January 2012

Assessing the Contribution of the Deinstitutionalization of the Mentally Ill to Growth in the U.S. Incarceration Rate

Steven Raphael
Goldman School of Public Policy
University of California, Berkeley
stevenraphael@berkeley.edu

Michael A. Stoll
School of Public Affairs
University of California, Los Angeles
mstoll@ucla.edu

Abstract

We assess the degree to which the mentally ill who would have been in mental hospitals in years past have been trans-institutionalized into prisons and jails. We also assess the contribution of deinstitutionalization to growth in the U.S. prison population. We find no evidence of trans-institutionalization for any demographic groups for the period between 1950 and 1980. However, for the twenty-year period from 1980 to 2000, we find significant trans-institutionalization rates for all men and women, with a relatively large trans-institutionalization rate for men in comparison to women, and the largest trans-institutionalization rate observed for white men. Our estimates suggest that between 4 and 7 percent of incarceration growth between 1980 and 2000 is attributable to deinstitutionalization. While this is a relatively small contribution to prison growth overall, the results do suggest that a sizable portion of the mentally ill behind bars would not have been incarcerated in years past.

We thank the Russell Sage Foundation for their generous support of this research.

1. Introduction

The prevalence of mental health problems is extremely high among U.S. prison and jail inmates (James and Glaze 2006). Approximately half of state and federal prison inmates and over 60 percent of jail inmates report having mental health problems or symptoms indicative of mental illness. The relative prevalence of severe mental illness is particular high (nearly five times that of the general adult population). Applying these prevalence rates to the 2008 incarcerated population implies that roughly 316,000 severely mentally ill people are inmates in the nation's prison and jails (115,000 jail inmates and 201,000 state and federal prison inmates). By contrast, the current mental hospital inpatient population is less than 60,000.

That the incarcerated mentally ill exceeds the inpatient mental hospital population is a relatively new development. In fact, as of mid century, mental hospital inpatients per 100,000 U.S. residents greatly exceeded the prison incarceration rate. This fact is illustrated in Figure 1. The figure presents state mental hospital inpatients per 100,000,[1] state and federal prisoners per 100,000, and the sum of these two series for the period 1930 to 2000. During the 1950s and 1960s, the inpatient rate was approximately three times the prison incarceration rate. Shortly thereafter the inpatient rate declines precipitously, falling below the incarceration rate in the mid 1970s and continuing to decline in later decades. Meanwhile, during the 1980s and 1990s the country experiences a near five-fold increase in incarceration rates.

1 Data on inmates in state and county mental hospitals was drawn from Palermo, Smith, and Liska (1991) through 1970 and from Raphael (2000) for later years.

The juxtaposition of these trends and the current high incidence of severe mental illness behind bars begs the question of whether the mentally ill have simply been trans-institutionalized from mental hospitals to prisons and jails. A related question concerns the extent to which the unprecedented growth in incarceration since the late 1970s is driven by a reduction in public investment in inpatient mental health services. Past changes in sentencing and corrections policy are currently under heightened scrutiny as state prison populations are at record levels and many states are seeking to scale back correctional populations with an eye on the fiscal benefits of doing so. To the extent that the run-up in state population was driven by deinstitutionalization, the current focus on sentence enhancements and the evolution of the U.S. sentencing regime may be misplaced.

In this paper, we analyze various facets of this question using U.S. census data covering the period from 1950 to 2000. We begin with a detailed descriptive analysis of the population of state, county, and private mental hospitals as of mid century. We document the fact that many of those who were institutionalized in the 1950s and 1960s, and were subsequently deinstitutionalized, did not experience large increases in incarceration. Conversely, those most likely to be incarcerated as of the 2000 census experienced pronounced increases in overall institutionalization between 1950 and 2000 (with particularly large increases for black males). Thus, the impression created by aggregate trends is somewhat misleading as the 1950 demographic composition of the mental hospital population differs considerably from the 2000 demographic composition of prison and jail inmates.

We then estimate the rate at which individuals who would have been institutionalized in years past have been trans-institutionalized into prisons and jails. We construct a panel data set that varies by state, gender, race, and age and estimate the impact of changes in regional mental hospital inpatient rates on changes in regional incarceration rates controlling for a variety of fixed effects defined by the dimensions of the panel. For the early period from 1950 through 1980, we find no evidence of trans-institutionalization for any of the demographic groups analyzed. For the twenty year period from 1980 to 2000, we find significant trans-institutionalization rates for all men and women, with a relatively large trans-institutionalization rate for men in comparison to women, and the largest trans-institutionalization rate observed for white men.

The magnitudes of these trans-institutionalization effect estimates suggest that deinstitutionalization has played a relatively minor role in explaining the phenomenal growth in U.S. incarceration levels. Our results indicate that 4 to 7 percent of incarceration growth between 1980 and 2000 can be attributed to deinstitutionalization. While this is a relatively small contribution to prison growth overall, the results do suggest that a sizable portion of the mentally ill behind bars would not have been incarcerated in years past.

2. Deinstitutionalization and the Criminal Justice System

Policies, Innovations, and Legal Decisions Driving Deinstitutionalization

Deinstitutionalization refers to the set of policies and treatment innovation driving the half-million person decrease in the mental hospital population between

1955 and the present. Initial declines during the late 1950s are often attributed to the introduction of medications, particularly phenothiazine, designed to control psychotic symptoms and permit more effective outpatient treatment for the least severe cases of mental illness. A further impetus towards reduction came with the 1966 introduction of the Medicaid and Medicare programs, under which the federal government committed to a fifty percent match for treatment costs in nursing homes. The match created an incentive for states to transfer all eligible residents of mental hospitals to nursing homes and other facilities; and many did. Such state responses account for much of the decline in the inpatient census during the 1960s and 1970s (Mechanic and Rochefort 1990).

