Does timing of first incarceration matter? :

The effect of age at first incarceration on midlife health

Yujin Kim

University of Texas at Austin

Abstract

Several studies investigated the effect of mass imprisonment on inmate and ex-inmate's family, employment, and health. They usually found the negative effect of it, but it is worthy to look at how the timing of incarceration might affect differently on ex-inmate's life, especially their midlife health. Experiencing incarceration during transition to adulthood might mean the different life trajectory of ex-inmates comparing to those with experiencing incarceration in adulthood. Early incarceration might take the opportunity for ex-inmates to finish their school, and make them carry the criminal record in earlier age than later incarceration. These disadvantages might give harder time for them to get married and find a job. I investigated how the timing of first incarceration affects people's midlife health using NLSY79. Early incarceration and later incarceration lower the log odds of respondents to say that they are in good and excellent health comparing never incarcerated people at age 40. However, when current marital status and marital history are added in the model besides demographic, family background, and health behavior, later incarceration effect does not statistically significant, but early incarceration effect is still significant. It looks like the mechanism of effect of incarceration on midlife health differs by timing of first incarceration.

INTRODUCTION

The incarceration rate (number of inmates per 100,000 resident U.S. population) has increased 245 percent between 1980 and 2007 (Sabol and Couture 2008) and about 2.3 million inmates were held in custody in state and federal prisons and jails in 2007 (West and Sabol 2008).The United States has the highest incarceration rate in the developed countries. Moreover, mass imprisonment is concentrated among minorities particularly less educated and African American men. While one in 30 men between the ages of 20 and 34 is behind bars, for black males in that age group the figure is one in nine (Warren, Gelb, Horowitz, and Riordan 2008).

Mass imprisonment produces not only increased number of inmates but also ex-inmates, and Uggen (2006) even argues that correctional policies have caused the emergence of new "felon class" in our society (Uggen, Manza, and Thompson 2006). This leads many researchers to investigate ex-inmates' life experience after release: inmate's marriage life (Lopoo and Western 2005), employment (Hagan 1993; Pager 2003), childbearing (Mumola and Analyst 1999), and educational attainment (Western 2007). Once people are incarcerated, they are less likely to get married after release, and more likely to get divorced while in prison (Lopoo and Western 2005). Ex-inmates are also less likely to find employment after release or may only acquire temporary jobs (Pager 2003). Recent work extends work on incarceration to health conditions in later life (Massoglia 2008a; Massoglia 2008b; Schnittker and John 2007). Indeed, inmates might acquire infectious disease while in prison (Baillargeon, Black, Pulvino, and Dunn 2000), and having an incarceration experience is related with worse health outcomes after release regardless of frequency (Massoglia 2008a; Massoglia 2008b; Schnittker and John 2007).

Despite the importance of previous research, it is important to rethink incarceration in a life course perspective, which may mean that the effect of incarceration will vary by the timing of

first incarceration. The incarceration experience is not just one time event which will be over after the event, but it is a lifelong transition and stigma that remains with ex-inmates for their entire life. Moreover, if people experience their first incarceration during the transition to adulthood or early adulthood, they probably not only carry a criminal record for a longer period but also are less likely to have an opportunity to get educated, become employed in a stable job, and eventually get married and have a stable family life than those with first incarceration during adulthood. These disadvantages might be related with worse health in later life, but previous research didn't consider that these disadvantages might be differed by the timing of first incarceration. The present research will investigate two questions to build on earlier research on the effect of incarceration. First, to what extent does the different timing of incarceration relate with the frequency of incarceration and duration of incarceration? Second, to what extent does first exposure to the penal system at different ages affect general health in midlife?

BACKGROUND AND LITERATURE REVIEW

INCACERATION AND HEALTH

Incarceration has both direct and indirect effects on health in midlife. The direct effect of incarceration on health occurs while inmates are in prison. Previous research shows that inmates are exposed to infectious diseases and sexually transmitted diseases from other inmates and can be stressed in adjusting into a new environment (Baillargeon, Black, Pulvino, and Dunn 2000; Hammett, Harmon, and Rhodes 2002). Thus inmates have a high percentage of infectious diseases, HIV, and mental disorders (CITE). However, these studies only focus on a specific state (i. e. Texas) and investigate only the incarcerated population, so we little know how much the health condition of the incarcerated population differs from the general population. On the other hand, incarceration can have a positive effect on inmate's health because prison can provide treatment and education to inmates. Indeed. prisons screen the inmate's health at

intake, even though the quality of health service in prison is not often optimum (Maruschak 2004). Schnittker and John (2007) attempted to measure inmate's current health condition compared with the general population using a nationally representative sample, and they found that the currently incarcerated population exhibited overall better health. This may be because access to the prison health care system among inmates improves their health. On the other hand, there may be measurement error or selection process getting into prison. Their results may also due to the measurement of health since, in their study, they use a health measure that shows whether the respondent has any severe health problems that prevented them from working. The main focus of previous research either focuses on current incarceration effects or immediate effects of incarceration on specific health conditions in a specific area, so the present research tries to investigate the long term effect of incarceration on general health in midlife using a nationally representative sample.

