samples and that cause attenuation bias in our sample of interest. For example, previous research (e.g. Robinson et al. 2012) has documented evidence of birth cohort effects on abdominal obesity, especially among women, which may partially explain the positive association between health and induction risk for women, although we find very little consistent evidence of an association between BMI or obesity and induction risk for women or male veterans in Table 7. Overall, the results of these falsification tests suggest that the negative association observed for male non-Vietnam-veterans between induction risk and worse later-life health is not due to a cohort effect or trend in unobserved variables. Although falsification tests cannot be definitive, these are consistent with stress having an adverse impact on later-life health.

The falsification tests for mortality yield a different result. Results of hazard models of mortality are listed in Table 6, Panel B for veterans, and Table 6, Panel C for women. For both placebo samples, induction risk has a similar correlation with later-life mortality as it has for our main analysis sample of male non-veterans. For all three groups, higher induction risk is associated with a lower probability of mortality. In fact, the point estimates are larger for the two placebo samples than for the main analysis sample of male non-veterans. Based on the results of these falsification tests, we conclude that the correlation is not an effect of exposure to stress but is instead a cohort effect.

5.4. Additional Sensitivity Analyses

State Fixed Effects

In Appendix Table A1, we present results from a specification similar to Tables 3 – 5, but with the addition of controls for state fixed effects. Results are qualitatively and quantitatively similar. We focus on the specifications without fixed effects for the following reasons. First, the restricted data with state markers are not available for our full 1982-1996 analysis sample: NHIS only began collecting these data in 1985 and the information is missing for a portion of individuals in later years as well. We lose approximately one-third of our sample in state fixed effects models. Second, this variable refers to state of birth, not state of residence at the time of induction risk, and is thus an imperfect control for time invariant observable and unobservable differences in one's state at the time of induction risk.

Compositional Changes

To investigate whether our results reflect compositional changes among non-Vietnam-veterans, we estimate a model for all men (non-Vietnam-veterans and veterans) pooled. The logic is that there could be compositional change in our sample: when induction risk is higher more healthy men leave the pool of non-veterans and mechanically make the pool of non-veterans less healthy, both during the War and later in life. If such a change were occurring and less healthy men were being left behind when induction risk rose explained our earlier results, then pooling non-Vietnam-veterans and veterans should show no association between induction risk and later-life health. In Appendix Table A2, we reprint our main induction risk results in

Panel A and we present the new results for all men pooled in Panel B. We include an indicator variable for veteran status in these estimates. The results of specification 3, which control for education, are robust to pooling all men, although they are also smaller in magnitude (as one would expect from adding men to the sample whose stress is not well captured by the average induction risk). Overall, we continue to find evidence that stress, in the form of induction risk, worsens later-life health.

Variations in Sample Inclusion Criteria

We also examine the sensitivity of results to variation in the sample inclusion criteria. These results are presented in Appendix Table A3, with Panel A reprinting our main results on induction risk from Tables 4 and 5 for easy comparison.[16] In Panel B, we present results when those who ever served in the military, not just during the Vietnam War era, are dropped from the sample. In Panel C, we include only non-Vietnam-veteran men who responded without a proxy to the NHIS survey. The purpose for doing this is to eliminate any additional reporting error due to health being proxy-reported instead of self-reported. In Panel D, we include in the sample all birth cohorts of male non-Vietnam-veterans back to 1930, who would have been of military age starting in 1948 and thus subject to the same post World War II draft system as those in our main sample. In Panel E we limit the sample to those born between 1930 and 1936 who did not serve in the military, but were age-eligible to serve during the Korean War. These results are generally similar to those of the main specification; exposure to a higher induction risk tends to be associated with a higher probability of obesity and worse self-assessed health.

Model Estimates for Veterans of Various Wars

[16] We do not present estimates on induction risk for specification 1 because these estimates are very similar to those from specification 2.

We estimate additional falsification tests, using data for male veterans of wars other than Vietnam in Appendix Table A4. The results generally confirm that veterans, no matter which war they served in, do not exhibit the negative correlation between induction risk (that was found for men who did not serve) and later-life health; the exception is that Korean veterans exhibit a positive correlation between induction risk and later-life BMI and obesity.

Alternate Measure of Stress: Risk of Being Killed in Action

We also estimate models using an alternate measure of stress. Specifically, the new proxy for stress is the interaction of induction risk with the probability of being killed in action, calculated as the number of deaths in a calendar year divided by the level of American troops in Vietnam in that year (de Walque 2007). The logic is that stress is raised not simply by the probability of serving in the military but also by the chances that one could be killed. We create this interaction in a similar fashion to equation 3. We present results of these estimations in Appendix Table A5, Panel A. These results are qualitatively similar to those in the main specification: greater stress (proxied by higher risk) is associated with a higher probability of obesity and worse self-assessed health.

Alternate Measures of Expected Induction Risk

We also explore other plausible proxies for stress. It may be that individuals are not able to perfectly forecast their risk of induction; instead, they may observe the rates of induction for the cohorts ahead of them and assume that they will face similar risks. To explore this possibility, we estimate our base model, but assigning individuals the induction risk of cohorts that came of military age 1, 2, or 3 years before them. In Appendix Table A6, the results suggest that the risk of military induction of one's own cohort has the largest effect on later life health. The size of the effect on health using risk of induction for older cohorts tends to decrease with the distance of the cohort, suggesting previous induction risk affects later cohorts but that they update their own risk calculations as they get closer to induction age.

6. Discussion

We find evidence consistent with the hypothesis that stress in adolescence and early adulthood worsens later-life health. Specifically, a greater risk of military induction during the Vietnam War is associated with worse later-life health for men who did not serve in the military. These adverse health effects are modest, but are relatively robust, and include a higher risk of obesity and higher probability of reporting being in worse health. Falsification tests conducted with samples of women and male veterans do not show the same pattern for obesity and self-assessed health, which suggests that those results are not due to cohort effects or trends in unobservables. Moreover, it does not appear to be due to compositional effects (i.e. more healthy men being removed from the ranks of non-veterans when induction risk is high), because the negative correlation is still detectable (though, naturally, weaker) in a sample in which the non-veterans are pooled with veterans. The finding that stress is associated with a greater risk of obesity and worse self-assessed health in later life is robust to alternate proxies for stress (such as the probability of being killed in action) and various sample inclusion criteria.

For the outcome of mortality, however, the falsification samples exhibit the same patterns as the main analysis sample, which leads us to conclude that the correlation between induction risk and later-life mortality is due to cohort effects or other omitted variables.

This study has a number of limitations. First, we cannot directly measure stress. No large-scale survey that we know of measured stress of individuals using cortisol laboratory measurements at the time of the Vietnam War. However, the measure we use, which we limit to those who did not serve in Vietnam, captures an important source of uncertainty faced by individuals at that time. For those who do not serve, we do not have baseline health measures to investigate whether they did not serve due to preexisting health conditions that would bias these individuals towards worse health later in life. However, this should not bias our results unless health varies by month and year of birth in a way that is correlated with induction risk, which seems unlikely.

Among veterans, we cannot distinguish those who volunteered immediately for service from those who were inducted after experiencing the stress of the draft. However, this should bias the coefficient on risk in the veterans model towards showing ill effects of draft risk on later-life health, which we do not find for the veteran sample. Finally, we are limited in the later-life health outcomes that we can examine by the questions that were asked in NHIS.

Overall, we find a consistent association between a proxy for stress and worse later-life health. One possible mechanism by which stress affects later life health is diet. Reviews have concluded that chronic stress is associated with eating energy-dense foods (i.e. foods higher in sugar and fat) and weight gain, with greater effects for men (Torres and Nowson, 2007). Another possible mechanism is the stress hormone cortisol; it is believed that long-term hyperactivation of the system that regulates cortisol can contribute to the development of obesity and metabolic syndrome, which includes hypertension, diabetes, and high cholesterol (Jackson et al., 2017). These findings are consistent with our estimates linking stress in young adulthood to obesity and worse self-reported health later in life.

This study contributes to the literature on the adverse later-life consequences of stress, most of which has focused on the effect of stress or insults at the earliest ages (Almond and Currie, 2011; Aizer et al., 2016; Camacho, 2008). Specifically, this study establishes that even stress in adolescence and early adulthood may be associated with worse later-life health.