The one policy change that embraced deinstitutionalization as an explicit goal occurred under the Kennedy administration. The 1963 Community Mental Health Service Act established Community Mental Health Centers (CMHCs) designed to provide outpatient, emergency, and partial hospitalization services for the mentally ill (Mechanic and Rochefort 1990). The legislation embodied the shift in professional opinion regarding the effectiveness of outpatient care and the importance of maintaining residence in the community.[2] A further force reducing inpatient population counts was the 1975 U.S. Supreme Court decision in *O'Connor v. Donaldson*. A key element of this decision was the finding that mental illness alone was not sufficient grounds for involuntarily commitment. In subsequent

[2]Many have questioned the effectiveness of this legislation, however, since the number of CMHCs falls far short of projected needs (Foly & Sharfstein 1983). Moreover, the CMHCs have been criticized as shunning individuals with the most severe and chronic mental health problems (Johnson 1990, Jencks 1994).

years, most states changed their involuntary commitment statutes to require that an individual be a danger to him or herself and/or to others, with varying evidentiary requirements, rendering involuntary commitment considerably more difficult (Ross et. al. 1996, Worth 2001).

To the extent that outpatient mental health services are inadequate, deinstitutionalization exposes severely and chronically mentally ill individuals to a number of competing risks. A risk that has received considerable attention concerns the relationship between untreated mental illness and homelessness (Jencks 1994, Torrey 1997). A competing risk that has received less attention concerns the probability of incarceration.

The size of the incarceration risk faced by the untreated mentally ill depends on the degree to which the mentally ill commit crimes. Moreover, whether the mentally ill are incarcerated in jail (where individuals serving sentences of less than a year and those awaiting arraignment and trial are held) or prison (where those serving time for felonies with sentences of a year or more are held) depends on the severity of offenses committed. Torrey (1997) notes that the mentally ill are often arrested for minor crimes such as shoplifting, engaging in lewd behavior, or failure to pay for a restaurant meal, offenses likely to result in a jail spell. Torrey also cites several instances of local authorities putting the mentally ill in local jails to provide a place for them to stay while awaiting more suitable psychiatric services.

A prison sentence, on the other hand, requires being convicted of a serious felony. Several studies address the issue of whether the mentally ill commit violent acts at a higher rate than that observed for the general public. An early review of

this research documents the consistent finding that discharged mental patients are arrested and convicted for violent crimes at a rate that exceeds that of the general adult population (Godwin-Rabkin 1979). The more recent literature reviews provided by Monahan (1992) and Frank and McGuire (2009) arrive at similar conclusions, noting the robustness of the relationship between mental illness and violence to alternative methodological approaches and model specifications.[3]

How prevalent is mental illness among prison and jail inmates?

The severely mentally ill are certainly over-represented among the incarcerated. Moreover, this is true for both prison and jail inmates suggesting that the criminal justice interactions of the untreated mentally ill extend beyond being jailed for safekeeping. Table 1 presents estimates of lifetime prevalence of various mental illnesses from the 2004 Survey of Inmates in State and Federal Corrections Facilities (SISFCF) and the 2002 Survey of Inmates in Local Jails (SILJ). These estimates are based on questions inquiring whether inmates have ever received a diagnosis of a specific mental illness from a health care professional. For comparison, the table also presents two sets of prevalence estimates for the general adult population; estimates by Kessler et. al. (1994) from the original National Comorbidity Survey, and estimates by Kessler et. al. (2005) from the National Comorbidity Survey Replication. While we could not find comparable estimates for

[3]Steadman et. al. (1998), assess the violent behavior of a sample of individuals discharged from acute psychiatric facilities. The authors find no difference in violent behavior between the mentally ill that do not abuse alcohol or drugs and members of the general population with no symptoms of substance abuse. For substance abusers, however, the mentally ill are relatively more violent, suggesting some interaction between mental illness and substance abuse. Frank and McGuire (2009) cite several studies that similarly find an interaction effect between mental illness and substance abuse on self-reported violent behavior.

each condition included in the inmate surveys, these studies do provide lifetime prevalence estimates for the most severe mental illnesses.

Lifetime prevalence among state prison inmates and local jail inmates are nearly identical with roughly one-quarter of each indicating at least one diagnosis. The prevalence of severe mental illness (manic depression/bipolar, or a psychotic disorder) among state prisoners and local jail inmates is very high (nearly 15 percent of each population, 3.1 to 6.5 times the rate observed for the general adult population). The rates of mental illness among federal prison inmates are somewhat lower. However, as federal prison inmates account for only 13 percent of the prison population, the overall prison prevalence rates are closer to those for state prisoners.

Tables 2, 3, and 4 present average characteristics for state prisoners, federal prisoners, and jail inmates by mental health status. Each table provides tabulations for all inmates, for inmates with no diagnosed mental illness, for inmates with any diagnosis, and for inmates diagnosed with bipolar disorder/manic depression or psychotic disorder (the severely mentally ill). There are several notable patterns in Table 2. First, while males and racial and ethnic minorities are heavily over-represented among state prison inmates, this is less the case among mentally ill inmates. For example, while 93 percent of state prisoners are male, approximately 85 percent of severely mentally ill inmates are male. Similarly, whites account for 49 percent of all inmates; they account for 63 percent of mentally ill inmates.

These patterns are consistent with the research documenting differences in the prevalence of mental illness across demographic groups. In their review of fifty

years of research on this topic, Frank and Glied (2006) find relatively comparable lifetime prevalence rates of severe mental illness for men and women and for different racial groups. While low socioeconomic status adults are over-represented among the mentally ill, it is difficult to rule-out a reverse causal effect of mental illness on socioeconomic status.[4] Regardless, as mental illness does not discriminate, it is noteworthy that the demographics of the incarcerated mentally ill are closer to the demographics of the general adult population than are those for the incarcerated overall.

Mentally ill state prisoners are only slightly more likely to be serving time for a violent crime (50.6 percent of all mentally ill compared to 47.1 percent of inmates without a diagnosis). The severely mentally ill are considerably more likely to be serving time for a property crime (6 percentage points more likely), and are somewhat less likely to be doing time for a drug offense. Finally, mentally ill prison inmates are more likely to indicate that they suffered a spell of homelessness in the year preceding the arrest leading to their current incarceration. While 17.3 percent of inmates with severe mental illness experienced homelessness prior to their current arrest, the comparable figure for inmates with no diagnosed mental illness is 6.5 percent.