Incarceration can be considered as a life course event such as marriage and employment, and this is the reason that incarceration also has indirect effects on health after release. The mechanism linking incarceration and health in midlife is through a life course process that is also associated with both incarceration and health. One of the mechanism is employment. Once ex-inmates are released from institutions, they need to deal with several issues, and one of them is whether they can obtain a stable job. Pager (2003) revealed that having a criminal record decreases the chance to get a first callback from employers compared to counterparts without a criminal record; this effect was worse for Blacks than Whites (Pager 2003). However, even though ex-inmates have a lower chance of getting a callback from employers, most eventually find a job if they keep trying, although the problem then becomes the type of job that they get. Ex-offenders usually obtain less secure and professional jobs, and employers even will be less likely to invest in workers with a criminal record. As a result, this will create less secure wage growth among ex-offenders than their counterparts (Western 2002).

Western (2002) found that incarceration reduced earnings by 19 percent compared to men who were never incarcerated, and that the wage of ex-convicts increased more slowly than their counterparts who were not incarcerated through their twenties and thirties. This work shows that there is a persistent effect of incarceration on wages. Unstable employment, low prestigious jobs, and low income are also associated with health in midlife. These disadvantages might decrease economic well-being, which is important for physical well-being and health. Individuals with low income need to worry about paying bills, buying foods for them and their family, and finding a safe place to live (Ross and Mirowsky 1995). Unstable employment also reduces the access to health insurance. (add more literature). Based on previous researches, incarceration reduce the odds that ex-inmates get the benefit of stable employment, high income, and access to health insurance to promote better health in midlife, so it is possible that ex-inmates are less likely to report their general health as excellent or very good in midlife than never incarcerated people.

These disadvantages in the labor market and the negative stigma of a "criminal record" may increase the chance for ex-offenders to becoming a "less marriageable partner." There is the possibility that ex-inmates were not already "marriageable men" before incarceration since men with disadvantaged background such as less education are more likely to be incarcerated. Criminal record, however, increases the disadvantages of these because marriageable men are usually described as having stable employment and earnings (Lichter, LeClere, and McLaughlin 1991). Lopoo and Western(2005) investigate the effect of incarceration among men, and found that incarceration disrupts an individual's chance of marriage. Incarceration during marriage also increases the risk of divorce or separation (Lopoo and Western 2005). Many prior studies have investigated the relationship between marriage and health, and found that married individuals report better health and less depression than their counterparts (Lillard and Waite 1995; Ross, Mirowsky, and Goldsteen 1990).The link between marriage and better health is

through economic well-being and social support. Married couples enjoy better economic resources, which are positively related with better health, than their counterparts (Lillard and Waite 1995; Waite and Gallagher 2001). Marriage also provides social support including emotional and instrumental support, which improve physical health. Married partners provide not only emotional support such as advice and love, but also promote healthier behavior such as better diets and discourage risk or unhealthy behavior such as smoking or drug use (Ross, Mirowsky, and Goldsteen 1990). Having a criminal record may make it harder for ex-inmates to enjoy this health benefit because they are less likely to get married and more likely to get divorced if they are married.

Relationship between incarceration and midlife health can be mediated by marriage, employment, health behavior, family income, and access to health insurance. Massoglia (2008) investigated this relationship and found a lasting effect of incarceration on midlife health functioning, even accounting marital status and labor force participation. However, it leaves one unsolved but important question: will the relationship between incarceration and health in midlife be the same regardless of the timing of first incarceration?

TIMING OF FIRST INCACERATION AND HEALTH

The life course perspective contributes to explaining health disparities through cumulative effects and pathways models. Cumulative effects refer to the duration of exposure to particular circumstances that produce cumulative effects on health outcomes in adulthood. Pathways refer to the way in which individuals follow trajectories that carry with them socioeconomic and psychological circumstances. For example, people with a better education have better health-related behavior than those with a worse education because having a better education is related to better diets and seeking preventive health care (Hertzman 2004). The relationship between incarceration and health also benefit from the life course perspective.

Incarceration can be a particular circumstance that produces a cumulative effect on midlife health. Further incarceration also can be a transition, which can put individuals on a different life trajectory, so the timing of first incarceration may have different implications for health outcomes in midlife.

Early adulthood is a critical life period that builds social-emotional, cognitive and physical development, and financial independence from parents. This period sets a course for later health and well-being. What does life look like if individuals go to prison in this period? First, they may have a hard time to keep continuing their education, so they are more likely to drop out of school or leave school while in prison. Once they are released from prison as parolees, it will be hard for them to come back to school and get a degree. However, if individuals experience their first incarceration in adulthood, the educational disruption due to incarceration may not be severe unless they drop out of school before their first incarceration. Early incarceration might disrupt education opportunity more severely than later incarceration, and the relationship between education and health is well-documented in previous studies. Education not only helps individuals acquire better stable employment, increasing income, and better social networks, which have important effects on health, but also improves their cognitive skills and reasoning skills, which promote better health behavior. These positive education effects will stay through the life course (Mirowsky and Ross 2003), so losing the opportunity to get educated due to incarceration in early adulthood might more profoundly affect midlife health than incarceration in adulthood.

