Age at First Marriage and Physical Health in Later Life

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ABSTRACT

Objectives. We work from a life course perspective to consider age at first marriage as a key factor defining the timing of life course transitions, which modifies men's and women's life context and affects their health in later life.

Method. Data are drawn from a nationally representative longitudinal dataset from the National Social Life, Health and Aging Project (N=2129). We examine four health outcomes including self-rated physical health, CVD events, diabetes, and cancer.

Results. We find that the optimum age at first marriage that is related to best health outcomes in later life is around 30 for men; men who entered their first marriage either at earlier or later ages have significantly higher odds of reporting poorer health and experiencing chronic conditions such as cardiovascular disease and cancer. Socioeconomic status and family transitions account little for the association. Interestingly, age at first marriage is not related to any of the later health outcomes for women.

Discussion. Results highlight important gender differences in the association between age at first marriage and physical health in later life. We discuss the findings in the context of continued trends of delaying marriage in the U.S.

Americans are getting married later today than ever before. The average age of first marriage in the U.S. was 27.4 for women and 29.5 for men in 2016, up from 20.3 for women and 22.8 for men in 1960 (Wang and Parker 2014; U.S. Census Bureau, Decennial Censuses, 1890 to 1940). Although the delayed age at first marriage is a well-documented trend in the U.S., health consequences of different ages at first marriage are less clear. In this study, we work from a life course perspective to consider how age at first marriage (i.e., the age at which people enter their first marriage) modifies individuals' development of life context and in turn affects health and well-being in later life. We analyze a nationally representative longitudinal dataset from the first two waves of the National Social Life, Health and Aging Project (NSHAP) to address three major research questions: 1) How is age at first marriage linked to physical health in later life? 2) Is this relationship explained by socioeconomic status and other related family status and transitions? and 3) Does this relationship vary by gender?

The importance of this study is highlighted by the continued increasing trend in age at first marriage in the U.S. as well as the current debates about the consequences of delayed marriage. On the one hand, a delayed marriage is generally considered to bring a number of advantages particularly for college-educated women in terms of socioeconomic achievement and later marital stability (Goldstein and Kenney 2001; Isen and Stevenson 2010). On the other hand, there are also potential costs related to delaying marriage (e.g., difficulties in mate sorting on marriage market, challenge of childbearing for women) (Lehrer & Chen 2013; Hymowitz et al. 2013). Results from this study shed light on the implications of current trends of delaying marriage on population health and speak to family policy and practice as well as to our general understanding of health and well-being in later life.

PREVIOUS EMPIRICAL EVIDENCE: AGE AT FIRST MARRIAGE AND HEALTH

Previous studies on age at first marriage mostly focus on the effects of early age marriages on socioeconomic achievement, family stability and mental health outcomes during young adulthood with less attention to the long-term effects on physical health at older ages (e.g., Carlson 2012; Uecker 2012). For example, a recent study using data from the National Longitudinal Study of Adolescent to Adult Health found that entering first marriage as a teenager is significantly associated with greater depression in young adulthood, and entering first marriage before age 22 is also linked to lower levels of life satisfaction (Uecker 2012). Another study based on data from the National Longitudinal Survey of Youth 1979 found that those who entered first marriage either earlier or later than they desired reported more depressive symptoms by the age of 40 than those who married at their desired ages (Carlson 2012). Indeed, some evidence shows that those with psychiatric or personality disorders are more likely to experience early teen marriages than others—suggesting a potential selection process (Forthofer et al. 1996; Whisman, Tolejko, and Chatav 2007).

A small but growing number of recent studies that examine different trajectories of marital transitions provide evidence for the association between the timing of first marriage and physical health in later life, but the evidence is mixed especially in terms of gender differences. For example, an analysis of data from the Health and Retirement Study found that compared to women who entered their first marriage between the ages of 19-25, women who had an earlier first marriage (i.e., before age 18) were at a greater risk of chronic disease onset in later life, but men's risk of disease onset was not related to age at first marriage (Dupre and Meadows 2007). In contrast, another study based on the same dataset found a significantly negative association between age at first marriage and number of chronic health conditions and mobility limitations, but only for older men and not for older women (Hughes and Waite 2009). Similarly, another

recent study that analyzed data from the National Social Life, Health and Aging Project (NSHAP) found that an earlier age at first marriage was significantly associated with a heightened risk of chronic inflammation for older men but not for older women (McFarland, Hayward, and Brown 2013). Still, another study on morality risk revealed no gender differences in this relationship and suggested that early age first marriages (i.e., before age 18) were related to a higher mortality risk at older ages for both men and women although the results for women but not men are mainly explained by SES (Dupre, Beck, and Meadows 2009).

Empirical evidence on late marriage in relation to later life health and well-being is much more limited relative to that of early marriage (Glenn et al. 2010). One study using data from the Health and Retirement Study from 1992-2006 found that late marriages were associated with a lower mortality risk especially for older men, but found no significant associations for older women (Dupre, Beck, and Meadows 2009). There is also evidence showing that late marriage may result in some positive outcomes such as greater likelihood of marital success and higher socioeconomic achievement (Hymowitz et al. 2013), especially for higher educated women—which are likely to lead to better health in later life. Yet, other studies find no evidence of late first marriage being related to such life outcomes (Glenn, Uecker, and Love 2010; Goldstein and Kenney 2001; Isen and Stevenson 2010) or chronic disease onsets in later life (Dupre and Meadows 2007).