This paper also contributes to the previous literature on the effects of education on later-life health. Specifically, while some previous studies used induction risk as an instrument for education, the results of this paper suggest that in some contexts it may be an invalid instrument, as induction risk may affect outcomes such as health directly, not only through the mechanism of education.

The policy implications of this study are that even systems that seek to allocate burdens in a fair and transparent way (e.g. draft lottery) may impose unanticipated costs on participants through the mechanism of stress. In our study, we show that this is true even of those who never serve in the military.

Appendix A. The Vietnam Conflict and the Risk of Induction into the U.S. Military

Following the French military departure from Vietnam in 1954, the US began to directly aid the South Vietnamese government, and US military advisors began training the South Vietnamese military in 1955 ("Chronology of Events Relative to Vietnam, 1954-1965," 1965). This growing influence in Vietnam did not affect US military inductions until the Gulf of Tonkin Incident in 1964 in which a US ship engaged the North Vietnamese navy in the Gulf of Tonkin ("Chronology of Events Relative to Vietnam, 1954-1965,"1965). Following this incident, induction rose rapidly, peaking in October 1966, and again in the first half of 1968 before decreasing rapidly; see Figure 1. Prior to U.S. involvement in Vietnam, induction levels also were high in the second half of 1961 due to the building of the Berlin Wall, and in the early 1950s due to the Korean conflict.

The risk of fighting in the Vietnam War took on a particular salience unseen before due to its novelty as America's first "televised war" (Hallin 1986, pp. 105). Before the first official exchange of fire in 1964, US publications printed disturbing images of a Buddhist monk's self-immolation in protest of the US backed Diem government (Hallin 1986). Then in August 1965, CBS aired footage of US Marines burning Cam Ne, a village of seemingly little strategic value and few, if any, enemy combatants (Engelhardt 2007). The particular brutality of that broadcast shocked Americans and suggested US troops were performing atrocities in Vietnam. While coverage of the war continued to skew towards pro-US government coverage in the mid-1960s, news outlets continued to show explicit war clips depicting death and destruction (Engelhardt 2007, Hallin 1984).

As the U.S. death toll rose in Vietnam, political unrest in the US grew with student protests and draft card burnings (Appy 2003, Engelhardt 2007). The fear among Americans of being inducted into the military during this time period was felt at all levels, including among presidential candidates. During his 1968 Presidential campaign, Nixon campaigned on a platform that included abolishing the draft and implementing an All-Volunteer Force (Rostker 2006).

In 1969, President Nixon initiated a "Vietnamization" policy which greatly curtailed the need for new inductees into the military. This policy required South Vietnamese troops to assume control of combat missions while the US drastically reduced troop levels in Vietnam (Gartner 1998). Nixon was able to create an all-volunteer force when Congress allowed the legislative mandate to induct citizens into the military to expire in 1973. Later in 1973 Congress passed the Case-Church amendment that officially ended direct US involvement in Vietnam.

A.1. Induction Process

Individuals at this time could enter military service in three ways by: (1) voluntary enlistment; (2) voluntary induction; (3) involuntary induction. Those who enlisted voluntarily served a longer tour of duty, but had a choice in their branch of service and military occupation (House Armed Services Committee, 1970 via Angrist, 1991). Voluntary inductees, on the other hand, served a shorter tour of duty with no choice of military occupation and while they were certain to serve, they controlled the timing of their service (Annual Report, 1955, Semi-Annual Report, 1968, Angrist, 1991).[17] Involuntary inductees were similar to voluntary inductees in terms of length of tour and no choice in military occupation, but were not certain they would serve in the military and had no control over the timing of their service.

Voluntary enlistments alone were not enough to maintain an adequate fighting force during this era (Annual Report of the Director of the Selective Service System, 1955). Draft-eligible males would sometimes volunteer in order to choose their branch of service; as a result,

[17] These volunteers for induction were generally younger than regular inductees and may have been trying to join the military so that their service did not interrupt their lives at a later age; they received no preferential treatment besides expedited delivery into the Armed Forces (Annual Report, 1955, Semi-Annual Report 1968).

enlistments and inductions were correlated - when inductions dropped, enlistments also dropped, necessitating inductions to meet military manpower needs.

The process of inductions proceeded as follows: The Director of the Selective Service System received a monthly call for inductions from the President and Secretary of Defense (Annual Report, 1955). The director then delivered these calls for induction to State-level directors of Selective Service, who sent these requisitions to the local boards in the state. To ensure an equitable system by state, requisitions were sent out proportionately depending on the number of eligible registrants by state, and states further received credit for the number of residents currently serving in the military (Annual Report, 1955).

Local boards conducted pre-induction examinations in order to have induction-eligible individuals ready when they received calls from the State Director. Approximately half of all examinees were cleared for service (Annual Report, 1966). An additional 20 percent were rejected for service after being delivered for induction (Annual Report, 1966; Angrist, 1991). Those passing pre-induction medical exams were sent to Armed Forces induction stations.

A priority system dictated the order of induction; generally, delinquents (a classification of involuntary inductee) received the highest draft priority, followed by volunteers for induction.[18] The priority of involuntary induction after the two classes above varied during the Vietnam War period, with various marital, paternal, and student deferments created, modified, and repealed. The lexis chart in Table 1 summarizes which ages of young adults were eligible for induction by year, and Appendix Figures 1 and 2 give a brief summary of changes in the induction system from 1948 through the end of the induction system and the beginning of an all-

[18] Delinquency is defined as failure to comply with the Universal Military Training and Service Act. Examples are refusal to register, failure to supply board with information, failure to report for pre-induction examination, or failure to report for induction (Annual Report 1952). Any person of 18-26, under provision part 1630 of SS regulations, can offer themselves for induction at any point in time. Persons between age 17 and 18, with the approval of a guardian, also can volunteer for induction (Annual Report 1955).

volunteer force in 1973. Our data do not allow us to determine an individual's eligibility for specific deferments, so they are not used in our calculation of induction risk.

Executive order 10659 provided a new order for inductions, one created to prevent older registrants (those 26 or older) and fathers from being high priority inductees (Annual Report 1955, pg. 27). Under this order, the next highest priority groups after delinquents and volunteers became those aged 19-25, without children, chosen by age, oldest first,[19] followed by those of similar ages with children. Then those aged 26 or older were chosen by age, with the youngest receiving calls for induction first. Some deferments, including student deferments, extended the age at which one could be inducted to age 35 (Annual Report 1953).[20] Finally, if local boards could not fill their quotas using the previous groups, those aged 18 ½, but not yet 19, could be called, oldest first.

The US selective service enacted the first draft *lottery* on December 1, 1969 (Selective Service System, 2012). Birth dates were randomly selected to determine draft priority for those born between January 1, 1944 and December 31, 1950.[21] Individuals were at risk of induction for the calendar year 1970, when they were aged 20 to 26, after which point they could not be called for induction. Subsequent draft lotteries included single birth cohorts; e.g. the 1970 draft, in which individuals were at risk of induction during the 1971 calendar year, applied only to the 1951 birth cohort, such that all inductees in these drafts were age 20. The final draft lottery from which inductees were called for service occurred on August 5, 1971 and affected the 1952 birth cohort. However, the Selective Service continued to conduct the draft lottery annually until 1975, with the understanding that should Congress reinstate the draft, inductions would be based on

[19] Previous research using induction risk as an instrumental variable for education looked only at risk during certain college ages (e.g. deWalque, 2007, used ages 19-22), but actual risk extended well past that. The priority of drafting the oldest first underscores the importance of including post-college years in induction risk.
[20] Few, if any, individuals over the age of 26 were called for induction.
[21] The 1969 draft lottery was skewed towards higher priority calls for those with December birthdays apparently due to inadequately mixed draft balls (Fienberg 1971 via Lindo and Stoecker 2014). This issue was corrected in later draft lotteries.

these draft lotteries. The last inductee was called in December 1972 and reported for duty in July 1973 (Selective Service System, 2012). Soon after in August 1973, Congress passed the Case-Church ending direct US involvement in the Vietnam War.