Second, if first incarceration occurs during early adulthood, then they probably have a longer period of life with a criminal record than those who experience incarceration in adulthood. Almost all inmates are released from prison as parolees, and if they don't violate any law while on parole, they can finish their sentence. However, a parolee's life is not easy. Goffman (2009) describes parolee's life in her ethnographic study of a Philadelphia ghetto. One parolee couldn't

go to the hospital even though he was severally hurt because his parole officer might serve him a violation for being out past curfew. Another parolee is even robbed by his neighbor because his neighbor knew that he couldn't call the police. The main concern of a parolee's daily life is avoiding going back to jail or prison due to a minor infraction. Early incarceration means that individuals might experience this kind of parolee's life at an earlier age, which might increase the stress and decreases the sense of control. They may not get many social supports to cope with stress from their family or other social network. This stressful life with less resources and stigma with a criminal record makes it hard to adjust to new circumstances after release, so maladjustment to new life might increases the chance for them to go back to prison, which is related with a higher frequency of incarceration and longer duration of incarceration. Those who are in and out of prison are on a different life trajectory, where it is hard to build a stable family life and a stable working career. Having a criminal record clearly decreases the chance to have stable employment and to get married, but having a criminal record at a relatively early age means that their health in midlife might be worse than never incarcerated people, but also worse than people who experience incarceration in adulthood. I will test the effect of incarceration by different timing, especially early adulthood and adulthood on midlife general health status adjusting basic demographic background, and see whether this effect is mediated by education attainment, employment status, marital status, health behavior, and access to health insurance. Figure 1 demonstrates conceptual model of my research question.

[Figure 1 is about here]

DATA

This analysis uses data from the National Longitudinal Survey of Youth 1979 (NLSY79). This data collection began in 1979 and is ongoing. The sample included 12,686 young men and women who were 14-22 years old when they were first surveyed in 1979. These individuals

were interviewed annually through 1994 and are currently interviewed on a biennial basis. Since 1998, NLSY79 has collected health information, which is asked to respondents at only one time when they turned age 40. (during survey years 1998, 2000, 2002, 2004, 2006). NLSY79 has been used in previous research on incarceration focusing on wages (Western 2002), marriage (Lopoo and Western 2005), and health (Massoglia 2008a; Massoglia 2008b; Schnittker and John 2007). Information on incarceration comes from a variable indicating the type of residence, including jail or prison. Thus we can measure whether each respondent was incarcerated or not between interviews. Even though NLSY79 used in previous research, it underestimates the incarceration effect if incarceration terms are shorter than 12 months. It is also hard to evaluate previous incarceration duration of sentence. However, we can measure incarceration bouts more than 12 months, which is more consequential to health in midlife. This data can also measure the approximate duration of incarceration and frequency of incarceration.

To investigate the relationship between incarceration and health, I used the data from 1979 to 2006, which is the most recent survey, and includes incarceration experience occurred between 1980 and the "health 40" survey year. The reason to measure incarceration experience from 1980, not 1979, is that I would like to know a respondent's initial health status before any incarceration, which comes from 1979. Once a respondent turns to age 40 between 1998 and 2006, health information is collected only one time. If a respondent does not turn to age 40 until most recent survey year (2006), health information is not collected yet. Thus, I only included the respondents (8,463) who answered the "health40" survey until most recent survey year (2006). I exclude respondents who have any incarceration experience before 1980 (26 individuals), and it is because I cannot get a respondent's initial health information if a respondent is already incarcerated in 1979. I also exclude respondents who experience their first incarceration after the "health 40" survey (14 individuals), and it is because these population might differ from

"never incarcerated "people. Finally I exclude respondents who did not report their health, even though they answered the "health 40" survey. The final sample size is 8,418.

MEASURES

Dependent variable: *Health*: Health status at age 40 is based on self reported general health. This variable has 5 categories (Excellent, very good, good, fair, and poor), and is measured as three categories (Excellent & very good, good, and fair & poor).

Independent variables*: Incarceration*: Based on the residence variable at every wave, if respondents answered their residence as prison or jail, they are considered as having incarceration experience in that survey year. About 6% of respondents (485 individuals) experienced incarceration between 1980 and the health survey year. Age at incarceration is based on respondent's age at first incarceration. If first incarceration happens at age 25 and earlier, then it is considered as "early incarceration", and if first incarceration happens after age 25, then it is categorized as "later incarceration". Frequency of incarceration is based on how many times respondents are in and out of prison between 1980 and the "health 40" survey year and is categorized as 1, 2, and 3 and more. Duration of incarceration is measured by how many times respondents answered the survey while in jail or prison, and categorized as one time, two times, three times, and more than three times. Current incarceration is measured whether respondents are currently incarcerated or not at the "health 40" survey year.