A LIFE COURSE PERSPECTIVE ON AGE AT FIRST MARRIAGE AND HEALTH IN LATER LIFE

Increasingly, scholars build on a life course perspective to view the status and transitions of social and family relationships as one ages (Elder and O'Rand 1995). Life course is viewed as a sequence of social pathways and transitions of roles and experiences that influence the course

of human development and aging. The marital role is one of the most important roles during adulthood. The life course perspective elaborates on the importance of timing and duration of role transitions (Elder, Johnson, and Crosnoe 2003), and suggests that age at first marriage, as the most important factor that defines the timing of marital role transitions, is critical for shaping individuals' life context and thus affecting health over time (Liu 2012). Transition into marriage at very early or very late ages may intervene with other role transitions and experiences in two primary life domains: education and family, both of which are salient to health trajectories in later life.

Education and socioeconomic achievement. The life course theory recognizes the potential role conflict during the role transition processes throughout the life course. Entering into marriage at a young age may lead to conflict between the enacted marital and school roles. For example, conflict happens when a teenage wife struggles to complete both her school and household obligations. Such conflict, especially in the case of high frequency, may discourage her to pursue higher education and lead her to drop out of school in order to fulfill her marital and other roles (Dupre and Meadows 2007). In contrast, delayed marriage may promote socioeconomic achievement, especially for women, by reducing exposure to such conflict if they complete their desired levels of education and obtained job training before getting married (Goldstein and Kenney 2001; Hymowitz, Carroll, Wilcox, and Kaye 2013). A number of empirical studies have confirmed this view and suggested that early age at first marriage, often measured as getting married in one's late teens or early twenties, is linked to higher chance of school dropouts and thus lower socioeconomic achievement, while later age of first marriage is associated with higher education and earnings especially for women (Teti and Lamb 1989; Hymowitz, Carroll, Wilcox, and Kaye 2013). Yet, there is also evidence showing that the

association between men's earnings and age-at-first-marriage changes to negative for those who married after age 30 although the association is positive for men who married before age 30 (Bergstrom and Schoeni (1996).

The association between socioeconomic status (SES) and health is one of the most robust relationships in social sciences, with substantial evidence indicating that there is a causal influence (Mirowsky & Ross, 2003). Socioeconomic achievement is a central dimension of human capital. The human capital perspective posits that a higher level of SES is associated with better health because it increases a sense of personal control over one's life and learned effectiveness in access to health care and health information (Link & Phelan, 1995; Mirowsky & Ross, 2003; Ross & Wu, 1995). Compared to individuals with lower SES, those with higher SES are more likely to exercise, abstain from tobacco use, maintain a healthy body weight, and make good use of health care service that may improve overall health and longevity (Link & Phelan, 1995; Mirowsky & Ross, 2003).

Family roles and transitions. Age at first marriage also intervenes with other family roles and experiences which may in turn affect health. For example, family scholars have identified age at first marriage as one of the key factors to predict marital success and dissolution. According to the *maturation theory*, "marriages are more likely to succeed if the spouses have reached a high level of psychological maturity at the time of marriage, if they have had time to develop good relationship skills, and if their standards for a spouse and what they have to offer on the marriage market have stabilized" (Glenn et. al. 2010, p.788). A number of studies based on U.S. datasets have confirmed this view and found that entering marriage at earlier ages, especially in the teenage years or early 20s, is related to higher risk of experiencing marital dissolutions (Glenn, Uecker, and Love 2010; Hymowitz et al. 2013; Lehrer and Chen 2013).

However, evidence on the relationship of age at marriage and marital dissolution beyond late twenties is less clear, with some studies showing a leveling off of divorce rate at later age of first marriage and others showing a slight increase at older ages of marriage—suggesting a nonlinear relationship between age at first marriage and marital dissolution (Glenn, Uecker, and Love 2010; Lampard 2013). Marital dissolution has long been identified as one of the most stressful life events during adulthood that creates many strains (e.g., economic stress, loss of a confidant) and in turn damages physical health (Liu 2012).

Historically, marriage and parenthood are closely linked to each other although this association tends to decrease in recent decades due to an increase in out-of-wedlock births (Smock and Greenland 2010). Earlier age at first marriage is often related to earlier age at first birth (Hayford, Guzzo, and Smock 2014). Mirowsky's work suggests that the age at first birth associated with the lowest predicted depression and health problems for women is around 30, and first birth at either earlier or later age is related to higher health risks for women; but for men, he found a generally positive and linear association between age at first birth and later health (Mirowksy 2002; Mirowsky and Ross 2002; Mirowsky 2005). In addition, getting married at younger ages is also related to a greater number of total births because of either having the first marital birth soon after getting married (Marini 1981) or a short interval for subsequent births (Marini and Hodsdon 1981) or a combination of both. A greater number of children is linked to poor parental health partly due to increased economic burden that comes with having multiple children, and this is especially true for women (Spence 2008).

Taken together, we develop two major research hypotheses:

Hypothesis 1: Both very early and very late ages at first marriage are associated with poorer physical health outcomes in later life.

Hypothesis 2: The relationship between age at first marriage and later life health is partially explained by socioeconomic status and other family status and transitions (such as marital dissolutions, parental status and transitions).

Given the long-standing observation on gender differences in marriage and health, we further examine potential gender differences in these relationships. Because of the mixed empirical and theoretical evidence, we have no clear prediction on the specific direction of the gender difference. For example, on the one hand, age at first marriage may be more important for women's health than for men's because it is a stronger predictor for women's socioeconomic achievement that may affect their health. On the other hand, a number of studies on marriage and health have demonstrated that marital status and transitions is more important for men's health than for women's (Bernard 1972; Williams and Umberson 2004). Therefore, we examine gender differences in a more exploratory—versus hypothesis-driven—way.