The variation in probability of induction for our analysis sample is due to: 1) changes in the number of inductions by year that were driven by political decisions about the Vietnam War; 2) changes over time in the ages that were eligible to be inducted or were subject to the draft lottery.[22]

[22] Additional variation in induction risk existed at the state level. Buckles et al. (2016) exploits the across-state variation to estimate the effect of college completion on mortality. They find rather sizable effects of education on mortality using both national and state level induction risk to instrument for both educational attainment and veteran status, noting this effect likely operates through decreased smoking, improved financial security, and better health resources. It seems unlikely that state-level variation in induction risk was well known at the time (Buckles et al. 2016). Thus, the national risk of induction may be a better measure of stress and perceived incentives for draft avoidance behavior.

References

Aizer, Anna, Laura Stroud, and Stephen Buka. 2016. “Maternal Stress and Child Outcomes: Evidence from Siblings.” *Journal of Human Resources*, 51 (3): 524-555.

Almond, Douglas, and Janet Currie. 2011. "Killing Me Softly: The Fetal Origins Hypothesis." *Journal of Economic Perspectives*, 25 (3): 153-72.

Angrist, Joshua D. 1990 “Lifetime Earnings and the Vietnam Era Draft Lottery: Evidence from Social Security Administrative Records.” *American Economic Review* 80 (3): 313–36.

———. 1991. “The Draft Lottery and Voluntary Enlistment in the Vietnam Era.” *Journal of the American Statistical Association* 86 (415): 584–95.

Angrist, Joshua D., and Stacey H. Chen. 2011. “Schooling and the Vietnam-Era GI Bill: Evidence from the Draft Lottery.” *American Economic Journal: Applied Economics* 3 (2): 96–118.

Appy, Christian. “Patrtiots: The Vietnam War Remembered from All Sides.” Penguin Books. 2003.

Bound, John & Brown, Charles & Mathiowetz, Nancy, 2001. "Measurement error in survey data," Handbook of Econometrics, in: J.J. Heckman & E.E. Leamer (ed.), Handbook of Econometrics, edition 1, volume 5, chapter 59, pages 3705-3843 Elsevier.

Buckles, Kasey, Andreas Hagemann, Ofer Malamud, Melinda S. Morrill, Abigail K. Wozniak. 2016. “The Effect of College Education on Health.” *Journal of Health Economics*, 50: 99-114.

Burkhauser, Richard, and Cawley, John. 2008. “Beyond BMI: The Value of More Accurate Measures of Fatness and Obesity in Social Science Research.” *Journal of Health Economics*, 27 (2): 519-29.

Camacho, Adriana. 2008. “Stress and Birth Weight: Evidence from Terrorist Attacks.” *American Economic Review* 98(2):511–15.

Card, David, and Thomas Lemieux. 2001. “Going to College to Avoid the Draft: The Unintended Legacy of the Vietnam War.” *American Economic Review* 91 (2): 97–102.

Cawley, John, Johanna Catherine Maclean, Mette Hammer, and Neil Wintfeld. 2015. “Reporting Error in Weight and its Implications for Estimates of the Economic Consequences of Obesity.” *Economics and Human Biology*, 19: 27-44.

“Chronology of Events Relative to Vietnam, 1954-1965.” *Vietnam Perspectives,* Vol 1. No. 1 (August 1965): 17-28.

Cutler, D. M., and A. Lleras-Muney. 2010. Understanding differences in health behaviors by education. *Journal of Health Economics*, 29(1), 1-28.

Dahl, Ronald E. “Adolescent Brain Development: A Period of Vulnerabilities and Opportunities.” *Annals of the New York Academy of Sciences* 1021 (2004): 1-22.

De Walque, Damien. 2007. “Does Education Affect Smoking Behaviors? Evidence Using the Vietnam Draft as an Instrument for College Education.” *Journal of Health Economics* 26 (5): 877–95.

Dobkin, Carlos, and Reza Shabani. 2009 “The Health Effects of Military Service: Evidence from the Vietnam Draft” *Economic Inquiry,* 47 (1): 69-80.

Engelhardt, Tom. 2007. “The End of Victory Culture: Cold War America and the Disillusioning

of a Generation." University of Massachusetts Press.
Fienberg, S. E. 1971. "Randomization and Social Affairs: The 1970 Draft Lottery." *Science*, 171(3968): 255–61.
Grossman, Michael. 2015. "The Relationship between Health and Schooling: What's New?" NBER Working Paper No. 21609.
Gimbel, Cynthia, and Alan Booth. 1996. "Who Fought in Vietnam?" *Social Forces,* 74 (4): 1137-1157
Griffin, Michael. 2010. "Media Images of War." Media, War & Conflict, 3(1): 7-41.
Hanson, Devlin. 2011. "Incentives to Marry: Draft Deferments during the Vietnam War." Mimeo Boston College University.
Gardner, Jonathan and Andrew Oswald. 2004. "How Is Mortality Affected by Money, Marriage, and Stress?" *Journal of Health Economics*, 23(6): 1181-1207.
Gartner, Scott. 1998. "Differing Evaluations of Vietnamization." *The Journal of Interdisciplinary History*, 29(2): 243-262.
Grimard, Franque, and Daniel Parent. 2007. "Education and Smoking: Were Vietnam War Draft Avoiders Also More Likely to Avoid Smoking?" *Journal of Health Economics* 26 (5): 896–926.
Hallin, Daniel. 1984. "The Media, the War in Vietnam, and Political Support: A Critique of the Thesis of an Oppositional Media." *The Journal of Politics,* 46 (1): 2-24.
Hallin, Daniel. 1986. "The "Uncensored War" The Media and Vietnam." Oxford Unversity Press.
Jackson, Sarah E., Clemens Kirschbaum, and Andrew Steptoe. 2017. "Hair Cortisol and Adiposity in a Population-Based Sample of 2,527 Men and Women Aged 54 to 87 Years." *Obesity Biology and Integrated Physiology* 25: 539-544.
Jackson, Sarah E., Clemens Kirschbaum, and Andrew Steptoe. 2017. "Hair Cortisol and Adiposity in a Population-Based Sample of 2,527 Men and Women Aged 54 to 87 Years." *Obesity*, 35(3): 539-544.
Kaestner, Robert and Benjamin Yarnoff. 2011. "The Long Term Effects of Minimum Legal Drinking Age Laws on Adult Alcohol Use and Traffic Fatalities." *Journal of Law and Economics* 54: 365-38.
Kutinova, Andrea. 2009. "Paternity Deferments And The Timing Of Births: U.S. Natality During The Vietnam War" *Economic Inquiry* 47(2): 351-365.
Lindo, J. M. and Stoecker, C. 2012. "Drawn into Violence: Evidence on "What Makes a Criminal" From the Vietnam Draft Lotteries." *Economic Inquiry*, 52: 239–258.
Lupien, Sonia J., Bruces S. McEwen, Megan R. Gunnar, and Christine Heim. 2009. "Effects of stress throughout the lifespan on the brain, behaviour and cognition." *Nature*, 10: 434-445.
Maclean, Johanna Catherine. 2013. "The Health Effects of Leaving School in a Bad Economy." *Journal of Health Economics* 32 (5): 951–64.
Maclean, Johanna Catherine, Reginald Covington, and Asia Sikora Kessler. 2016. "Labor Market Conditions at School-Leaving: Long-run Effects on Marriage and Fertility." *Contemporary Economic Policy* 34 (1): 63-88.
National Institute of Mental Health (NIMH). 2011. The Teen Brain: Still Under Construction.

NIH Publication No. 11-4929. https://www.nimh.nih.gov/health/publications/the-teen-brain-still-under-construction/teen-brain_141903.pdf

Robinson, W.R., R.L. Utz, K.M. Keyes, C.L. Martin, and Y. Yang. 2013. "Birth cohort effects on abdominal obesity in the United States: the Silent Generation, Baby Boomers and Generation X." *International Journal of Obesity*, 37: 1129–1134.

Rostker, Bernard. "I Want You, The Evolution of the All-volunteer Force" 2006, Rand Reports, http://www.rand.org/pubs/research_briefs/RB9195/index1.html (Accessed December 27, 2016)

Ruhm, Christopher J. 2012. "Understanding overeating and obesity," Journal of Health Economics 31 (6): 781-796.

Sapolsky, Robert M., L. Michael Romero, and Allan U. Munck. 2000. "How Do Glucocorticoids Influence Stress Responses? Integrating Permissive, Suppressive, Stimulatory, and Preparative Actions." *Endocrine Reviews*, 21: 55–89.