Mediating variables*: Marriage*: current marriage comes from the marital status variable at the "health 40" survey year, and measures whether respondents are married or not at the health 40 survey year. Marital history variable is the number of marriages between 1980 and the "health 40" survey year. *Educational attainment*: This variable is the highest degree attainment that respondents achieved by the "health 40" survey year. *Employment*: The employment variable is measured by whether the respondent is employed or not in 2006. If the respondent didn't do an

interview in 2006, I used the employment status variable that is the closet to the 2006 survey year *Net family income*: Net family income at health survey year is used for this variable. If the respondent refused to answer, didn't know, or skipped this information, I used the mean income of survey year between 1998 and 2006. I take the log of income, since income doesn't show a normal distribution. *Health Insurance*: Health insurance is based on whether the respondent has health insurance at the health survey year. *Health behavior*: Cigarette use is used to capture health behavior, and it is based on whether the respondent reports daily cigarette use during the 1984, 1992, 1994 and 1998 survey years. If the respondent ever reports daily cigarette use during these survey years, they are coded as cigarette smokers. Cocaine or crack cocaine use is created based on whether the respondent ever used cocaine or crack cocaine in their lifetime.

Control variables*: Health problems in 1979*: This variable come from three variables: whether health prevents from working at a job for pay, whether health limits the kind of work respondents can do, and whether health limits the amount of work respondent can do. If the respondent does not have any of these three problems, then they are coded as "no problem", If the respondent does not have a health problem that prevents their work for pay but only limit their type and amount of work, then they are coded as have a "minor health problem". If the respondent has a health problem that prevents their work for pay, then they are coded as having a "severe health problem". *Race and Ethnicity*: This variable uses the race and ethnicity information, and is recoded as 4 categories: Non-Hispanic White, Non-Hispanic Black, Hispanics, and others. *Family background at age 14*: There are two family background variables: family structure at age 14, and parent's education level at age 14. Family structure is categorized as three categories: biological parents, single mom, and others. Parent's education is the highest degree attainment among parents and it is categorized as less than high school (less than 12 years of schooling), high school (12 years of schooling), and college (13 years of schooling and above) using the number of years of schooling.

MODELING APPROACH

To investigate the relationship between age at incarceration and health status at age 40, I use an ordered logistic model with a lagged time point. For the health measure, the reference is excellent and very good, so standard interpretation of the ordered logit coefficient is that for a one unit increase in the predictor, the response variable level is expected to change by its respective regression coefficient in the ordered log-odds scale while the other variables in the model are held constant. If the ordered logit in early incarceration is negative, then it means that the early incarcerated people are less likely to be in the excellent and very good health category than never incarcerated people when the other variables in the model are held constant. In the bivariate model, I look at the relationship between age at incarceration and self reported health at age 40. I then add the baseline health status before incarceration. I later add family background, race-ethnicity, and gender, so I can see the effect of early and later incarceration effect on later life health after controlling basic demographic background. After that, I look at how health behavior during lifetime affects health in midlife and see how much the incarceration effect on midlife health changes. Finally, I add several mediating variables to see whether the effect of early and later incarceration is mediated by current marital status, current access to health insurance, educational attainment, current employment status, and current net family income.

RESULTS

Descriptive Results

Table 1 presents distributions of the independent and dependent variables for our sample.

[Table 1 is about here]

Around 6% of respondents have incarceration experience, and around 40% of incarceration occurs before age 25. About 60% of never incarcerated people reported that their health condition is excellent or very good at age 40, but 47% of those who are early incarcerated and 53% of those who are later incarcerated say that they are in excellent or very good health. Moreover, about 22-23% of incarcerated people report they are in fair or poor , which is higher than never incarcerated people (13%). However, there is no difference between incarcerated people and never incarcerated people in health problems in 1979, which means that it is hard to say that less healthy people are more likely to be incarcerated. There is a huge race-ethnicity difference in incarceration. Non-Hispanic whites are the majority (54%) among never incarcerated people, but Non-Hispanic blacks are the majority (56%) among the early and later incarcerated populations. This shows the massive imprisonment concentrated among Non-Hispanic blacks. Males are dominant among the incarcerated population. Family background and health behavior also shows that incarcerated people come from more disadvantaged family background and have a higher percentage of ever daily cigarette and ever cocaine or crack cocaine use than never incarcerated people. Current marital status also shows that more than half of never incarcerated people are currently married, and only 17% are never married. However, only 24% of early incarcerated people are currently married, and around half of these individuals are never married. The more interesting point is that fewer people are currently married among the later incarcerated people (16%) than the early incarcerated people, but fewer people are never married among the later incarcerated people (39%) than the early incarcerated people. This means that more people are ever married among the later incarcerated people than the early incarcerated people. About 81% of never incarcerated people are currently employed, but only half of early incarcerated people are currently employed. Net family income also shows a similar pattern: 28% of early incarcerated people don't have a high school degree, and 23% of later incarcerated people have a high school degree. This may

be because incarceration during the transition to adulthood ruins their educational opportunity more so than incarceration in adulthood.

Age, Frequency, Duration of Incarceration, and Health in Mid Life

Table 2 presents the duration and frequency of incarceration by early and later incarceration. First, frequency of incarceration varies by age at first incarceration. About 40% of people whose first incarceration occurred during the transition to adulthood have 3 and more incarceration experiences by age 40. This contrasts with only 8% of people whose first incarceration occurred in adulthood have same number of incarceration experience. Moreover around 70% of them have only one time incarceration experience by age 40. Duration of incarceration also varies by the timing of first incarceration. About 60% of early incarcerated people have more than 4 years of incarceration duration, and the mean duration is 5.2. However, only 19% of later incarcerated people have more than 4 years of incarceration, and the mean duration is 2.33. These relationships show that first incarceration during the early adulthood may put people in different life trajectory, and this might be related with a longer time in prison and higher frequency of in and out of prison than first incarceration in adulthood.