DATA

We use the first two waves of data from the National Social Life, Health and Aging Project (NSHAP), a national longitudinal dataset. The longitudinal design of the data lies at the foundation of a life course perspective. The NSHAP is one the first national-scale population-based studies of health and intimate relationships. It was conducted by the National Opinion Research Center (NORC) at the University of Chicago. A nationally representative probability sample of community-dwelling individuals aged 57–85 years was selected from households across the U.S. and screened in 2004. African Americans, Latinos, men, and those 75–84 years old at the time of screening were over-sampled. All analyses are weighted. We use the survey data analysis commands in Stata (StataCorp 2012) to account for clustering and stratification of the complex sampling design.

The first wave of the NSHAP (Wave 1) included a sample of 3,005 adults ages 57–85 who were interviewed during 2005-2006 (Waite, Laumann, et al. 2014). Both in-home interviews and lab tests and assays were conducted. Wave 2 consisted of 2,261 Wave 1 respondents who were re-interviewed during 2010–2011 (Waite, Cagney, et al. 2014). Given our interest in the age at first marriage, we restrict our sample to 2,129 respondents (1,019 men and 1,110 women) who are either currently or previously married. A smaller number of respondents (n=15) reported to marry before age 14 are exclude from this sample due to its rare occurrence. Results from additional analysis (not shown) including these cases revealed no difference in the findings. In the final models, we further exclude missing values on the specific dependent variables analyzed. Thus, the final analyzed sample size varies slightly across dependent variables.

MEASURES

Age at first marriage is calculated by subtracting the year of birth from the year of the first marriage. We include both the linear and quadratic forms of age at first marriage in order to understand potential nonlinear patterns.

Physical health outcomes. We examine a number of physical health outcomes ranging from a general measure of 1) self-rated physical health to specific measures on chronic conditions such as 2) cardiovascular diseases (CVD), 3) diabetes, and 4) cancer. We focus on these three chronic conditions because they are among the top ten leading causes of death in the U.S. and they are directly affected by social behavioral factors (Liu, Waite, and Shen 2016; Yang, Li, and Frenk 2014; Zhang and Hayward 2006). *Self-rated physical health* is based on the question asking "Would you say your health is excellent, very good, good, fair, or poor?" We recode this variable into five-categories with higher values indicating better health. During the

home interviews, all NSHAP respondents were asked whether they had ever been told by a medical doctor that they had had a heart attack, heart failure, or stroke. Respondents who reported any of these *CVD events* are coded as 1, and others are coded as 0. Respondents were also asked whether they had ever been told by a medical doctor that they had *diabetes* (or high blood sugar) and *cancer* (1=yes, 0=no).

Socioeconomic status. We include two measures of SES: education and family income. *Education* is coded as a binary variable (1=some college or higher degree, 0=others). *Family income* is derived from the question that asked respondents to self-assess their family income levels compared with other American families. Responses range from below average (reference), average, to above average. We create a "missing" indicator category for about 17% of the analytic sample without valid values on family income.

Family status and transition. We consider a number of indicators for family status and transition including current marital status (1=unmarried, 0=married), ever had divorce (1=yes, 0=no), number of children (0 [reference], 1-3, 4 or more, and missing), and age at first birth (before 20 [reference], 20-24, 25-29, later than 30, and missing reports).

Control Covariates. We stratify all analyses by *gender*. *Age* is categorized into three groups: 57–64 (young-old, reference), 65–74 (middle-old), and 75–85 (old-old). *Race-ethnicity* includes non-Hispanic white (reference), non-Hispanic black, Hispanic, and other. We also control a number of health behavior covariates including *currently smoke* (1=yes, 0=no), *currently drink alcohol* (1=yes, 0=no), *physical exercise* (1=exercise more than three times per week, 0=others), and *body mass index* (BMI). BMI is measured as categorical variables with five categories: normal or underweight (BMI < 25, reference), overweight ($25 \leq$ BMI < 30), obese (30

≥ BMI < 40), morbidly obese (BMI ≥ 40), and missing reports (WHO Expert Committee, 1995). All control covariates are measured at Wave 1.

ANALYTIC APPROACH

The specific models we estimate vary depending on the measures of the health outcomes. We estimate ordinal logistic regression models to predict self-rated physical health and we estimate binary logistic regression models to predict all other binary outcomes including diabetes, CVD, and cancer. We apply lagged dependent variable approach to examine changes in health outcomes between two waves. For example, we use age at first marriage at Wave 1 to predict self-rated health at Wave 2, net of the effects of Wave 1 self-rated health and all other covariates. In addition, because the longstanding literature on marriage and health emphasizes the fundamental differences between men and women, we stratify all analyses by gender. Results from t-tests (not shown) suggested that all key gender differences are statistically significant at the level of $p<0.001$.

For each health outcome, we estimate four models. In the baseline model, we examine the relationship between age at first marriage and health outcomes controlling for basic demographic and health behavior-related covariates. The second model adds SES covariates in addition to the controls in the baseline model to understand whether SES explains the relationship between age at first marriage and later health. The third model includes family status and transition variables in addition to the controls in the baseline model to understand whether family status and transitions account for the association. In the final full model, we add all covariates including socioeconomic status, family status and transition as well as all other control covariates. Because results showed no substantive differences in the patterns observed in the

second and third model in comparison to the final full model, we only report results from the full model along with the baseline model.