We observe similar demographic patterns for federal prison inmates, with lower proportions male, higher proportion white, and lower proportions Latino and black among the severely mentally ill. We also observe a strong relationship

4 While one might contend that socioeconomic status based on parental characteristics takes care of this problem, there is strong intergenerational correlation between the mental health of parents and their offspring (Gottesman 1991).

between mental illness and the likelihood of being homeless prior to arrest. Mentally ill federal inmates are considerably more likely to be held for violent crime than are inmates with no diagnosis and considerably less likely to be serving time for a drug crime. One pattern that is unique to the federal system concerns the proportion serving time for a weapons violation. Inmates with severe mental illness are eight percentage points more likely to be help for a weapons violation than are inmates with diagnosed metal illness. Under federal law, individuals who have been "adjudicated mentally defective" or "committed to a mental health institution" are prohibited from purchasing firearms (Daly 2008). This differential treatment of the mentally ill under federal law may explain this disparity.

The comparisons for jail inmates largely conform to the patterns observed for state and federal prison inmates. We see similar patterns with regards to gender and race. Over one-fifth of severely mentally ill inmates were homeless prior to arrest. Severely mentally ill inmates are also nearly twice as likely to have been arrested for a violent crime relative to inmates with no such diagnosis. One interesting finding that jumps out from this table is the relatively small proportion of inmates who are being held for safekeeping. Only half a percent of all inmates are described in this manner. While this is three times the comparable value for non-mentally ill inmates, it is still remarkably low.

Prior research on the trans-institutionalization of the mentally ill

There are several studies that directly correlate prison populations with mental hospital population. Penrose (1939) is probably the first to raise the issue. Data on 18 European countries revealed a negative correlation between the size of

the prison and mental hospital populations. Based on this inverse correlation, Penrose advanced what he labeled the "balloon theory;" assuming a stable population in need of institutionalization, squeezing the population of one institution (for example, closing mental hospitals) will cause a ballooning of the other. By modern standards the study is flawed,[5] but it is interesting to note that the inverse relationship observed in Figure 1 existed in a different time and place.

A more recent study provides a simple time series analysis of aggregate national data for the U.S. between 1926 and 1987 (Palermo, Smith, & Liska 1991), revealing significant negative correlations between the size of mental hospital population and prison and jail populations. No attempt is made to control for other possibly important variables or to assess the direction of causality. Nonetheless, the correlations are strong (the Pearson correlation coefficients for various time periods range from -.4 to -.5) and highly significant.

3. Putting an Upper Bound on the Possible Contribution of Deinstitutionalization to Prison and Jail Growth

The research findings regarding the relationship between severe mental illness and criminal activity, combined with the over-representation of the mentally ill behind bars suggests that deinstitutionalization may be an important contributor to U.S. prison growth during the last few decades of the 20th century. However, a careful analysis of the characteristics of those in mental hospitals during the peak-

[5]There is no attempt to control for other determinants of the institutionalized population and no attempt to net out common trends -- i.e., the panel aspects of the data analyzed are not fully exploited.

period of use reveals large differences between the characteristics of those who were subsequently deinstitutionalized and those who experienced large increases in incarceration rates.

To be specific, prison and jail inmates in the United States are overwhelmingly male, disproportionately minority, and are relatively young. The same cannot be said for mental patients at mid century. Table 5 uses data from the Public Use Microdata Samples (PUMS) of the U.S. Census of Population and Housing for the years 1950 through 1980 to characterize mental hospital inpatients, prison and jail inmates, and the non-institutionalized.[6] Beginning with tabulations for 1950, there are several notable differences between the inpatient and correctional populations. First, the mental hospital population is considerably older with larger proportions over 40 and a population 65 and over that is more than ten times the comparable figure for the correctional population. Second, the proportion black or Hispanic is not appreciably larger than the comparable proportion for the non-institutionalized population, while minorities are very much over-represented in prisons and jails. One of the most pronounced disparities is the gender composition. Nearly half of the mental hospital population is female, while in 1950 only 9 percent of those in prison or jail are women.

Between 1950 and 1980, the mental hospital inpatient population becomes younger, more minority, and more male, although the elderly and women still constitute larger proportions of mental hospital inpatients than they do of prison and jail inmates. These changes suggest that deinstitutionalization proceeded in a

6 For each of the census years, one is able to distinguish those in mental hospitals from those in correctional institutions using the detailed group quarters variable.

non-random fashion, with institutionalization rates declining first for those who are perhaps the least likely to be trans-institutionalized (for example, women and/or the elderly), followed by subsequent declines in mental hospital institutionalization among groups who subsequently experience increases in incarceration (young men and racial and ethnic minorities). While we cannot measure further changes in the composition of the mental hospital population beyond 1980 as this is the last year that the census separately identifies mental hospital inpatients, we know from aggregate statistics that by 2000 the mental hospital population becomes trivially small. Hence, the 1980 mental hospital population largely represents the demographics of those deinstitutionalized over the subsequent two decades.

These demographic differences between prison and jail inmates and mental hospital patients suggest that the potential impact of deinstitutionalization on prison growth is substantially less than what one might infer from comparisons of aggregate time series. While the 1950 to 2000 decline in mental hospital institutionalization rates is of comparable magnitude to the late century increase in incarceration a fact that may lead one to believe that we are simply re-housing the mental patients of 1950 in current prisons and jails, the demographic dissimilarities in Table 5 suggest that one should be cautious about drawing such an inference.

To illustrate the importance of these compositional differences, we pose the following two questions. First, how has the overall institutionalization risk (in either mental hospitals or prisons/jails) for someone who is institutionalized in 2000 changed since 1950? Second, how did the institutionalization risk for someone institutionalized in 1950 change over the subsequent half century? If we

have simply transferred the same types of people from one institution to another, the 2000 institutionalization risk of the currently institutionalized should resemble what their comparable institutionalization risks at mid-century. Similarly, the institutionalization risk in 2000 of those institutionalized in 1950 should equal their institutionalization risk in 1950.