[Table 3 is about here]

How does this relationship among age, frequency, and duration work to health status in midlife?

[Table 3 is about here]

Based on Table 3, early incarceration and later incarceration are negatively correlated with health in midlife, which means these people are less likely to be in excellent and very good health status than never incarcerated people. The correlation between frequency of incarceration and health in later life shows an interesting pattern. One time incarceration shows

the strongest negative correlation with health in midlife, and as frequency of incarceration increases, health is less negatively correlated. Duration of incarceration also shows a similar pattern. It might because of two reasons. One is a selection process going into high frequency and longer duration of incarceration, so these groups are highly selective groups, whose are different from general population. The second is that the incarceration experience might work in a different way among some of those people. Several previous studies show that inmates might have worse health since infection is easily transmitted among inmates (CITE). But it is also possible that incarceration provide not only health care and education to inmates, but also provide regular meals and place to have sound sleep. The relationship between high frequency and longer period of incarceration and health in midlife might be based on this reason. As seen in Table 2, age, frequency, and duration of incarceration are highly correlated each other, and our main research question is to look at the relationship between timing of incarceration and health. Thus we only include age at incarceration in our final model.

Effect of Timing of Incarceration on Health in Midlife

Table 4 shows the result of ordered logistic regression models predicting respondent's general health in midlife. Model 0 presents bivariate associations with general health. Both those who are early incarcerated and later incarcerated are less likely to be in excellent and very good health at age 40 compared with never incarcerated people. The log odds of early incarcerated people is more negative than the log odds of later incarcerated people. It means the health difference between early incarcerated people and never incarcerated people in excellent and very good health category is bigger than those between later incarcerated people and never incarcerated people in same category. If respondents have any health problems in 1979, they are less likely to report excellent or very good health in mid life compared with people who didn't have any health problems. Non-Hispanic Blacks, Hispanics, and other race are also less likely to report their health as excellent and very good than Non-Hispanic Whites.

People who are raised with biological parents are more likely to report that they have excellent or very good health than people from other family backgrounds. Parent's education also matters in an unsurprising way. Having worse health behavior such as reporting daily cigarette use and cocaine or crack cocaine use are related to lower odds of being in excellent or very good health in midlife. People who have health insurance at the time of the health survey are more likely to be in excellent or very good health than people who don't, and currently married people at the heath survey also show the same pattern. People who have higher education also are more likely to report excellent or very good health at age 40, and employed people are more likely to be in excellent or very good health than unemployed people.

[Table 4 is about here]

Model 1 controls the health problems in 1979 and current incarceration to see whether the early incarceration and later incarceration effect on midlife health is due to selection effect. Early incarceration and later incarceration effects are not changed and still significant after controlling health problems in 1979, and they are almost the same even after controlling for current incarceration. In model 2, even after controlling sex, race-ethnicity, and family background, these effects stay the same, and the log odds of early incarceration is still larger than the log odds of later incarceration. However, these effects decrease when we add health behaviors (cigarette use and cocaine or crack cocaine use) in model 3. This is because incarcerated people are more likely to report daily cigarette use and cocaine or crack cocaine use, which have strong impacts on health at midlife. Moreover, the log odds of later incarceration becomes marginally significant, which means it is hard to say that the later incarcerated people are statistically less likely to report excellent or very good health in midlife than never incarcerated people, net of several controls. Even though currently married people enjoy better health, it doesn't change the effect of early incarceration on midlife health in model 4. People who experienced incarceration during the transition to adulthood are still less likely to

report that they have excellent or very good health at age 40 than never incarcerated people even after considering current marital status, marital history, and other background characteristics. This is unlike people who are incarcerated in adulthood. However, once we add educational attainment in the model 5, the early incarceration effect becomes statistically insignificant even though the effect of early incarceration on general health in midlife still negative. In the final model with health insurance, employment, and household income, the effect of early incarceration and later incarceration on general health in midlife is not statistically significant.

DISCUSSION

We investigated the relationship between timing of first incarceration and frequency and duration of incarceration and how timing of first incarceration is associated with health in midlife. First, we found that first incarceration in early adulthood is highly related to have high recidivism and longer duration of incarceration than first incarceration in adulthood. It gives a clear picture of early incarcerated people's life trajectory. If incarceration starts in early adulthood, and they don't have enough resources to soften the hardship and stress due to new life after release from prison, they are more likely to being in and out of prison several times. This might also increase the total duration of incarceration. Early incarceration may also increase the period of having a criminal record than later incarceration. Thus, they probably have more hard time to get married, have higher education, and get a stable job. Second, we did not find a statistically significant effect of early and later incarceration on general health at midlife compared with never incarcerated people once we control all mediating effects such as marital status, educational attainment, employment, and family income. However, we see some differences between early incarceration and later incarceration on health in midlife.