Schneiderman, Neil, Gail Ironson, and Scott D. Siegel. 2005. "Stress and Health: Psychological, Behavioral, and Biological Determinants." *Annual Review of Clinical Psychology*, 1: 607–28.

Selective Service System: History and Records. (2012) "The Vietnam Lotteries." https://www.sss.gov/lotter1.htm, accessed on March 2, 2014.

Torres, Susan J., and Caryl A. Nowson. 2007. "Relationship between stress, eating behavior, and obesity." *Nutrition* 23: 887-894.

The U.S. National Archives and Records Administration. "Statistical Information about Fatal Casualties of the Vietnam War http://www.archives.gov/research/military/vietnam-war/casualty-statistics.html, (2013) accessed on June 9, 2015.

U.S. Selective Service. (1967-1973) "Semiannual Report of the Director of Selective Service." http://catalog.hathitrust.org/Record/000506738, accessed on June 9, 2015.

U.S. Selective Service. (1951-1956) "Annual report of the Director of the Selective Service." Washington, D.C.; U.S. Government Printing Office.

U.S. Selective Service. (1957-1966) "Annual report of the Director of the Selective Service." http://catalog.hathitrust.org/Record/000506708, accessed on June 9, 2015.

Wood, Robert G., Brian Goesling, and Sarah Avellar. 2007. "The Effects of Marriage on Health: A Synthesis of Recent Research Evidence." http://aspe.hhs.gov/sites/default/files/pdf/75106/report.pdf

Figure 1: Number of Inductions by Month, 1955-1975

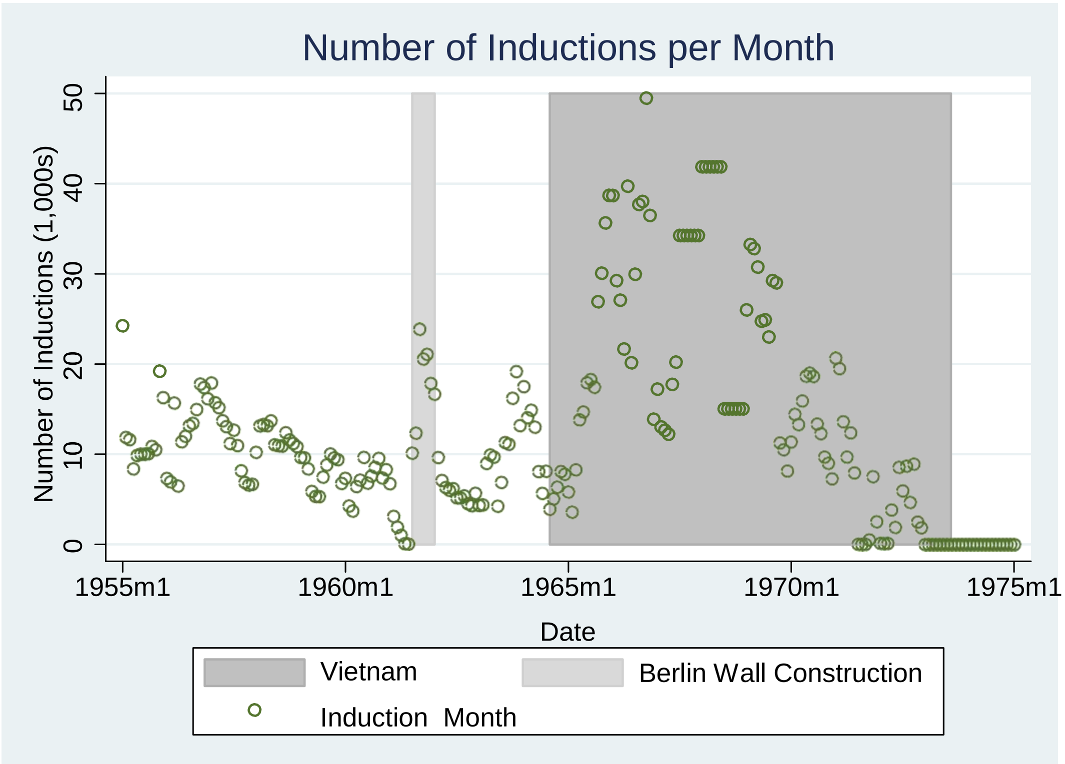


Figure 2: Risk of Induction by Birth Cohort

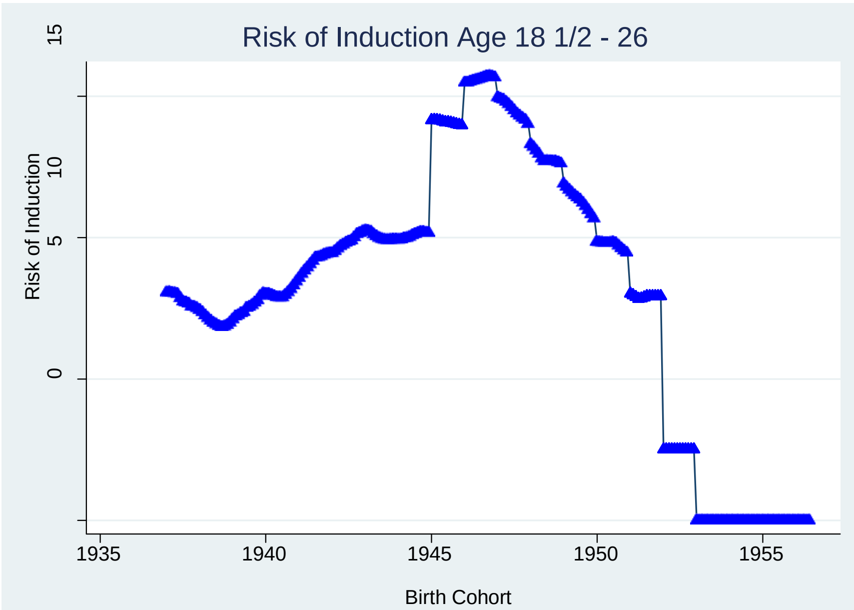


Table 1: Lexis Chart Showing Birth Cohorts and the Ages and Years at which these Cohorts were at Risk of Being Inducted into the US Armed Forces.

	Years Induction Age Eligible																		Age At Survey
Cohort	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	1982-1996
1937	18.5	19	20	21	22	23	24	25	26										44-59
1938		18.5	19	20	21	22	23	24	25	26									43-58
1939			18.5	19	20	21	22	23	24	25	26								42-57
1940				18.5	19	20	21	22	23	24	25	26							41-56
1941					18.5	19	20	21	22	23	24	25	26						40-55
1942						18.5	19	20	21	22	23	24	25	26					39-54
1943							18.5	19	20	21	22	23	24	25	26				38-53
1944								18.5	19	20	21	22	23	24	25	*26*			37-52
1945									18.5	19	20	21	22	23	24	*25*			36-51
1946										18.5	19	20	21	22	23	*24*			35-50
1947											18.5	19	20	21	22	*23*			34-49
1948												18.5	19	20	21	*22*			33-48
1949													18.5	19	20	*21*			32-47
1950														18.5	19	*20*			31-46
1951															18.5		*20*		30-45
1952																		*20*	29-44
1953																			28-43
1954																			27-42
1955																			26-41
1956																			25-40

Source: Ages at which the birth cohorts were interviewed in the National Health Interview Survey are displayed in the right-most column. Ages in *italics* denote the draft lottery system was in place at this point in time (1970-1972).