RESULTS

Table 1 shows the weighted descriptive statistics of all analyzed variables for men and women. From Table 1 we can see that, on average, men have higher prevalence of reporting diagnosed diabetes (23.97% v.s. 18.97), CVD (22.02% v.s. 14.40%), and cancer (29.23% v.s. 20.97%) at Wave 2 compared to women. Older men are also more likely than older women to report poor health (6.59% v.s. 4.41%) at Wave 2. It is also clear that the Wave 2 health outcomes of both men and women are worse than those of Wave 1. The average age at first marriage is older for men than for women (23. 72 v.s. 21.09).

[Table 1 about here]

Tables 2 and 3 show the estimated odds ratios of age at first marriage for predicting health outcomes for men and women separately. The significant effect of the quadratic term of age at first marriage in the baseline model of Table 2 suggests that there is a significant nonlinear relationship between age at first marriage and each examined health outcome for men with the only exception for diabetes. For diabetes, we did not see significant association between age at first marriage and diabetes in Table 2. To better illustrate the significant non-linear relationships between age at first marriage and other health outcomes, we graphically present the results for men from the baseline models of Table 2 in Figures 1-3.

[Table 2 about here]

Figure 1 illustrates the results of self-rated health for men. We see that for men, self-rated health increases with age at first marriage until age 29; and then after age 29 self-rated health tends to decease with age at first marriage. In terms of CVD (illustrated in Figure 2) and cancer

(illustrated in Figure 3), the patterns are consistent: the odds of reporting CVD events (Figure 2) and cancer (Figure 2) steadily decrease until men's age at first marriage reaches 30 and then start to increase after age 30. Strikingly, the odds of CVD and cancer dramatically increase when men's age at first marriage is later than their 40s. Therefore, we see that an optimum age at first marriage that is related to best self-reported health and lowest risk of CVD and cancer in later life is around age 30 for men; entering into first marriage at either earlier or later ages is related to poorer health in later life for men.

[Figures 1-3 about here]

Results in the final full model of Table 2 suggest that the significant nonlinear relationship of age at first marriage with self-rated health and cancer remains unchanged after controlling for SES and family status and transition covariates. Yet, the nonlinear effect of age at first marriage on CVD becomes marginally significant after we add SES and family status and transition variables; and our additional analysis (results not shown) indicates that this is mainly driven by the addition of family status and transition variables instead of SES.

In terms of other covariates in the full model of Table 2, we see that men who reported above average household income tend to report better health (OR=0. 1.957, $p<0.01$) and have lower odds of reporting CVD events (OR=0.548, $p<0.05$) compared to men who reported their household income below average American families. Men who had their first child after age 30 have lower odds (OR=0.439, $p<0.1$) of reporting CVD events in later life than men who had their first child before age 20. Interestingly, for women, as shown in Table 3, age at first marriage is not related to any of the later health outcomes in either the baseline or final models. Additional analysis (results not shown) excluding the squared term of age at first marriage also revealed no significant linear relationship between age at first marriage and any health outcome for women.

[Table 3 about here]

DISCUSSION AND CONCLUSION

This study adds to a small but growing literature on the link between the timing of first marriage formation and physical health in later life (Dupre & Meadows, 2007; Hughes & Waite, 2009; O'Flaherty, Baxter, Haynes, & Turrell, 2016). Working from a life course perspective and building on previous studies, we hypothesized that both early and late marriages compared to "on-time" marriages (i.e., average age of first marriage) are associated with poorer self-reported health and higher risks of major chronic diseases and that the strength of the association may vary by gender. As one of the first nationally representative and longitudinal studies to examine the gendered linkages between age at first marriage and a variety of later life physical health outcomes, our findings contribute significantly to the ongoing debate on the gendered effects of marital biography on late-life health. Some studies suggest stronger effects of marital biography on men's health (Dupre, Beck, and Meadows 2009; Hughes & Waite, 2009; McFarland, Hayward, & Brown 2013), some report stronger effects on women's health (Dupre & Meadows 2007), and still other studies find no significant gender differences.

Our results provide mixed evidence for our hypotheses. First, consistent with our hypothesis (Hypothesis 1), we find that there is a non-linear relationship between age at first marriage and several later life health outcomes (e.g., self-reported health, CVD, cancer) among men, net of the effects of age, race/ethnicity, health behaviors, and respective health outcomes at Wave 1. Specifically, both early and late marriages are associated with worse physical health for men compared to relatively "on-time" marriages. This finding is consistent with several other recent studies indicating that early age at first marriage is more detrimental to men's physical health and survival than women's in both the U.S. (Dupre et al., 2009; Hughes and Waite 2009;

McFarland et al. 2013) and other countries (e.g., O'Flaherty et al. 2016). However, as far as we know, our study is one of the first to find negative physical health outcomes related to relatively late age at first marriage (after age 30) for men. Our results suggest that the odds of reporting poor health for men who got first married after age 40 are similar or even higher than the odds of men who got first married as a teenager (Figure1). Results for CVD and cancer also suggest escalating health risk for men who got first married after age 40.