Mass imprisonment has created a new "felon class" that has a criminal record, but our society is not fully ready to give an opportunity for them to come back to our society without any disadvantages. Coming back from prison or jail means that ex-inmates will have different life that they had before incarceration, and it also means that their family and their community also have to deal with different circumstances. It is not an event that ex-inmates and their family and community deal with for a while, but it is lifelong transition that ex-inmates will have, so we need to start to think about effect of mass imprisonment as a life course perspective, and I think this paper is the first step to look at it in this perspective.

FUTURE DIRECTION

I would like to address some future direction that I will work more.

First, I would like to investigate more about mediating effect and how it works differently to early incarceration and later incarceration. It looks like marriage and education works differently to early incarceration and later incarceration, but employment and income don't work differently to early and later incarceration. Second, I will extend health measure to mental health or physical health. General health is a good starting point, but it is based on people's perception on their health condition, so it will vary by people's perception. NLSY79 have several SF12 such as mental, physical, and health limitation, and CCR such as high blood pressure, etc. Third, I would like to run this model with only men. About 90% of incarcerated people are male, so I want to check whether result will be same.

REFERENCE

Baillargeon, J, SA Black, J Pulvino, and K Dunn. 2000. "The disease profile of Texas prison inmates." *Annals of epidemiology* 10:74-80.

Hagan, J. 1993. "Social Embeddedness of Crime and Unemployment, The." *Criminology* 31:465.

Hammett, TM, MP Harmon, and W Rhodes. 2002. "The burden of infectious disease among inmates of and releasees from US correctional facilities, 1997." *American journal of public health* 92:1789.

Hertzman, C. 2004. "The life course contribution to ethnic disparities in health." *Critical perspectives on racial and ethnic differences in health in late life*:145-170.

Lichter, D T., F B. LeClere, and D K. McLaughlin. 1991. "Local marriage markets and the marital behavior of black and white women." *American Journal of Sociology*:843-867.

Lillard, LA and LJ Waite. 1995. "'Til death do us part: Marital disruption and mortality." *American Journal of Sociology* 100:1131-1156.

Lopoo, LM and B Western. 2005. "Incarceration and the formation and stability of marital unions." *JOURNAL OF MARRIAGE AND FAMILY-MINNEAPOLIS-* 67:721.

Maruschak, LM. 2004. "HIV in Prisons and Jails, 2002." *Bureau of Justice Statistics Bulletin*:1–11.

Massoglia, M. 2008a. "Incarceration as exposure: the prison, infectious disease, and other stress-related illnesses." *Journal of health and social behavior* 49:56.

—. 2008b. "Incarceration, health, and racial disparities in health." *Law & Society Review* 42:275-306.

Mirowsky, J and CE Ross. 2003. *Education, social status, and health*: Aldine de Gruyter.

Mumola, C. J. and Bjsp Analyst. 1999. "Incarcerated parents and their children." *children* 37:44.6.

Pager, D. 2003. "The Mark of a Criminal Record 1." *American Journal of Sociology* 108:937-975.

Ross, CE and J Mirowsky. 1995. "Does employment affect health?" *Journal of health and social behavior* 36:230-243.

Ross, CE, J Mirowsky, and K Goldsteen. 1990. "The impact of the family on health: The decade in review." *Journal of Marriage and the Family* 52:1059-1078.

Sabol, W. J. and H. Couture. 2008. "Prison inmates at midyear 2007." *Bureau of Justice Statistics (NCJ 221944). Retrieved June* 1:2008.

Schnittker, J and A John. 2007. "Enduring stigma: the long-term effects of incarceration on health." *Journal of health and social behavior* 48:115.

Uggen, C, J Manza, and M Thompson. 2006. "Citizenship, democracy, and the civic reintegration of criminal offenders." *The ANNALS of the American Academy of Political and Social Science* 605:281.

Waite, LJ and M Gallagher. 2001. *The case for marriage: Why married people are happier, healthier, and better off financially*: Broadway.

Warren, J., A. Gelb, J. Horowitz, and J. Riordan. 2008. "One in 100: Behind bars in America 2008." *The Pew Center on the States. Washington, DC: The Pew Charitable Trusts.*

West, HC and WJ Sabol. 2008. "Prisoners in 2007." *US Department of Justice, Office of Justice Programs, Bureau of Justice Statistics.*

Western, B. 2002. "The impact of incarceration on wage mobility and inequality." *American Sociological Review*:526-546.