Table 2: Summary Statistics

	Men	Male Non-Vietnam Veteran	Male Vietnam Veteran	Women
Induction Risk	7.689	6.873	10.26	7.696
	(5.165)	(5.115)	(4.423)	(5.163)
Body Mass Index (BMI)	26.48	26.42	26.68	25.32
	(4.420)	(4.484)	(4.203)	(5.685)
Obese (BMI>30)	0.190	0.188	0.195	0.185
	(0.392)	(0.391)	(0.396)	(0.388)
Health (1-5)	4.017	4.005	4.053	3.876
	(1.032)	(1.040)	(1.005)	(1.053)
Fair or Poor (Health<3)	0.0827	0.0857	0.0732	0.100
	(0.275)	(0.280)	(0.260)	(0.301)
Very Good (Health>3)	0.708	0.703	0.726	0.649
	(0.454)	(0.457)	(0.446)	(0.477)
Black	0.0907	0.0937	0.0812	0.108
	(0.287)	(0.291)	(0.273)	(0.310)
Other Race	0.0355	0.0419	0.0155	0.0374
	(0.185)	(0.200)	(0.123)	(0.190)
Hispanic	0.0697	0.0784	0.0423	0.0724
	(0.255)	(0.269)	(0.201)	(0.259)
Served in Vietnam	0.241	0	1	0.00603
	(0.428)	(0)	(0)	(0.0774)
Ever Served	0.346	0.138	1	0.0127
	(0.476)	(0.345)	(0)	(0.112)
Family Size	3.293	3.296	3.281	3.294
	(1.537)	(1.559)	(1.464)	(1.502)
Married	0.804	0.801	0.815	0.738
	(0.397)	(0.399)	(0.388)	(0.440)
Log Income	10.53	10.51	10.59	10.45
	(0.637)	(0.654)	(0.579)	(0.702)
Years of Education Past	1.871	1.904	1.767	1.497
High School	(2.184)	(2.227)	(2.042)	(2.003)
Educational Attainment	13.38	13.32	13.59	13.03
	(2.986)	(3.168)	(2.306)	(2.751)

Source: Summary statistics using 1982-1996 NHIS data. We report means with standard deviations in parentheses.

Table 3: The Effect of Induction Risk on Health for Men Who Did Not Serve in Vietnam Born between 1937 and 1956: OLS Clustered Results Age 18-26 Risk

	BMI	Obese	Self-Assessed Health	Health FairPoor	Health VeryGood
Induction Risk	0.0031	0.0004**	–0.0012	0.0007***	–0.0005
	(0.0032)	(0.0002)	(0.0010)	(0.0002)	(0.0003)
trend	0.0379	0.0054**	0.0090**	–0.0010	0.0046**
	(0.0316)	(0.0023)	(0.0039)	(0.0015)	(0.0018)
Black	–0.2060***	–0.0056*	–0.4168***	0.0695***	–0.1675***
	(0.0435)	(0.0029)	(0.0185)	(0.0029)	(0.0043)
Other Race	–2.5488***	–0.1469***	–0.1084***	0.0115***	–0.0592***
	(0.0615)	(0.0065)	(0.0130)	(0.0033)	(0.0065)
Hispanic	0.1083	0.0008	–0.2822***	0.0462***	–0.1268***
	(0.0659)	(0.0051)	(0.0131)	(0.0033)	(0.0052)
Obs	145044	145044	146680	146680	146680
R^2	0.041		0.047		
Dep var mean	26.408	0.187	3.976	0.091	0.691

Source: Authors' estimation of equations (4) and (5) in the text using 25-59 year old men who did not serve in the military during the Vietnam Era from the 1982-1996 NHIS. Each column in the table comes from a separate regression. Estimates for BMI and health are from OLS models while estimates for obese, fair or poor, and very good or excellent health are from probit models and coefficients represent marginal effects. The main independent variable in all equations is the risk of being inducted into the army between the ages 18 1/2 and 26 based on equation 3 in the text. All estimates include age and year of interview fixed effects. Standard errors clustered at the birth cohort level are in parentheses: *** indicates significance at the 1% level, ** indicates significance at the 5% level, and * indicates significance at the 10% level.

Table 4: The Effect of Induction Risk on Health for Men Who Did Not Serve in Vietnam Born between 1937 and 1956: OLS Clustered Results Age 18-26 Risk

	BMI	Obese	Self-Assessed Health	Health FairPoor	Health VeryGood
Induction Risk	0.0040	0.0005**	–0.0013	0.0007***	–0.0005*
	(0.0030)	(0.0002)	(0.0009)	(0.0002)	(0.0003)
trend	0.0411	0.0055**	0.0099**	–0.0011	0.0048***
	(0.0312)	(0.0023)	(0.0038)	(0.0014)	(0.0017)
Black	–0.1213**	–0.0037	–0.3680***	0.0595***	–0.1484***
	(0.0436)	(0.0029)	(0.0183)	(0.0029)	(0.0042)
Other Race	–2.6244***	–0.1525***	–0.0933***	0.0092***	–0.0532***
	(0.0644)	(0.0066)	(0.0132)	(0.0031)	(0.0064)
Hispanic	0.0267	–0.0057	–0.2545***	0.0420***	–0.1160***
	(0.0655)	(0.0052)	(0.0127)	(0.0032)	(0.0050)
Family Size	0.0949***	0.0080***	–0.0438***	0.0068***	–0.0169***
	(0.0097)	(0.0007)	(0.0029)	(0.0005)	(0.0016)
Married	0.6859***	0.0212***	0.3167***	–0.0598***	0.1216***
	(0.0412)	(0.0037)	(0.0080)	(0.0026)	(0.0037)
Obs	145044	145044	146680	146680	146680
R^2	0.047		0.058		
Dep var mean	26.408	0.187	3.976	0.091	0.691

Source: Authors' estimation of equations (4) and (5) in the text using 25-59 year old men who did not serve in the military during the Vietnam Era from the 1982-1996 NHIS. Each column in the table comes from a separate regression. Estimates for BMI and health are from OLS models while estimates for obese, fair or poor, and very good or excellent health are from probit models and coefficients represent marginal effects. The main independent variable in all equations is the risk of being inducted into the army between the ages 18 1/2 and 26 based on equation 3 in the text. All estimates include age and year of interview fixed effects. Standard errors clustered at the birth cohort level are in parentheses: *** indicates significance at the 1% level, ** indicates significance at the 5% level, and * indicates significance at the 10% level.

Table 5: The Effect of Induction Risk on Health for Men Who Did Not Serve in Vietnam Born between 1937 and 1956: OLS Clustered Results Age 18-26 Risk

	BMI	Obese	Self-Assessed Health	Health Fair/Poor	Health Very Good
Induction Risk	0.0166***	0.0015***	–0.0048***	0.0010***	–0.0020***
	(0.0033)	(0.0003)	(0.0007)	(0.0002)	(0.0002)
trend	0.0446	0.0066***	0.0098**	–0.0015	0.0042**
	(0.0324)	(0.0024)	(0.0043)	(0.0013)	(0.0020)
Black	–0.1307**	–0.0147***	–0.1531***	0.0167***	–0.0738***
	(0.0513)	(0.0040)	(0.0140)	(0.0030)	(0.0051)
Other Race	–2.3894***	–0.1422***	–0.0926***	0.0049	–0.0570***
	(0.0664)	(0.0071)	(0.0154)	(0.0038)	(0.0065)
Hispanic	–0.0108	–0.0187***	–0.0345**	–0.0001	–0.0351***
	(0.0754)	(0.0063)	(0.0148)	(0.0034)	(0.0068)
Family Size	0.0711***	0.0060***	–0.0322***	0.0059***	–0.0122***
	(0.0094)	(0.0006)	(0.0030)	(0.0004)	(0.0015)
Married	0.5922***	0.0243***	0.1268***	–0.0200***	0.0535***
	(0.0490)	(0.0041)	(0.0162)	(0.0039)	(0.0060)
Log Income	0.2932***	–0.0023	0.3867***	–0.0674***	0.1222***
	(0.0298)	(0.0026)	(0.0226)	(0.0021)	(0.0043)
Years of Education Past	–0.2047***	–0.0164***	0.0775***	–0.0139***	0.0333***
High School	(0.0096)	(0.0008)	(0.0015)	(0.0006)	(0.0007)
Obs	125109	125109	125824	125824	125824
R^2	0.056		0.157		
Dep var mean	26.413	0.187	3.997	0.087	0.700

Source: Authors' estimation of equations (4) and (5) in the text using 25-59 year old men who did not serve in the military during the Vietnam Era from the 1982-1996 NHIS. Each column in the table comes from a separate regression. Estimates for BMI and health are from OLS models while estimates for obese, fair or poor, and very good or excellent health are from probit models and coefficients represent marginal effects. The main independent variable in all equations is the risk of being inducted into the army between the ages 18 1/2 and 26 based on equation 3 in the text. All estimates include age and year of interview fixed effects. Standard errors clustered at the birth cohort level are in parentheses: *** indicates significance at the 1% level, ** indicates significance at the 5% level, and * indicates significance at the 10% level.