Second, inconsistent with our hypothesis (Hypothesis 2), most of the associations between age at first marriage (except for CVD) remain robust after we control for an extensive array of socioeconomic and other family life course covariates, which have been hypothesized as potential pathways linking age at first marriage and later physical health. One possibility is that the social selection process may play a key role in accounting for the observed relationship. For example, previous research has suggested that higher SES is associated with both on-time marriage and better health in later life (Hughes &Waite, 2009; Xie et al. 2003). It is possible that selection of people with higher SES into on-time marriage may explain some of our findings. Unfortunately, we did not have information of the respondents' socioeconomic status at the time of first marriage, thus cannot test this selection hypothesis in this study. Another potential explanation is that similar as teenage marriages which are often related to poor marital quality, waiting very long to get married for men also may carry health risks given that previous research suggests that entering marriage at older ages may make for stable but poor-quality marriages (Glenn et al., 2010) due to fewer suitable partners (e.g., similarity in age, religion, education) in the marriage market (Lehrer et al., 2013). Mounting research suggests that poor marital quality can lead to poor physical health (Hawkins & Booth, 2005; Kiecolt-Glaser et al., 2005; Robles et al., 2014; Liu & Waite 2014). Men who enter their first marriage at older ages also tend to have

shorter marriage duration compared to men who married earlier but also reached old age; and longer marriage duration has been found to be associated with lower risk of disease onset in later life (Dupre & Meadows, 2007).

For women, we did not find any significant association between age at first marriage and physical health outcomes. Although this finding is surprising and in contrast with a few studies showing negative effects of early marriage for women's physical health and survival (Dupre & Meadows 2007; Dupre et al., 2009), it is consistent with a recent study on marital biography and biological risk using the NSHAP data which did not find significant association between age at first marriage and cardiovascular, metabolic, and inflammation risk among women (McFarland et al., 2013). We speculate that for older women of this cohort, due to limited opportunities for pursuing higher education and careers along with social norms of marriage in early twenties (only 14% got married at age 25 older and 4% at age 30 or older in our sample), marital timing may not have as significant an effect on schooling and labor force participation as it has on women in more recent cohorts. Moreover, unlike younger cohorts of more educated women who tended to delay marriage, the older cohorts of women with more education were much less likely to marry at all (Goldstein & Kenney, 2001). We think that the lack of association between age at first marriage and late-life physical health for women may be unique to this cohort of women who are born in the 1940s or earlier.

Our study has several limitations. First, although we build our research hypotheses primarily based on a causal framework, we were not able to directly test the alternative selection hypothesis due to data limitations. For example, we do not have information about young-adulthood SES or health before first marriage. More research is needed to untangle the social selection and causation process in the association between marital timing and physical health,

with particular attention to potential gender differences. Second, our study did not provide any direct evidence about the specific mechanism that may underlie the association between marital timing and late-life health among men. Our measures of potential mechanisms of socioeconomic status and family transitions are limited, and it is likely that we did not capture the key life course pathways that forge the linkage between age at first marriage and physical health in later life. Future studies should look at other potential mediators such as chronic stress, employment history, and spouses' characteristics that may explain the important finding in our study. Third, our study relied on two waves of data and longer follow-ups are needed to show the relationship between marital timing and health trajectories in later life. The NSHAP is currently collecting the third wave of data, which will provide opportunities to further entangle this linkage. Fourth, due to small sample size of African Americans, Latino and Asian Americans, we were not able to investigate whether the association between marital timing and late-life health vary by racial-ethnic groups. As there are significant differences in the timing of first marriage and childbearing in different racial-ethnic groups, future research using large samples of minority groups can enrich our understanding of the significance/nonsignificance of marital timing in late-life in these groups.

Despite these limitations, our findings make a significant contribution to a growing literature on marital timing and health in later life. Using nationally representative and longitudinal data in the U.S., we find that late as well as early first marriages are significantly associated with poorer self-reported health and higher risk of CVD and cancer among older men; and marital timing is not associated with any examined health indicator among older women. Given the continued trend in delaying marriage in the U.S., these findings, for the first time, raise concerns for this persistent population trend. Yet, we also note that the cohorts we studied on

average married earlier than more recent cohorts, and late age at first marriage was relatively rare in these older cohorts. Therefore, late first marriage for the older cohorts may carry different social and economic significance than for more recent birth cohorts, and our findings may not be generalized to younger cohorts. We call for more research to unpack the mechanisms by which the association between marital timing and later-life health, especially among older men, is produced and to further unfold the patterns among more recent cohorts.

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Table 1. Weighted Descriptive Statistics

	All (*N* = 2,129)	Men (*N* = 1,019)	Women (*N* = 1,110)	
	Percent / Mean (SD)			
Age at first marriage W1	22.35 (0.16)	23.72 (0.22)	21.09 (0.16)	*
Self-rated health W2				
Poor	5.46	6.59	4.41	*
Fair	19.74	18.74	20.67	
Good	31.28	30.39	32.10	
Very good	31.02	32.29	29.87	
Excellent	12.50	12.00	12.95	
Diabetes W2 (yes=1)	21.36	23.97	18.97	*
CVD W2 (yes=1)	18.05	22.02	14.40	*
Cancer W2 (yes=1)	24.92	29.23	20.97	*
Covariates at W1				
Female (=1)	52.05			
Age groups				
57-64 (Ref.)	44.29	49.24	39.73	*
65-74	34.26	32.17	36.19	
75-85	21.45	18.58	24.08	*
Race/ethnicity				
Non-Hispanic white (Ref.)	81.13	81.09	81.17	
Non-Hispanic black	9.62	9.04	10.15	*
Hispanic	6.84	7.19	6.52	
Other races	2.41	2.69	2.15	
Smoking (yes=1)	14.68	16.51	12.98	*
Drinking (yes=1)	59.65	68.16	51.81	*
Physical activity (≥3 times per week=1)	66.21	70.63	62.14	*
BMI				
Underweight or normal (Ref.)	22.52	19.43	25.37	*
Overweight	35.39	37.97	33.02	*
Obesity	32.03	34.07	30.15	
Morbidly obese	4.70	3.43	5.86	*
Missing	5.36	5.09	5.60	
Some college or higher (yes=1)	57.92	61.87	54.29	*
Relative household income				
Below average (Ref.)	25.07	20.66	29.13	*
Average	33.71	31.83	35.44	
Above average	24.56	30.09	19.47	*
Missing	16.66	17.41	15.96	
Currently unmarried (yes=1)	31.77	17.77	44.67	*
Ever experienced divorce (yes=1)	36.43	37.39	35.55	
Number of children				
No child (Ref.)	5.39	5.20	5.56	
1-3	54.04	53.13	54.89	
4 or more	23.49	22.43	24.46	
Missing	17.08	19.24	15.07	*
Age at first birth				
Before 20 (Ref.)	16.33	6.77	25.13	*
20-24	33.16	30.24	35.85	*
25-29	18.90	24.38	13.84	*
30 or more	7.72	11.30	4.42	*
Missing	23.90	27.30	20.76	*