To answer these questions, we calculate the following weighted average institutionalization risks. Let *i* index the eight age groups between 18 and 64 listed in Table 5, *r* index the four race/ethnicity groups, *g* index gender, and *t* index year. Furthermore, define w_{girt} as the proportion of the institutionalized population in year *t* that is of gender *g*, age group *i*, and race/ethnicity group *r*, and define I_{girt} as the corresponding institutionalization rate for this group. Taking the product of the group specific institutionalization rate and the group institutionalization share and summing over all dimensions gives the institutionalization risk for someone with demographic characteristics that mirror those of the average institutionalized person. For example, this institutionalization risk in 2000 for those institutionalized in 2000 is

(1) $$IR_{2000}^{2000} = \sum_{g}\sum_{i}\sum_{r} w_{gir\,2000}\, I_{gir\,2000}.$$

The value in equation (1) will of course exceed the overall institutionalization rate as it is a weighted average with higher weights placed on those demographic groups that disproportionately comprise the institutionalized population.

To answer the two questions posed, we calculate the institutionalization risk for each analysis year for the institutionalized population from a specific year. For

example, the institutionalization risk in 1950 for someone with demographic characteristics that resemble the institutionalized in 2000 is given by the equation

$$IR_{1950}^{2000} = \sum_{g}\sum_{i}\sum_{r} w_{gir\,2000}\, I_{gir\,1950}. \tag{2}$$

To the extent that we are institutionalizing the same people in 2000 as we did in 1950, the alternative risk measures in equations (1) and (2) should be of comparable magnitude.

Figure 2 graphically depicts the overall institutionalization rate for adults 18 to 64 years of age for each year between 1950 and 2000 as well as the institutionalization risk in each year for those who resemble the 2000 institutionalized population and for those who resemble the 1950 institutionalized population. The overall institutionalization risk exhibits a pattern comparable to that in Figure 1; a substantial decline between 1960 and 1980 from 1,156 per 100,000 to 716 per 100,000 followed by a more than offsetting increase to 1,309 per 100,000 in 2000. The institutionalization risk for those resembling the 1950 institutionalized population exceeds the overall risk in the peak year of 1960 by about 14 percent. However, by 2000 the institutionalization risk for this group falls short of the overall institutionalization rate by approximately 7 percent. Moreover, relative to the 1960 peak this weighted institutionalization risk declines by nearly 9 percent.

By contrast, the institutionalization risk weighted by the 2000 institutionalization shares exhibits a sharp increase between 1950 and 2000. Relative to the peak year of 1960, the institutionalization risk for this group increase

nearly 80 percent from 2,521 per 100,000 to 4,512 per 100,000. In conjunction, these two series suggest real declines in the institutionalization risks for those who would have been institutionalized in the past (both absolutely and relative to overall trends) and real, particularly large increases in institutionalization risks for those who are most likely to be institutionalized today.

The dissimilarities between those in mental hospitals and those in prisons and jails as well as the limits of the potential contribution of deinstitutionalization to prison growth becomes particularly salient when we take a close look at the period between 1980 and 2000. Note, nearly 92 percent of growth in U.S. incarceration rates occurring between 1950 and 2000 happens during this latter period, with most of the remaining eight percent occurring during the latter half of the 1970s. Figures 3 through 6 present comparisons of mental hospitalization rates in 1980 to change in incarceration rates between 1980 and 2000 for white and black males (figures 3 and 4) and white and black females (figures 5 and 6). Each figure provides comparisons for eight age groups between 18 and 64. Note, we would ideally wish to compare the change in mental hospital institutionalization rates over this period to the corresponding changes in incarceration rates. However, the census does not separately identify the incarcerated from mental hospital inpatients in public use microdata beyond 1980. Nonetheless, we know that by 2000 the overall population of state and county mental hospitals declines to below 60,0000 people, and declines in all states. Thus, if one assumes for the sake for the argument that the mental hospital population zeros-out by 2000, the change in incarceration can be measured by the difference between the 2000 institutionalization rate and

the 1980 incarceration rate, while the change in mental hospital inpatient rates simply equals negative one times the inpatient rate for the base year 1980. The base mental hospital population rate can be thought of as providing an upper bound estimate of the potential contribution of deinstitutionalization to incarceration growth.

For white males, the mental hospital inpatient rate in 1980 is roughly 12 to 17 percent of the change in incarceration rates occurring between 1980 and 2000, with larger percentage figures for older groups of males. For black males, the comparable figures are considerably smaller. For relatively young black males (under 40) the base mental hospital inpatient rates range from three to six percent of the change in incarceration occurring over the subsequent two decades. Similar to white males, the comparable figures for older groups of black males are higher, though never exceeding 20 percent of the actual change. For white women, mental base hospitalization rates constitute relatively larger proportions of the subsequent change in incarceration (40 to 60 percent) while for black females the comparable figures range from 10 to 30 percent across age groups.

These comparisons can be used to calculate an upper bound of the potential contribution of deinstitutionalization to incarceration growth as well as several estimates of the impact of deinstitutionalization under alternative trans-institutionalization rates between mental hospitals and prisons. To do so, we first tabulate what the incarceration rate would have been in 2000 for demographic groups defined by gender, race/ethnicity, and age assuming (1) that the mental hospitalization rate did not decline from the 1980 value, and (2) that each one-

person change in the mental hospitalization rate causes a one-person change in the incarceration rate of opposite sign. We then use actual 2000 population shares across the gender/race/age groups to tabulate a hypothetical overall incarceration rate in 2000. Comparing actual growth to counterfactual growth towards this hypothetical rate provides our upper bound estimate.

Table 6 provides some of the intermediate inputs for this tabulation (to conserve space, we don't provide the age-specific tabulations). The first two columns of figures present the actual incarceration rate in 1980 as well as the actual institutionalization rate in 2000 by gender and race/ethnicity. The third column presents the hypothetical incarceration rate for each group assuming one-for-one trans-institutionalization and assuming a change in mental hospital inpatient rates equal to negative one times the base rate in 1980. The fourth and fifth columns provide alternative hypothetical estimates assuming trans-institutionalization rate of 0.5 and 0.25.