Table 6: The Effect of Induction Risk on Death for Individuals born between 1937 and 1956: Cox Proportional Hazards results Age 18-26 Risk

	Spec 1	Spec 2	Spec 3
Panel A. Male Non-Vietnam Veterans			
Induction Risk	–0.0088***	–0.0088***	–0.0036
	(0.0032)	(0.0032)	(0.0033)
Panel B. Male Vietnam Veterans			
Induction Risk	–0.0119**	–0.0100*	–0.0060
	(0.0055)	(0.0058)	(0.0066)
Panel C. Women			
Induction Risk	–0.0144***	–0.0147***	–0.0119***
	(0.0038)	(0.0039)	(0.0038)

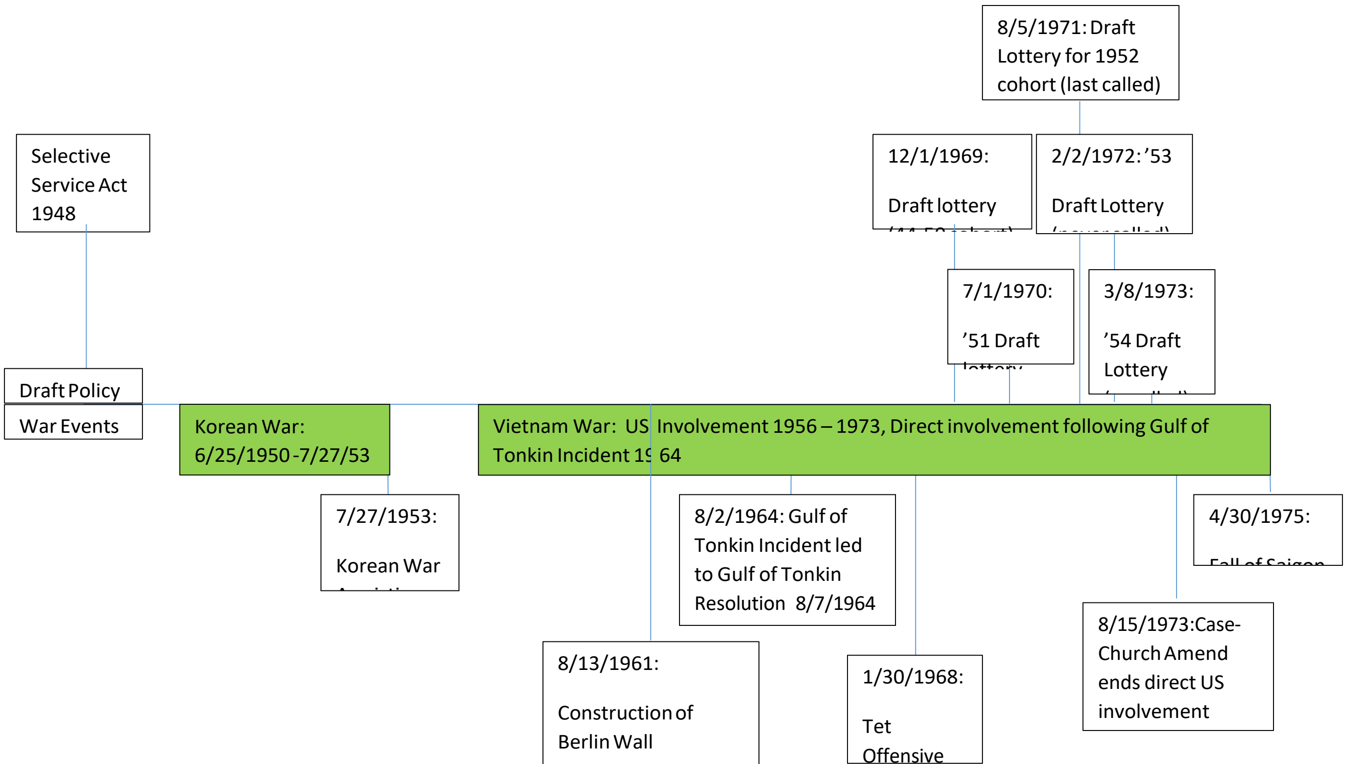
Source: Authors' estimation of equation (6) in the text using 25-59 year old individuals from the 1982- 1996 NHIS. Each cell in the table comes from a separate regression in which the main independent variable is the risk of being inducted into the army between the ages 18 1/2 and 26 based on equation (3) in the text. All models are estimated using Cox proportional hazards models. All estimates include age and year of interview fixed effects. Standard errors clustered at the birth cohort level are in parentheses: *** indicates significance at the 1% level, ** indicates significance at the 5% level, and * indicates significance at the 10% level.

Table 7: The Effect of Induction Risk on Health for Male Vietnam Veterans and Women: OLS Clustered Results Age 18-26 Risk

Sensitivity Sample	BMI	Obese	Self-Assessed Health	Health Fair/Poor	Health Very Good
Panel A: Male Vietnam Veterans					
Specification 1	0.0022	–0.0003	0.0057***	–0.0014***	0.0026***
	(0.0071)	(0.0006)	(0.0014)	(0.0002)	(0.0004)
Specification 2	0.0007	–0.0004	0.0053***	–0.0014***	0.0024***
	(0.0070)	(0.0006)	(0.0014)	(0.0002)	(0.0004)
Specification 3	0.0042	0.0001	0.0020	–0.0007***	0.0012***
	(0.0063)	(0.0005)	(0.0013)	(0.0002)	(0.0005)
Panel B: Women					
Specification 1	0.0001	–0.0002	0.0026***	–0.0007***	0.0010***
	(0.0048)	(0.0003)	(0.0007)	(0.0002)	(0.0003)
Specification 2	0.0010	–0.0002	0.0025***	–0.0007***	0.0009***
	(0.0048)	(0.0003)	(0.0007)	(0.0002)	(0.0003)
Specification 3	0.0058	0.0000	0.0004	–0.0003*	–0.0000
	(0.0047)	(0.0003)	(0.0006)	(0.0001)	(0.0003)

Source: Authors' estimation of equations (4) and (5) in the text using 25-59 year old men who served in the military during the Vietnam Era in Panel A, and women in Panel B from the 1982-1996 NHIS. Each cell in the table comes from a separate regression. Estimates for BMI and health are from OLS models while estimates for obese, fair or poor, and very good or excellent health are from probit models and coefficients represent marginal effects. The main independent variable in all equations is the risk of being inducted into the army between the ages 18 1/2 and 26 based on equation 3 in the text. All estimates include controls for race and ethnicity, time trend, and age and year of interview fixed effects. Specification 2 also includes controls for family size and marital status, while Specification 3 includes log family income and educational attainment controls as well. Standard errors clustered at the birth cohort level are in parentheses: *** indicates significance at the 1% level, ** indicates significance at the 5% level, and * indicates significance at the 10% level.

Appendix Figure 1. Timeline of Draft Policy and War Events Post-World War II through the End of the Vietnam War (1948-1975)



Others things of interest: Paris Peace Accords of 1973

Last US induction 6/30/1973 (last induction call December 7, 1972)

Additional draft lotteries (also never called)– March 20 1974 (1955 cohort), March 12 1975 (1956 cohort)

Appendix Figure 2. Marital Status and Paternity Deferments through the Years (1948-1975)