Self-rated health				
Poor	4.60	4.38	4.79	
Fair	16.69	17.50	15.94	
Good	28.81	26.62	30.82	*
Very good	35.49	37.02	34.09	
Excellent	14.42	14.58	14.36	
Diabetes (yes=1)	17.55	18.30	16.87	
CVD (yes=1)	17.05	21.18	13.25	*
Cancer (yes=1)	24.02	25.18	22.96	

Note. BMI = body mass index; W1 = Wave 1; W2 = Wave 2

* $p < 0.05$ comparing results between men and women.

Table 2. Estimated Odds Ratios of Physical Health Outcomes by Age at First Marriage, Men (*N* = 1,019)

	Self-rated Health[a]	Diabetes[b]	CVD[b]	Cancer[b]
Baseline model				
Age at first marriage	1.189***	0.925	0.835*	0.835*
	(0.046)	(0.082)	(0.065)	(0.074)
Age at first marriage, squared	0.997***	1.001	1.003*	1.003*
	(0.001)	(0.001)	(0.001)	(0.001)
Full model				
Age at first marriage	1.140*	0.903	0.898	0.822*
	(0.061)	(0.090)	(0.063)	(0.079)
Age at first marriage, squared	0.998**	1.001	1.002+	1.003*
	(0.001)	(0.001)	(0.001)	(0.001)
Some college or higher (yes=1)	1.229	0.913	1.155	0.991
	(0.229)	(0.230)	(0.265)	(0.188)
Relative household income				
Average (*Ref: below average*)	1.344	1.737	0.734	1.296
	(0.325)	(0.789)	(0.209)	(0.389)
Above average	1.957**	0.973	0.548*	1.452
	(0.387)	(0.419)	(0.142)	(0.326)
Missing	1.115	1.790	0.525+	0.884
	(0.274)	(0.817)	(0.183)	(0.257)
Currently unmarried (yes=1)	1.216	1.364	0.669	1.271
	(0.218)	(0.580)	(0.187)	(0.335)
Ever experienced divorce (yes=1)	0.964	0.754	0.977	0.977
	(0.168)	(0.202)	(0.150)	(0.167)
Number of children (Ref: No child)				
1-3	1.051	0.318	0.644	0.858
	(0.383)	(0.219)	(0.327)	(0.424)
4 or more	1.327	0.374	0.697	1.067
	(0.491)	(0.223)	(0.320)	(0.659)
Missing	0.976	0.280+	0.992	1.079
	(0.256)	(0.181)	(0.493)	(0.347)
Age at first birth (Ref: less than 20)				
20-24	1.020	1.741	0.732	1.232
	(0.338)	(0.856)	(0.250)	(0.546)
25-29	1.178	1.248	0.584	0.913
	(0.455)	(0.793)	(0.244)	(0.409)
30 or more	1.118	2.010	0.439+	1.492
	(0.463)	(1.106)	(0.203)	(0.803)
Missing	1.125	1.461	0.387*	1.767
	(0.354)	(1.169)	(0.180)	(0.931)
N	1,012	1,009	1,005	1,012

Note. All models control for age, race/ethnicity, health behaviors (i.e., smoking, drinking, physical activity, and BMI), and respective health outcomes at Wave 1.
[a] Results are based on ordinal logistic regression models.
[b] Results are based on binary logistic regression models.
*$p < .05$, **$p < .01$, ***$p < .001$, $^{+}p < .1$.

Table 3. Estimated Odds Ratios of Physical Health Outcomes by Age at First Marriage, Women (N = 1,110)