The results of this exercise reveal the likely modest contribution of deinstitutionalization to incarceration growth. Starting with black males, these tabulations indicate that at most deinstitutionalization contributed 331 persons per 100,000 to the 5,842 persons per 100,000 change in the incarceration rate experienced by black males (less than 6 percent of growth). For white males, the tabulations suggest that deinstitutionalization could be culpable for at most 17 percent of incarceration growth. The comparable figure for Hispanic males is four percent. Among women, the upper bound estimates suggest that deinstitutionalization may be a proportionally more important contributor to

incarceration growth (39 percent for white women, 19 percent for black women, 16 percent for other women, an 26 percent for Hispanic women). Naturally, when we assume lower trans-institutionalization rates, the tabulated contribution of deinstitutionalization to prison growth falls.

Of course, our upper bound estimate of the overall contribution of deinstitutionalization to prison growth over this latter time period will more closely reflect the group-specific estimates for demographic groups that constitute disproportionate shares of the prison population. That is to say, the overall impact will be closer to that of males, and in particular, to that of black and Hispanic males. Figure 7 graphically displays the actual incarceration rates for 1980 and 2000 and several hypothetical overall incarceration rates in 2000 assuming no deinstitutionalization between 1980 and 2000 and one-for-one trans-institutionalization, trans-institutionalization of one-half for one, and trans-institutionalization of one-quarter for one. The hypothetical 2000 incarceration rate assuming a one-for-one transfer rate is roughly 90 percent of the actual rate for that year. Growth between 1980 and this hypothetical rate amounts to 87 percent of the actual growth in incarceration rates occurring between 1980 and 2000. In other words, these tabulations indicate that deinstitutionalization over this periods can account for no more than 13 percent of corresponding growth in incarceration. To be sure, the estimated contributions to incarceration growth are smaller when we assume lower trans-institutionalization rates (7 percent assuming a transfer rate of 0.5 and 3 percent assuming a transfer rate of 0.25).

While the potential contribution to overall incarceration growth is relatively modest, the potential contribution to growth in incarceration levels of the mentally ill is much larger. Above, we presented estimates from inmate surveys finding that 14.3 percent of state prison inmates, 6.1 percent of federal prison inmates, and 14.7 percent of local jail inmates have a prior diagnosis of severe mental illness. Combining these lifetime prevalence rates with 2000 correctional population totals suggests that in 2000 there was roughly 277,000 incarcerated severely mentally ill individuals (66 percent of which were in state or federal prison). The hypothetical estimate in Figure 7 assuming a one-for-one transfer rate suggests that deinstitutionalization contributed a maximum of 129 per 1000,000 to the adult incarceration rate in 2000. With approximately 108 million adults between 18 and 64 in 2000, this contribution translates into 140,000 additional prisoners (roughly half of the population of incarcerated persons with severe mental illness).

Moving beyond upper-bound estimates requires that we generate more precise estimates of the trans-institutionalization rate. We turn next to this estimation challenge.

4. Estimating the Transfer Rate from Mental Hospitalization to Incarceration

There are a number of reasons to suspect that the empirical relationship between the mental hospital inpatient rate and the incarceration rate should be heterogeneous, with a stronger empirical association in latter years, and perhaps a stronger association for certain demographic subgroups. Given the differences between the forces driving early deinstitutionalization (new drug therapies and the

incentives created by Medicare) and the forces driving latter declines (legal challenges to involuntary commitments), it is likely that deinstitutionalization followed a chronologically selective path with the least ill and perhaps the least prone to felonious behavior deinstitutionalized first. This alone suggests that the impact of declining inpatient populations on prison growth may be larger during the latter decades of the twentieth century.

Beyond selective deinstitutionalization, the impact of declining hospitalization rates on prison counts should interact with the degree of stringency in sentencing policy. In other words, a one person decline in the mental hospitalization rate will have a larger impact on incarceration the more likely society is to incarcerate a criminal offender and the longer the effective prison sentence. A further concern is the possibility that increases in incarceration may reverse cause declines in the mental hospital population, to the extent that the mentally ill get caught up in correctional systems or if corrections expenditures displace expenditures on mental health services.[7] Both suspicions are plausible as the likelihood of being sent to prison conditional on committing a crime has increased[8] as has the share of state budgets devoted to operational and capital correctional expenditures. In our empirical estimate below we can rule out the possibility of a reverse causal effect of prison growth on the pace of deinstitutionalization by exploiting variation in this pace occurring across demographic groups within states. However, a reverse causal effect operating

7 Indeed, Gertskow and Ellwood (2009) find that correctional expenditures displace spending on budget items usually covered by state health services departments.
8 Raphael and Stoll (2009) demonstrate that between 1984 and 2002 the admissions rates into U.S. prisons increased sharply as did the expected value of time served conditional on the conviction offense.

through a higher "competing risk" of incarceration for the mentally ill in recent years will qualify the causal interpretation of the estimates below.

In the remainder of this section, we present a series of estimates of the trans-institutionalization rate between mental hospitals and prisons that attempt to account for some of these factors. We first estimate the empirical relationship during the early phases of deinstitutionalization (1950 through 1980). We then present estimates for the period from 1980 to 2000.

Estimates for 1950 through 1980

To estimate the trans-institutionalization rate for this early phase of deinstitutionalization, we employ data from the one percent PUMS files of the U.S. census for the years 1950, 1960, 1970, and 1980. Again, these census years permit separate identification of those institutionalized in mental hospitals and those institutionalized in jails or prisons. For each year, we estimate the proportion in mental hospitals and the proportion incarcerated for demographic sub-groups defined by state of residence, gender, the eight age groups listed in the stub of Table 5 between 18 and 64, and the four mutually-exclusive race/ethnicity groups that we have been using throughout our discussion. We estimate a series of models where the dependent variable is the group-specific, inter-census change in the incarceration rate and the key explanatory variable is the corresponding change in the hospitalization rate.