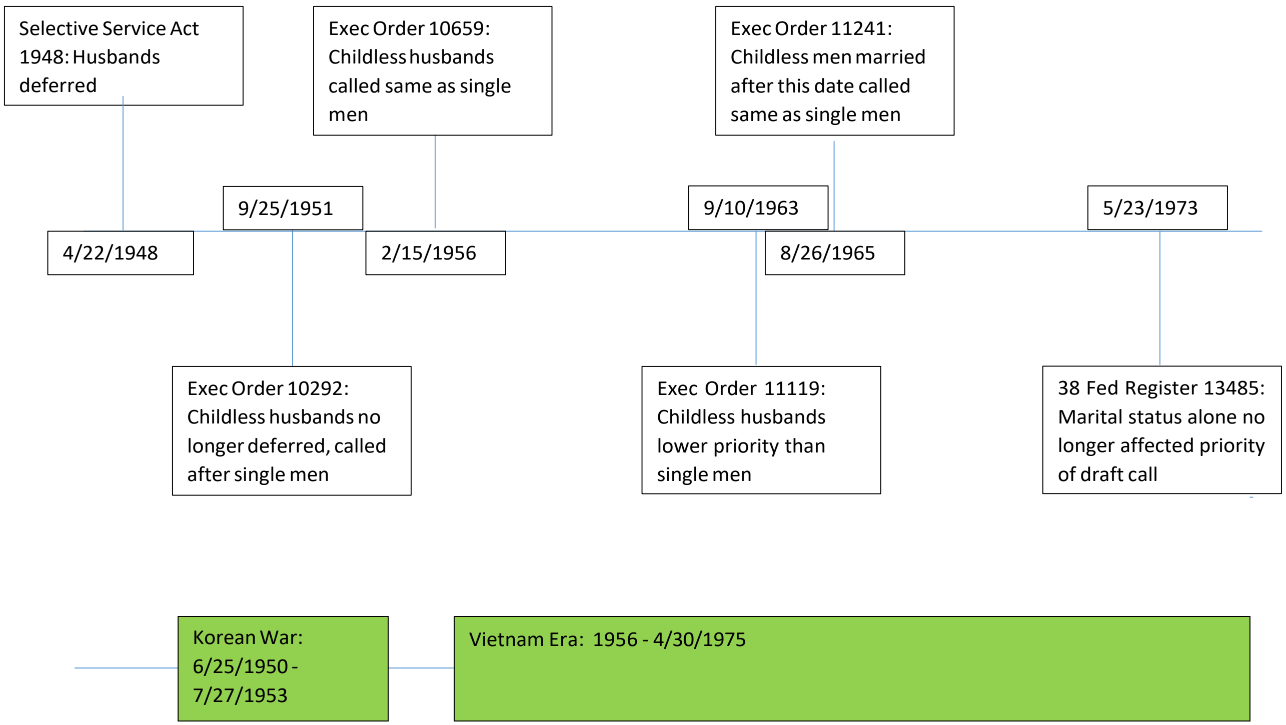


Table A1: The Effect of Induction Risk on Health for Female individuals born between 1937 and 1956: OLS Clustered results Age 18-26 Risk, Including State of Residence Fixed Effects

	BMI	Obese	Self-Assessed Health	Health Fair/Poor	Health Very Good
Specification 1	0.0120***	0.0012***	–0.0018	0.0009***	–0.0008**
	(0.0038)	(0.0003)	(0.0012)	(0.0003)	(0.0004)
Specification 2	0.0129***	0.0012***	–0.0018	0.0009***	–0.0008*
	(0.0037)	(0.0003)	(0.0012)	(0.0003)	(0.0004)
Specification 3	0.0280***	0.0024***	–0.0058***	0.0013***	–0.0024***
	(0.0039)	(0.0004)	(0.0011)	(0.0003)	(0.0004)

Source: Authors' estimation of equation (4) and (5) in the text using 25-59 year old males who did not serve in the military from the restricted NHIS sample. Each cell in the table comes from a separate regression. Estimates for BMI and health are from OLS models while estimates for obese, fair or poor, and very good or excellent health are from probit models and coefficients represent marginal effects. The dependent variable in all equations is the risk of being inducted into the army between the ages 18 1/2 and 26 based on equation (3) in the text. All estimates include state of residence, ag,e and year of interview fixed effects. Standard errors clustered at the birth cohort level are in parentheses: *** indicates significance at the 1% level, ** indicates significance at the 5% level, and * indicates significance at the 10% level.

Table A2: The Effect of Induction Risk on Health for All Men: OLS Clustered Results Age 18-26 Risk

Sensitivity Sample	BMI	Obese	Self-Assessed Health	Health Fair/Poor	Health Very Good
Panel A: Main Results, Non-Vietnam Veterans 1937-1955					
Specification 1	0.0031	0.0004**	–0.0012	0.0007***	–0.0005
	(0.0032)	(0.0002)	(0.0010)	(0.0002)	(0.0003)
Specification 2	0.0040	0.0005**	–0.0013	0.0007***	–0.0005*
	(0.0030)	(0.0002)	(0.0009)	(0.0002)	(0.0003)
Specification 3	0.0166***	0.0015***	–0.0048***	0.0010***	–0.0020***
	(0.0033)	(0.0003)	(0.0007)	(0.0002)	(0.0002)
Panel B: Naive Regressions of All Men, 1937-1955					
Specification 1	0.0030	0.0003	–0.0004	0.0003	–0.0000
	(0.0030)	(0.0003)	(0.0008)	(0.0002)	(0.0003)
Specification 2	0.0033	0.0003	–0.0005	0.0003*	–0.0001
	(0.0028)	(0.0002)	(0.0008)	(0.0002)	(0.0003)
Specification 3	0.0129***	0.0011***	–0.0035***	0.0006***	–0.0013***
	(0.0028)	(0.0003)	(0.0006)	(0.0001)	(0.0002)

Source: Authors' estimation of equations (4) and (5) in the text using 25-59 year old men who served in the military during the Vietnam Era in Panel A, and all men in Panel B from the 1982-1996 NHIS. Each cell in the table comes from a separate regression. Estimates for BMI and health are from OLS models while estimates for obese, fair or poor, and very good or excellent health are from probit models and coefficients represent marginal effects. The main independent variable in all equations is the risk of being inducted into the army between the ages 18 1/2 and 26 based on equation 3 in the text. All estimates include controls for race and ethnicity, time trend, and age and year of interview fixed effects. Specification 2 also includes controls for family size and marital status, while Specification 3 includes log family income and educational attainment controls as well. Naive regressions include a binary indicator for whether the individual served in the military during the Vietnam Era. Standard errors clustered at the birth cohort level are in parentheses: *** indicates significance at the 1% level, ** indicates significance at the 5% level, and * indicates significance at the 10% level.

Table A3: The Effect of Induction Risk on Health for Men Who Did Not Serve in Vietnam: Comparing Sensitivity Analyses to Main Results, OLS Clustered Results Age 18-26 Risk

	BMI	Obese	Self-Assessed Health	Health Fair/Poor	Health Very Good
Panel A: Main Results, 1937-1955					
Specification 2	0.0040	0.0005**	–0.0013	0.0007***	–0.0005*
	(0.0030)	(0.0002)	(0.0009)	(0.0002)	(0.0003)
Specification 3	0.0166***	0.0015***	–0.0048***	0.0010***	–0.0020***
	(0.0033)	(0.0003)	(0.0007)	(0.0002)	(0.0002)
Panel B: Non Veterans, 1937-1955					
Specification 2	0.0057	0.0006**	–0.0003	0.0004*	–0.0001
	(0.0033)	(0.0003)	(0.0010)	(0.0002)	(0.0003)
Specification 3	0.0169***	0.0015***	–0.0038***	0.0008***	–0.0016***
	(0.0036)	(0.0003)	(0.0008)	(0.0002)	(0.0002)
Panel C: No Proxy Responses, 1937-1955					
Specification 2	0.0004	0.0001	–0.0007	0.0007**	–0.0003
	(0.0047)	(0.0003)	(0.0012)	(0.0003)	(0.0005)
Specification 3	0.0130**	0.0010***	–0.0049***	0.0011***	–0.0021***
	(0.0056)	(0.0004)	(0.0008)	(0.0002)	(0.0004)
Panel D: All Years, 1930-1955					
Specification 2	0.0033	0.0005*	–0.0004	0.0003	–0.0001
	(0.0034)	(0.0003)	(0.0009)	(0.0002)	(0.0003)
Specification 3	0.0120***	0.0012***	–0.0032***	0.0005**	–0.0013***
	(0.0042)	(0.0003)	(0.0007)	(0.0002)	(0.0003)
Panel E: Korea Only, 1930-1936					
Specification 2	0.0092	0.0017	–0.0105***	0.0033***	–0.0053***
	(0.0170)	(0.0011)	(0.0027)	(0.0009)	(0.0008)
Specification 3	0.0063	0.0006	–0.0077**	0.0009	–0.0050***
	(0.0240)	(0.0017)	(0.0022)	(0.0007)	(0.0017)

Source: Authors' estimation of equations (4) and (5) in the text using 25-59 year old men who did not serve in the military during the Vietnam Era from the 1982-1996 NHIS. Each cell in the table comes from a separate regression. Estimates for BMI and health are from OLS models while estimates for obese, fair or poor, and very good or excellent health are from probit models and coefficients represent marginal effects. Birth cohorts included in the analysis are listed in Panel titles. The main independent variable in all equations is the risk of being inducted into the army between the ages 18 1/2 and 26 based on equation 3 in the text. All estimates include controls for race and ethnicity, time trend, family size, and marital status and age and year of interview fixed effects. Specification 3 includes log family income and educational attainment controls as well. Standard errors clustered at the birth cohort level are in parentheses: *** indicates significance at the 1% level, ** indicates significance at the 5% level, and * indicates significance at the 10% level.