	Self-rated Health[a]	Diabetes[b]	CVD[b]	Cancer[b]
Baseline model				
Age at first marriage	0.999	1.077	1.006	1.073
	(0.060)	(0.118)	(0.092)	(0.079)
Age at first marriage, squared	1.000	0.998	1.000	0.998
	(0.001)	(0.002)	(0.001)	(0.001)
Full model				
Age at first marriage	1.010	1.201	1.140	1.143+
	(0.065)	(0.142)	(0.103)	(0.089)
Age at first marriage, squared	1.000	0.997+	0.998	0.997+
	(0.001)	(0.002)	(0.002)	(0.001)
Some college or higher (yes=1)	1.378*	1.496	0.555*	1.168
	(0.220)	(0.460)	(0.147)	(0.303)
Relative household income				
Average (*Ref: below average*)	1.133	0.724	0.538+	1.034
	(0.204)	(0.217)	(0.167)	(0.218)
Above average	1.281	0.752	0.582	0.837
	(0.361)	(0.306)	(0.213)	(0.257)
Missing	0.690	0.670	1.124	1.112
	(0.153)	(0.254)	(0.401)	(0.385)
Currently unmarried (yes=1)	1.170	1.260	0.778	0.759
	(0.186)	(0.323)	(0.198)	(0.192)
Ever experienced divorce (yes=1)	1.170	1.012	1.173	1.202
	(0.222)	(0.261)	(0.286)	(0.265)
Number of children (Ref: No child)				
1-3	0.470*	0.339	3.441	0.374+
	(0.155)	(0.225)	(2.842)	(0.210)
4 or more	0.397*	0.479	2.397	0.299+
	(0.150)	(0.321)	(2.083)	(0.193)
Missing	0.872	1.988	5.068**	0.417+
	(0.230)	(1.090)	(2.751)	(0.205)
Age at first birth (Ref: less than 20)				
20-24	0.691*	0.657	0.642	1.070
	(0.118)	(0.242)	(0.210)	(0.305)
25-29	0.877	0.339+	0.753	0.535
	(0.221)	(0.217)	(0.394)	(0.232)
30 or more	0.642	0.472	0.373	1.060
	(0.258)	(0.514)	(0.308)	(0.503)
Missing	0.431+	0.168*	0.893	0.519
	(0.184)	(0.137)	(0.778)	(0.356)
N	1,100	1,104	1,089	1,105

Note. All models control for age, race/ethnicity, health behaviors (i.e., smoking, drinking, physical activity, and BMI), and respective health outcomes at Wave 1.
[a] Results are based on ordinal logistic regression models.
[b] Results are based on binary logistic regression models.
*$p < .05$, **$p < .01$, ***$p < .001$, $^{+}p < .1$.