The exact model specification that we estimate for each gender is given by

$$\Delta Incarceration_{tsgra} = \alpha_{tsg} + \beta_{sgr} + \delta_{sga} + \gamma_g \Delta hospitalization_{tsgra} + \varepsilon_{tsgra} \quad (3)$$

where t indexes specific ten year periods, s indexes states, g indexes gender, r indexes race/ethnicity, a indexes age groups, $\Delta Incarceration_{tsgra}$ is the inter-census change in the incarceration rate for a specific ten-year period, in state s, for group gra, $\Delta hospitalization_{tsgra}$ is the corresponding change in the mental hospitalization rate, $\alpha_{tsg}, \beta_{sgr}, \delta_{sga}$, and γ_g are parameters to be estimated, and ε_{tsgra} is a random error term.

Note, the key parameter of interest, γ_g, is permitted to vary by gender. We expect a priori that this coefficient should be negative for both genders, but perhaps larger in absolute value for men relative to women. The specification includes decade-state-gender fixed effects to control for any corrections policy changes that may vary across decades and have differential impact on gender groups. These fixed effects also control for a possible reverse-causal impact of incarceration growth on hospitalization rates operating through state budgetary displacement, assuming the impact of such budgetary pressures is the same within gender. The state-gender-race fixed effects adjust both series for average differences in ten-year changes in incarceration and hospitalization rates that vary by state, gender, and race, while the state-gender-age fixed effects account for similar differences along groups defined by this triple interactions. In addition, we also estimate equation (3) separately for each of the four racial/ethnic groups, effectively interacting all of the fixed effects with race and permitting the gender-specific trans-institutionalization parameter to vary for each racial/ethnic group. All models are weighted by the number of observations used to compute the incarceration rate in the starting year

of the change observation. Finally, in calculating standard errors for our parameters, we cluster on gender-race-state-age cells.

Table 7 presents estimations results for the period from 1950 to 1980. For all men pooled, men by race/ethnicity, all women pooled, and women by race/ethnicity, the table reports estimates of the trans-institutionalization parameter from several alternative specifications. First, we estimate the parameter with no controls. Next, we add year, state, age, and race fixed effects. We then add interaction terms between year and state to the previous specification. Finally, we estimate the complete model as specified in equation (3). There is essentially no evidence of a negative relationship between incarceration and institutionalization rates during this early period. All of the coefficients are relatively small and insignificant, and few have the theoretically expected sign. Thus, we conclude that during the early phases of deinstitutionalization, there is no evidence that the declining mental hospital population counts contributed to prison growth.[9]

Estimating the Tran-Institutionalization Parameter for the 1980 to 2000 Period

Beginning with the 1990 census, the PUMS data stopped separately identifying mental hospital inpatients and prison and jail inmates (all are lumped together as residing in institutional group quarters). Hence, the exact equation that we estimate for the earlier phase of deinstitutionalization cannot be estimated for this latter phase. However, the ability to separately identify mental hospital inpatients in 1980 coupled with the fact that the mental hospital population declined to very low levels by 2000 (despite substantial population growth over this

9 We also estimated models separately by decade to test for possible heterogeneity along this dimension. Similar to the results in Table 7 we found little evidence of a trans-institutionalization effect.

time period) does allow us to construct a proxy for the actual change in hospitalization rates occurring within demographic groups.

Specifically, we gauge the change in hospitalization rates between 1980 and 2000 by negative one times the base hospitalization level in 1980. This approximation would be exact if the mental hospital population declined to zero by 2000. As this is not the case however, we sought corroborating evidence on the suitability of our proxy using state level data on state and county mental hospital populations for this time period. Figure 9 presents a state-level scatter plot of the change in mental hospital inpatients per 100,000 between 1980 and 2000 against the mental hospital inpatient rate in 1980. As is evident in the graph, the base level in 1980 is a very strong predictor of the overall change in hospitalization rates over the subsequent two decades. The slope coefficient on the bivariate regression lines fit to the data is near -1 (the exact coefficient is -0.73 with a standard error of 0.04) and the explanatory power of this simple regression is quite high (R^2 = 0.87). Hence, the 1980 hospitalization value provides a strong proxy for the subsequent change in hospitalization rates through 2000.[10]

For the period from 1980 to 2000, we thus estimate the equation

$$(4) \qquad \Delta Incarceration_{gsra} = \alpha_{gsr} + \beta_{gsa} + \gamma_g hospitalization\_1980_{gsra} + \varepsilon_{gsra}$$

where all dimensions and variables are as define above, and where we have substituted the base mental hospitalization rate for the actual change. There are a

10 We also produced similar graphs using specific demographic cohorts for early decades for which we can observe mental hospitalization for both the beginning and ending years (for example, the change from 1970 to 1980 in the PUMS data). These analyses produced similar results – i.e., base level institutionalization rates are strong predictors of the actual changes occurring within specific demographics groups.

few differences between this model and that specified for the earlier period that bear mentioning. First, since we observe only one change per demographic group (following from the fact that we cannot observe hospitalization rates for 1990) we have dropped the time subscript and all interactive fixed effects with time. Second, since we cannot separately identify the incarcerated from mental hospital inpatients in 2000, we effectively assume that all adults within our age range of study that are in institutional group quarters in 2000 are incarcerated in prisons or jails. Hence, the change in incarceration for each sub-group is measured by the overall institutionalization rate in 2000 for that group minus the proportion incarcerated in 1980. Similar to the results for the earlier period, we also estimate equation (4) separately for each racial/ethnic. The one necessary change when we estimate separate models by race/ethnicity is that we must drop the gender-state-age interactions since there is only one observation per age groups in each state. Again, all models are weighted by the number of observations used to compute the incarceration rate in the starting year of the change observation. We estimate the model in equation (4) using data from the 5 percent PUMS files for 1980 and 2000.

Table 8 presents the results from this analysis. The first column presents estimates of the coefficient on the 1980 hospitalization rate[11] by gender and by gender interacted with race/ethnicity when no other controls are added to the model. The second column presents estimates of the trans-institutionalization effect from estimating the complete specification in equation (4). There is

11 Before estimating the regression we multiplied the base hospitalization rate by negative one. With this transformation, evidence of a trans-institutionalization effect would require a negative statistically significant coefficient on the pseudo-change in hospitalization.

considerably stronger evidence of trans-institutionalization during this latter period, especially for men. The bivariate regression estimate for all men pooled yields an implausible large statistically-significant negative coefficient. After adding the complete set of fixed effects in equation (4), the coefficient attenuates considerably yet remains significant at the one percent level of confidence. The estimate suggests that each one percent change in the male hospitalization rate between 1980 and 2000 resulted in a 0.4 increase in the corresponding male incarceration rate.