Western, B. 2007. *Punishment and inequality in America*: Russell Sage Foundation Publications.
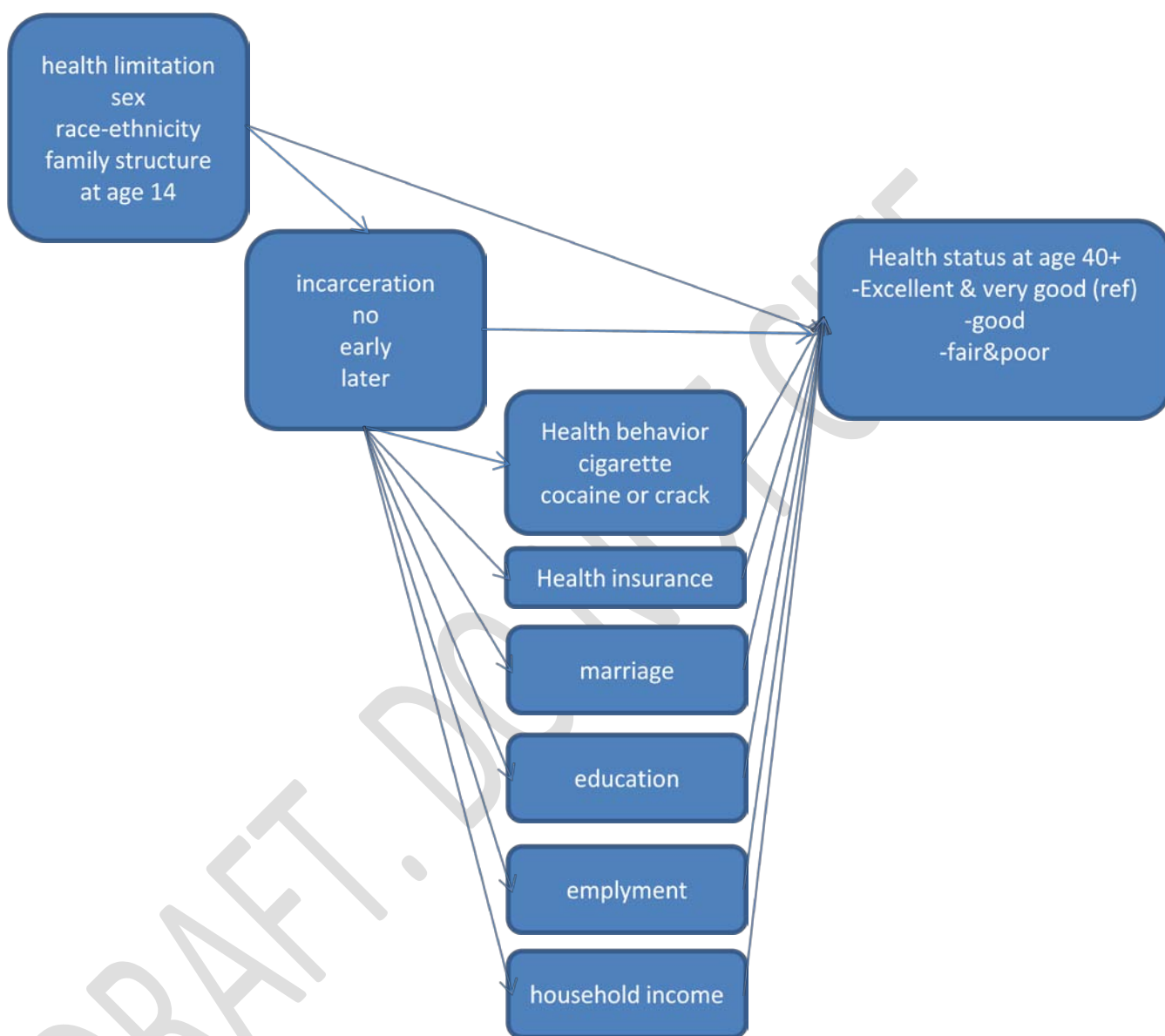
Figure 1. Conceptual model

Table 1. Unweighted Distribution of Sample by Incarceration Experience

	No Incarceration	Early incarceration (before age 25)	later incarceration (after age 25)
	94.24%	2.40%	3.36%
Self reported general health at age 40+			
Fair & Poor	12.61	22.77	22.61
Good	27.85	30.69	24.73
Excellent & Very good	59.55	46.53	52.65
Health limitation in 1979			
No limitation	93.92	93.07	94.7
Minor limitation	4.39	5.45	4.59
Severe limitation	1.69	1.49	0.71
Race-Ethnicity			
NonHispanic white	53.8	22.77	22.97
NonHispanic Black	28.5	55.94	55.83
Hispanics	16.34	19.8	18.02
Others	1.36	1.49	3.18
Sex			
Male	46.65	96.04	83.75
Family structure at age 14			
Bio parent	69.05	44.06	47.35
Singlemom	16.03	26.24	26.15
others	14.91	29.7	26.5
Parent's education			
Less than High school	32.21	46.53	44.17
High school	41.35	44.06	41.34
College and above	26.45	9.41	14.49
Health behavior: Ever report daily cigarrette use			
Yes	45.43	85.15	77.03
Ever cocaine or crackcocaine use			
Yes	45.38	84.16	79.86
Health insurance at health survey			
Yes	82.78	48.02	45.94
Current marital status			
Never married	17.13	49.01	38.87
Married	58.04	23.76	16.25
Others(separated, widow, etc)	24.83	27.23	44.88
Current Employment status			
Not employed (including out of labor force)	18.56	50.5	43.82
Employed	81.44	49.5	56.18
Net family Income at health survey			
Mean	59357.52	24512.67	19852.25
Median	46500	12000	13000
Highest education attainment			
Less than high school	9.62	28.22	23.32
High school or GED or others	60.81	66.83	71.73
BA and above	29.57	4.95	4.95
# of marriage between 1980 and health survey			
0	18.19	51.49	37.81
1	60.72	34.65	44.88
2	17.64	11.88	13.43
3	3.45	1.98	3.89
Sample(N)	7,933	202	283