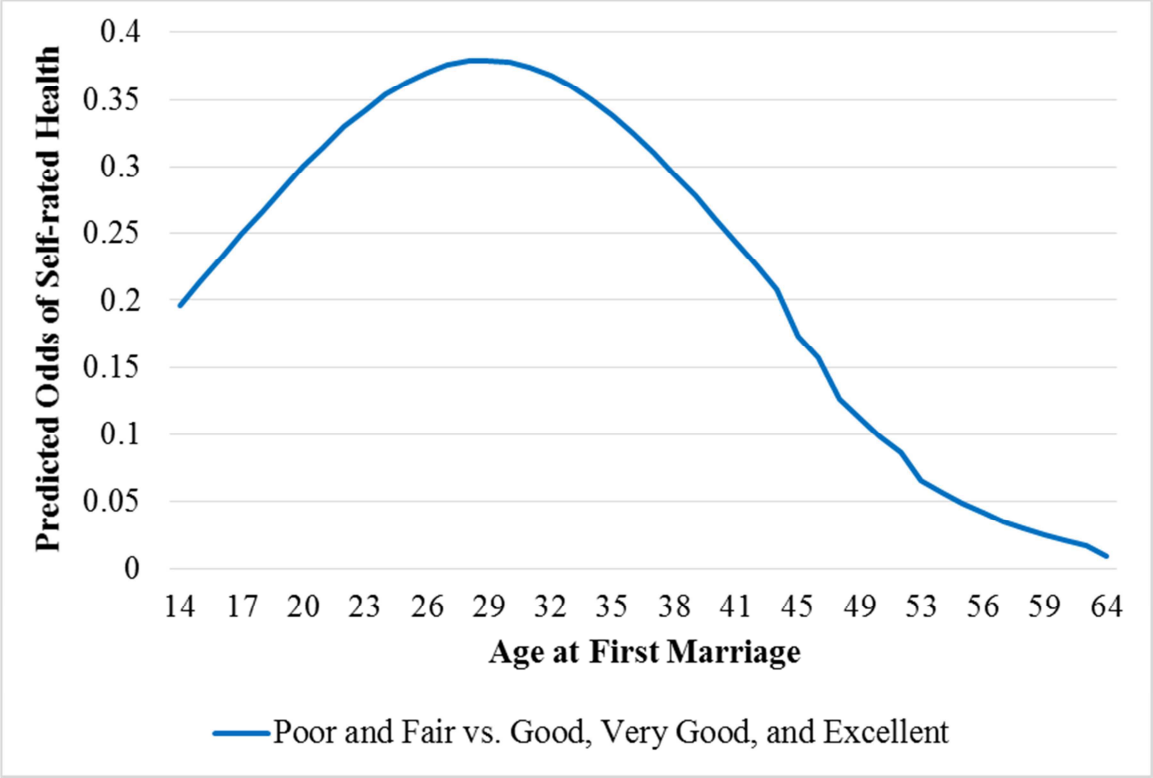

Figure 1. Self-rated health and age at first marriage for men

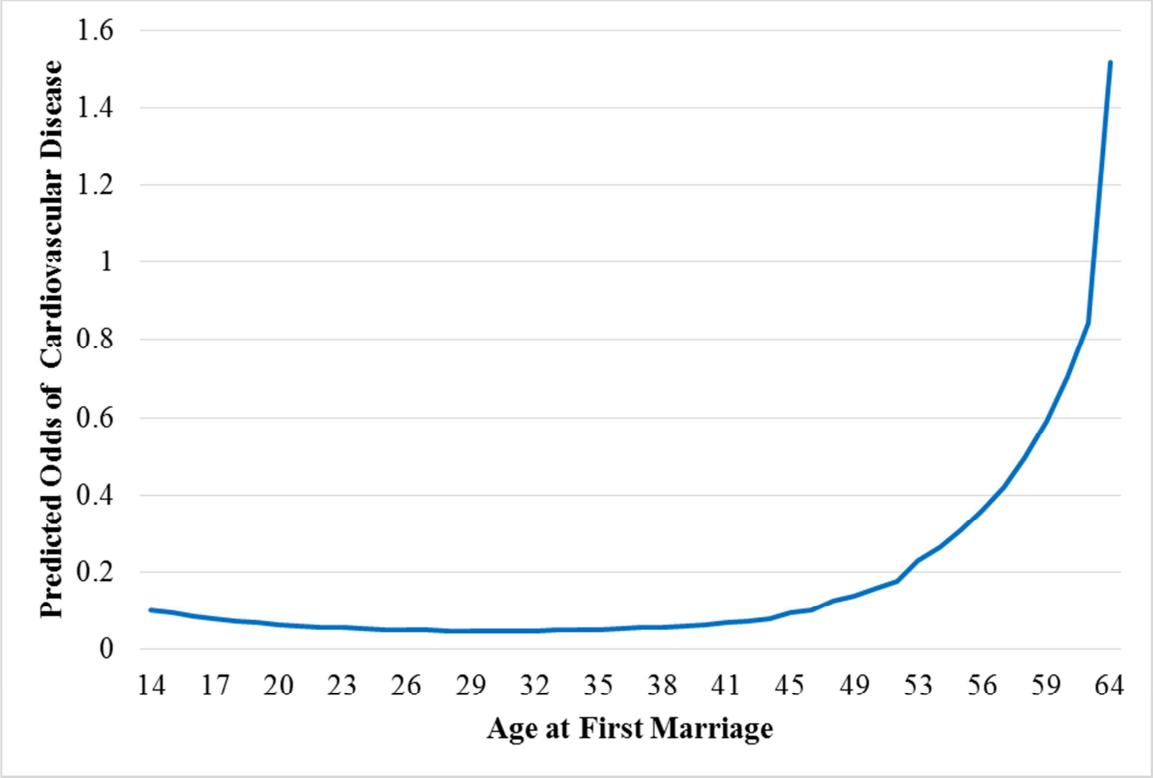

Figure 2. Cardiovascular Disease and age at first marriage for men

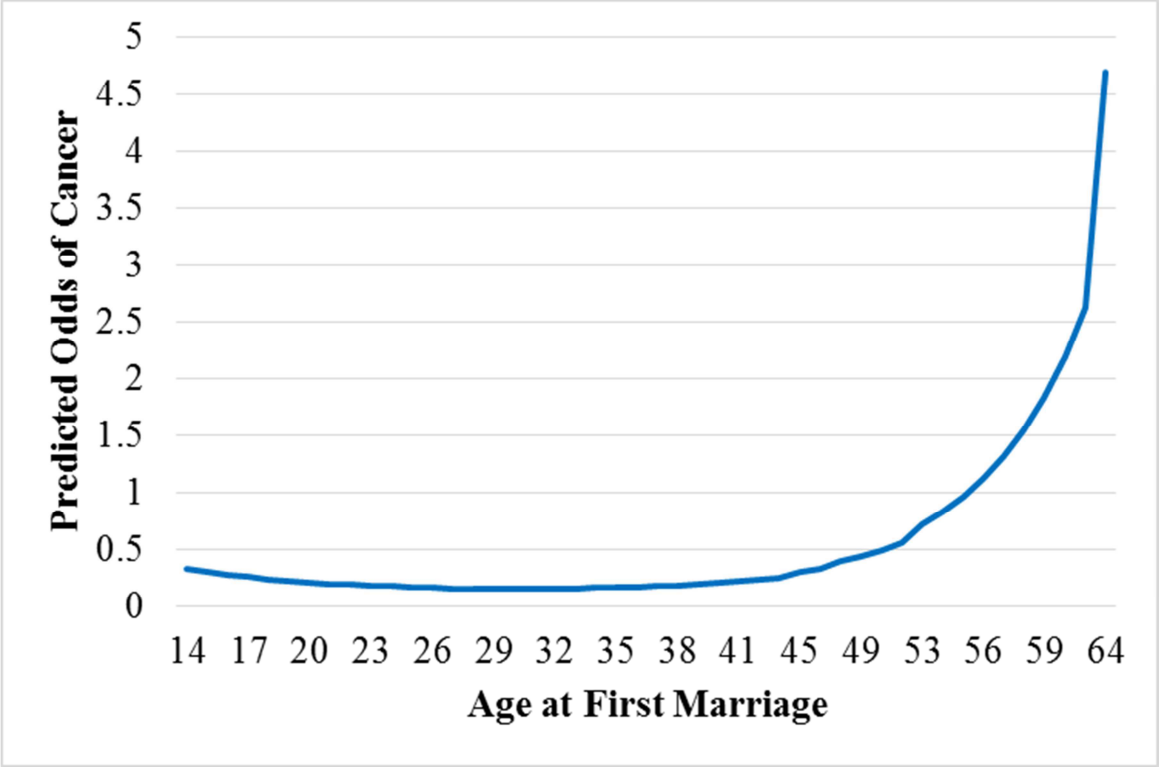

Figure 3. Cancer and age at first marriage for men