The results for men by race and ethnicity reveal further heterogeneity in this relationship. The bivariate regression for white males gives a large positive and significant effect of changes in mental hospitalization on incarceration. The corresponding results from the complete specification, however, yields a significant (at the one percent level) negative impact for white males. In fact, the estimate suggests a near one-for-one transfer rate from mental hospitals to prisons for white men over this time period. For black males, the bivariate estimate is negative yet insignificant while the estimate from the complete specification is negative (-0.501) yet imprecisely estimated. The p-value on this coefficient is 0.130. For other men and Hispanic men there is no evidence of trans-institutionalization.

The results for women indicate that the relationship between the hospitalization and the incarceration rate is substantially weaker than that observed for men. For women overall, the coefficient estimate on the pseudo-change in hospitalization is significant and negative in both the bivariate model as well as in the complete specification (at the one percent level in the former and the 10 percent

level in the latter). The magnitudes of these estimates, however, are substantially lower than those observed for men. While there are several negative coefficients in the race/ethnicity-specific estimate for women, none of the estimates from the complete model specification are significant.

Thus, we do find evidence of trans-institutionalization for the latter phases of deinstitutionalization but not for the first few decades of this process. This pattern is in line with expectations, as deinstitutionalization proceeded in a chronologically selective manner and since those deinstitutionalized after 1980 (either literally through release or effectively by not being admitted to a mental hospital when in the past they would have) were subject to increasingly harsh penalties for criminal activity.

Did stiffer sentencing policies drive the decline in mental hospital inpatient populations?

In the introduction to this section, we raised two potential alternative interpretations of a negative relationship between mental hospitalization and incarceration, both where changes in the incarceration rate are reverse causing the decline in the mental hospital inpatient population (the opposite of what we are hypothesizing). First, budgetary pressures caused by increasing prison population may force states to pair back resources allocated to state mental hospitals. We believe that our empirical methodology addresses this particular threat to internal validity by the inclusion of state fixed effects in our change regressions and the analysis of multiple demographic groups within states.

The second reverse-causal explanation operates through an enhanced risk of incarceration due to sentencing changes enhancing the competing risk of incarceration for the mentally ill. Policies that increase the extensiveness and intensity of the use of prison as punishment will increase the likelihood that an untreated mentally ill person gets caught up in the criminal justice system, perhaps precluding an involuntary commitment to a mental hospital. The qualitative interpretation of the large mentally-ill population currently behind bars is substantially different under this alternative scenario. Rather than deinstitutionalization effectively hoisting the mentally ill into state corrections systems, a more aggressive sentencing structure is capturing and punishing the mentally ill with incarceration, effectively diverting these individuals away from state mental health systems.

While this subtle difference in interpreting an inverse relationship may appear to be splitting hairs, the importance of this distinction extends beyond mere semantics. If deinstitutionalization post-1980 is responsible for this inverse relationship, than it must necessarily be the case that the reduction in the likelihood of a mental health intervention has resulted in more crime, and by extension more crime victims, than the nation would have otherwise experienced has this change not occurred. On the other hand, if newly aggressive sentencing is driving the inverse relationship, then the criminal justice system is simply more likely to incarcerate (and perhaps incarcerate for longer periods) those among the mentally ill who commit felonies. Under such circumstances, crime may actually decrease due to greater incapacitation.

One way to address this more subtle identification problem would be to find a third factor that impacts mental hospitalization rates but impact prisons only indirectly through its impact on hospitalization. With such a variable, we could re-estimate the models in Tables 7 and 8 using instrumental variables rather than OLS. We were unable to identify such a variable that varies at the level of demographic groups that we employ in this paper. One possibility that we explored in detail is to use inter-state differences in the stringency of laws pertaining to the involuntary commitment of the mentally ill and re-estimate our model using state-level data on incarceration and hospitalization. The intuition here is that states with more stringent standards should have exogenously lower mental hospital populations. Quantifying these standards across states and over time, however, proved to be quite difficult. First, the language of state statutes is quite similar and thus it is difficult to identify differences that in practice would result in differences in hospitalization rates. For example, all states allow for the involuntary civil commitment of those who, as a result o their illness, pose a danger to themselves or others. The primary existing differences pertain to whether someone who is "gravely ill" (unable to care for oneself) can be involuntarily committed and the evidentiary requirements stipulated in the legislation (Ross, Rothbard, and Shinnar 1996). We are unable to find a strong first-stage effect of this statutory variation on hospitalization rates.[12]

12 We estimated several alternative two-stage-least-squares models using a single year of cross-sectional state observations and two alternative characterizations of state involuntary commitments laws. In the first model we used data from the 1980s and a classification scheme developed by Ross, Rothbard and Shinnar (1996). While we did find a weak first-stage relationships, the standard errors from the 2SLS model for our parameter of interest was too large to draw any conclusive inferences. For the second model, we used a classification scheme constructed by the American Bar Foundation (Parry 1994) characterizing state laws

Second, the existing body of state case law plays an important role in determining how easy or hard it is to commit someone involuntarily (Brakel, Parry, and Winer 1985, LaFond and Durham 1992). Given that this case law is not necessarily reflected in the language of state statutes and given the enormity of the task of categorizing the body of cases related to involuntary commitment proceedings, using variation in state precedents does no appear to be a viable identification strategy.

In light of this potential identification problem, we must place a qualification on the interpretation of our estimation results. Essentially, the negative partial correlation between incarceration and hospitalization rates that we observe for some demographic groups for the period 1980 through 2000 may reflects both causal effects of deinstitutionalization on prison as well as stiffer sentencing policies increasing the likelihood that the competing risk of prison wins out over that of mental hospitals for the mentally ill. While a causal impact of deinstitutionalizations must necessarily result in additional crime and victimization to generate the prison increase, a causal effect in the opposite direction likely prevents crime through the earlier and perhaps longer incapacitation of the criminally-active mentally ill. That said, both causal stories imply that more mentally ill serve time in prisons and jails rather than mental hospitals as a results of these policy shifts.