Table A4: The Effect of Induction Risk on Health for Separately for Veteran Men: OLS Clustered Results from Specification 3, Age 18-26 Risk

Sensitivity Sample	BMI	Obese	Self-Assessed Health	Health Fair/Poor	Health Very Good
Vietnam Veterans, 1937-1955	0.0042	0.0001	0.0020	–0.0007***	0.0012***
	(0.0063)	(0.0005)	(0.0013)	(0.0002)	(0.0005)
All Veterans, 1937-1955	0.0085	0.0002	0.0006	–0.0002	0.0007
	(0.0053)	(0.0003)	(0.0010)	(0.0002)	(0.0004)
No Proxy Veterans, 1937-1955	0.0050	–0.0003	0.0005	–0.0004	0.0003
	(0.0082)	(0.0008)	(0.0019)	(0.0004)	(0.0006)
Veterans, 1930-1955	0.0043	–0.0000	–0.0019	0.0003	–0.0002
	(0.0035)	(0.0003)	(0.0011)	(0.0002)	(0.0004)
Korea Veterans, 1930-1936	0.0354**	0.0017*	–0.0051	0.0001	–0.0018
	(0.0140)	(0.0010)	(0.0033)	(0.0011)	(0.0013)

Source: Authors' estimation of equations (4) and (5) in the text using 25-59 year old men who served in the military during the Vietnam Era from the 1982-1996 NHIS. Each cell in the table comes from a separate regression. Estimates for BMI and health are from OLS models while estimates for obese, fair or poor, and very good or excellent health are from probit models and coefficients represent marginal effects. Birth cohorts included in the analysis are listed in each row. The main independent variable in all equations is the risk of being inducted into the army between the ages 18 1/2 and 26 based on equation 3 in the text. All estimates include controls for race and ethnicity, time trend, family size, marital status, log family income, and educational attainment, and age and year of interview fixed effects. Standard errors clustered at the birth cohort level are in parentheses: *** indicates significance at the 1% level, ** indicates significance at the 5% level, and * indicates significance at the 10% level.

Table A5: The Effect of Induction Risk*Killed in Action on Health Separately for Men by Vietnam Status: OLS Clustered Results, Age 18-26 Risk

	BMI	Obese	Self-Assessed Health	Health Fair/Poor	Health Very Good
Panel A: Main Results, 1937-1955					
Specification 1	1.2311	0.2120*	–0.3686	0.2984**	–0.2090
	(1.6439)	(0.1203)	(0.4875)	(0.1234)	(0.1596)
Specification 2	1.6331	0.2349**	–0.4366	0.3111**	–0.2358
	(1.5027)	(0.1153)	(0.5021)	(0.1273)	(0.1632)
Specification 3	7.2847***	0.6659***	–1.9904***	0.4541***	–0.8882***
	(1.9044)	(0.1499)	(0.4846)	(0.1027)	(0.1663)
Panel B: Male Vietnam Veterans, 1937-1955					
Specification 1	–1.0043	–0.3716	2.5952***	–0.7702***	1.0310***
	(3.7852)	(0.3065)	(0.8786)	(0.1465)	(0.3501)
Specification 2	–1.8238	–0.4161	2.3755**	–0.7246***	0.9446***
	(3.6828)	(0.3033)	(0.8661)	(0.1463)	(0.3513)
Specification 3	1.0281	–0.0485	0.5671	–0.3360**	0.2768
	(3.4728)	(0.2967)	(0.8442)	(0.1666)	(0.3523)
Panel C: Women					
Specification 1	1.0993	–0.0146	1.1024***	–0.3101***	0.4296***
	(2.0593)	(0.1096)	(0.2738)	(0.0887)	(0.1496)
Specification 2	1.5837	0.0045	1.0879***	–0.3218***	0.4148***
	(2.1049)	(0.1123)	(0.2738)	(0.0889)	(0.1465)
Specification 3	3.6979*	0.1135	–0.0286	–0.0929	–0.0900
	(2.1163)	(0.1079)	(0.2625)	(0.0760)	(0.1494)

Source: Authors' estimation of equations (4) and (5) in the text using 25-59 year old men and women from the 1982-1996 NHIS. Each cell in the table comes from a separate regression. Estimates for BMI and health are from OLS models while estimates for obese, fair or poor, and very good or excellent health are from probit models and coefficients represent marginal effects. The main independent variable in all equations is the risk of being inducted into the army between the ages 18 1/2 and 26 based on equation 3 in the text. All estimates include controls for race and ethnicity, time trend and age and year of interview fixed effects. Specification 2 adds family size, and marital status. Specification 3 includes log family income and educational attainment controls as well. Standard errors clustered at the birth cohort level are in parentheses: *** indicates significance at the 1% level, ** indicates significance at the 5% level, and * indicates significance at the 10% level.

Table A6: The Effect of Induction Risk on Health for Men who Did Not Serve in Vietnam: Assigning Induction Risk from Prior Year Cohorts (No Induction Risk post-1953), OLS Clustered Results Age 18-26 Risk

	BMI	Obese	Self-Assessed Health	Health Fair/Poor	Health Very Good
Panel A: Main Results, 1937-1955					
Specification 2	0.0040	0.0005**	–0.0013	0.0007***	–0.0005*
	(0.0030)	(0.0002)	(0.0009)	(0.0002)	(0.0003)
Specification 3	0.0166***	0.0015***	–0.0048***	0.0010***	–0.0020***
	(0.0033)	(0.0003)	(0.0007)	(0.0002)	(0.0002)
Panel B: Year t-1 Cohort Induction Risk, 1937-1955					
Specification 2	0.0001	0.0002	0.0001	0.0003	–0.0000
	(0.0034)	(0.0002)	(0.0008)	(0.0002)	(0.0003)
Specification 3	0.0122***	0.0011***	–0.0037***	0.0008***	–0.0016***
	(0.0037)	(0.0003)	(0.0008)	(0.0002)	(0.0003)
Panel C: Year t-2 Cohort Induction Risk, 1937-1955					
Specification 2	–0.0016	0.0002	0.0007	0.0001	0.0002
	(0.0035)	(0.0003)	(0.0006)	(0.0002)	(0.0003)
Specification 3	0.0093**	0.0010***	–0.0028***	0.0005***	–0.0013***
	(0.0039)	(0.0003)	(0.0008)	(0.0002)	(0.0003)
Panel D: Year t-3 Cohort Induction Risk, 1937-1955					
Specification 2	–0.0039	0.0000	0.0010*	–0.0001	0.0003
	(0.0035)	(0.0003)	(0.0006)	(0.0002)	(0.0002)
Specification 3	0.0054	0.0007**	–0.0019**	0.0002	–0.0009***
	(0.0039)	(0.0003)	(0.0007)	(0.0002)	(0.0003)

Source: Authors' estimation of equations (4) and (5) in the text using 25-59 year old men who did not serve in the military during the Vietnam Era from the 1982-1996 NHIS. Each cell in the table comes from a separate regression. Estimates for BMI and health are from OLS models while estimates for obese, fair or poor, and very good or excellent health are from probit models and coefficients represent marginal effects. Birth cohorts included in the analysis are listed in Panel titles. The main independent variable in all equations is the risk of being inducted into the army between the ages 18 1/2 and 26 based on equation 3 in the text. All estimates include controls for race and ethnicity, time trend, family size, and marital status and age and year of interview fixed effects. Specification 3 includes log family income and educational attainment controls as well. Standard errors clustered at the birth cohort level are in parentheses: *** indicates significance at the 1% level, ** indicates significance at the 5% level, and * indicates significance at the 10% level.