Table 2. Unweighted Distribution between Age, Frequency, and Duration of Incarceration

	Early incarceration (age 25 and below)	later incarceration (over age 25)
Frequency of incarceration (%)		
1	32.18	67.84
2	28.22	24.38
3+	39.60	7.77
Mean	2.07	1.39
Duration of incarceration (%)		
1	19.31	44.88
2	9.90	23.67
3	12.38	12.72
4+	58.42	18.73
Mean	5.20	2.33

Table 3. Correlation between Age, Frequency, Duration of Incarceration and General Health in Midlife

Correlation	Health at age 40	Early incarceration	Later incarceration	Frequency-once	Frequency-two times	Frequency- three and more	Duration-once	Duration-two times	Duration-three times	Duration-four and more
Health at age 40	1									
Early incarceration	-0.0483	1								
Later incarceration	-0.0411	-0.0292	1							
Frequency-once	-0.0586	0.2655	**0.7024**	1						
Frequency-two times	-0.0283	0.3451	0.3515	-0.0219	1					
Frequency-three and more	-0.0117	**0.5502**	0.1119	-0.0197	-0.0137	1				
Duration- once	-0.0478	0.1955	**0.5756**	**0.7992**	-0.0175	-0.0157	1			
Duration- two times	-0.0408	0.1375	0.4176	0.2754	0.413	-0.0113	-0.0145	1		
Duration- three times	-0.0253	0.2154	0.2638	0.2128	0.2778	0.093	-0.0121	-0.0087	1	
Duration- four and more	-0.0134	**0.6267**	0.2208	0.0723	0.3775	**0.7075**	-0.0204	-0.0147	-0.0123	1

Table 4. Logistic Regression Predicting General Health condition in midlife

	Model 0	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Age at incarceration							
Never incarcerated (Ref)							
Incarcerated in early adulthood	-0.58 ***	-0.62 ***	-0.56 ***	-0.37 *	-0.30 *	-0.19	0.04
Incarcerated in later adulthood	-0.40 ***	-0.45 ***	-0.39 **	-0.23 +	-0.15	-0.06	0.13
Currently incarcerated at health survey							
Yes	-0.29	0.21	0.27	0.27	0.30	0.26	0.52 *
Health limitation in 1979							
No limitation (Ref)							
Minor limitation	-0.58 ***	-0.58 ***	-0.58 ***	-0.58 ***	-0.56 ***	-0.55 ***	-0.54 ***
Severe limitation	-0.88 ***	-0.89 ***	-0.77 ***	-0.77 ***	-0.73 ***	-0.71 ***	-0.58 ***
Sex							
Male	0.27 ***		0.28 ***	0.31 ***	0.30 ***	0.33 ***	0.23 ***
Race-Ethnicity							
NonHispanic white (Ref)							
NonHispanic Black	-0.49 ***		-0.27 ***	-0.30 ***	-0.21 ***	-0.20 ***	-0.18 **
Hispanics	-0.52 ***		-0.25 ***	-0.30 ***	-0.28 ***	-0.21 **	-0.20 **
Others	-0.46 **		-0.29	-0.22	-0.16	-0.16	-0.19
Family structure at age 14							
Bio parent (Ref)							
Songlemom	-0.34 ***		-0.13 *	-0.10	-0.08	-0.05	-0.04
others	-0.33 ***		-0.18 **	-0.13 *	-0.11	-0.07	-0.06
Parent's education							
Less than High school	-0.47 ***		-0.40 ***	-0.41 ***	-0.41 ***	-0.30 ***	-0.27 ***
High school (Ref)							
College and above	0.33 ***		0.22 ***	0.20 ***	0.18 ***	0.03	0.05
miss			-0.36 **	-0.34 **	-0.32 **	-0.19	-0.15
Ever report daily cigarrett use							
Yes	-0.48 ***			-0.42 ***	-0.38 ***	-0.27 ***	-0.24 ***
Ever cocain or crackcocaine use							
Yes	-0.16 ***			-0.14 **	-0.11 *	-0.09 *	-0.06
Health insurance at health survey							
Yes	0.49 ***						0.04
Current marital status							
Married	0.54 ***				0.30 ***	0.25 ***	0.18 ***
# of marriage between 1980 and health survey							
0=Ref							
1	0.45 ***				0.12	0.12	0.07
2	0.32 ***				0.03	0.05	0.00
3	0.06				-0.15	-0.07	-0.14
Highest education attainment							
Less than high school	-0.79 ***					-0.58 ***	-0.44 ***
High school or GED or others(Ref)							
BA and above	0.73 ***					0.53 ***	0.47 ***
Current Employment status							
Employed	1.06 ***						0.77 ***
miss							-0.45 *
Net family Income at health survey (log)	0.14 ***						0.03 ***
Constant (pair & poor)		-1.97	-2.14	-2.40	-2.11	-1.96	-1.02
Constant (good)		-0.43	-0.56	-0.82	-0.51	-0.34	0.65

*** p< .001, ** p<.01, * p< .05, Analyses are unweighted