5. Discussion

---

as of 1994. Here we find no first stage relationship. The two classifications schemes are sufficiently different to prevent their combinations to form a two-year panel.

The estimation results from the previous section can be used to estimate the proportion of prison growth attributable to those who in years past would likely have been mental hospital inpatients. Using the gender-specific trans-institutionalization parameter estimates for the 1980 to 2000 period, our estimates suggest that such individuals account for four percent of incarceration growth during this period. Employing the trans-institutionalization parameters estimated separately by gender and race, our models suggest that that the incarceration of those who would have formally been hospitalized accounts for seven percent of prison growth between 1980 and 2000. Thus, despite the impressions created by the juxtaposition of aggregate trends, deinstitutionalization is not the smoking gun behind the tremendous growth in incarceration rates. While a significant contributor, mental health policy is of second-order importance when compared against the contribution of shifts in sentencing policy occurring within most states.

Nonetheless, it is certainly the case that a relatively high proportion of the currently incarcerated mentally ill would not have been incarcerated in years past and would likely be receiving inpatient treatment in a mental facility. For the year 2000, our estimates indicate that there are between 40,000 and 72,000 incarcerated individuals who in years past would likely have been mental hospital inpatients. Relative to a stock of 277,000 severely mentally ill, this constitutes 14 to 26 percent of the mentally ill incarcerated population.

Certainly, it would be preferable from the viewpoint of the mentally ill as well as from that of crime victims to intervene prior to the commission of a felony. There is research evidence finding that mental health interventions impact violent crime,

suggesting that the criminal activity associated with mental illness could be prevented through non-criminal justice channels. Perhaps most relevant to the current paper, Harcourt (2006) finds significant relationships between total institutionalization rates inclusive of mental hospital inpatients and state-level homicide, suggesting that the withdrawal of service in the form the shuttering of mental hospitals leads to more crime. A more positive development concerns the findings of Marcotte and Markowitz (2009). The authors demonstrate a negative association between increases in prescription for antidepressants and ADHD medication and violent crime. Both papers suggest that the current criminal activity attributable to the mentally ill is not a necessary consequence of this particular human ailment.

In addition, interventions that prevent incarceration among those with severe mental illness would certainly benefit those diverted from prisons and jails. The regimented, often predatory, environment common in U.S. prisons are not ideal setting for treating mental illness. It is likely the case that the mentally ill are at elevated risk for assault and victimization while incarcerated, and likely receive insufficient mental health services.

References

Brakel, Samuel J.; Parry, John; and Barbara A. Weiner. 1985. *The Mentally Disabled and the Law, 3rd Addition*. Chicago, IL: American Bar Foundation.

Daly, Rich. 2008. People with Mental Illness Target of New Gun Law. *Psychiatric News* 43(3): 1.

Ellwood, John W. and Joshua Guetzkow. 2009. Footing the Bill: Causes and Budgetary Consequences of State Spending on Corrections. Pp. 207-238 in *Do Prisons Make Us*

Safer? The Benefits and Costs of the Prison Boom, edited by Steven Raphael and Michael Stoll. New York, NY: Russell Sage Foundation.

Foley, H. A. and S. S. Sharfstein. 1983. *Madness and Government: Who Cares for the Mentally Ill?* Washington, D.C.: American Psychiatric Press.

Frank, Richard G. and Shelly Glied. 2006. *Better But Not Well: Mental Health Policy in the United States Since 1950*. Baltimore, MD: Johns Hopkins University Press.

Frank, Richard G. and Thomas G. McGuire. 2009. Mental Health Treatment and Criminal Justice Outcomes. Working paper No 15858. National Bureau of Economic Research, Cambridge, MA.

Harcourt, Bernard. 2006. Should We Aggregate Mental Hospitalization and Prison Population Rates in Empirical Research on the Relationship Between Incarceration and Crime, Unemployment, Poverty, and Other Social Indicators? *Public Law and Legal Theory Working Paper #114*. Chicago, IL: The Law School, The University of Chicago.

Gottesman, Irving I. 1991. *Schizophrenia Genesis: The Origins of Madnes.* New York, NY: W.H. Freeman and Company.

Godwin Rabkin, Judith. 1979. Criminal Behavior of Discharges Mental Patients: A Critical Appraisal of the Research. *Psychological Bulletin* 86(1): 1-27.

James, Doris J. and Lauren E. Glaze. 2006. *Mental Health Problems of Prison and Jail Inmates*. Washington, D.C. U.S. Bureau of Justice Statistics, Office of Justice Programs, Report NCJ 213600.

Jencks, Christopher. 1994. *The Homeless*. Cambridge, MA: Harvard University Press.

Johnson, Braden Ann. 1990. *Out of Bedlam: The Truth About Deinstitutionalization*. New York, NY: Basic Books.

Kessler, Ronald C.; McGonagle, Katherine A.; Zhao, Shanyang; Nelson, Christopher B.; Hughes, Michael; Eshleman, Suzann; Wittchen, Hans-Ulrich, and Kenneth S. Kendler. 1994. Lifetime and 12-Month Prevalence of DSM-III-R Psychiatric Disorders in the United States. *Archives of General Psychiatry* 51: 8-19.

Kessler, Ronald C.; Berglund, Patricia; Demler, Olga; Jin, Robert; Merikangas, Kathleen R.; and Ellen E. Walters. 2005. Lifetime Prevalence and Age of Onset Distributions of DSM-IV Disorders in the National Comorobidity Survey Replication. *Archives of General Psychiatry* 62: 593-602.

La Fond, John Q. and Mary L. Durham. 1992. *Back to the Asylum: The Future of Mental Health Law and Policy in the United States.* New York: Oxford University Press.

Marcotte, Dave E. and Sarah Markowitz. 2009. A Cure for Crime? Psycho-Pharmaceuticals and Crime Trends. Working Paper No 15354. National Bureau of Economic Research, Cambridge, MA.

Mechanic, David and David A. Rochefort. 1990. Deinstitutionalization: An Appraisal of Reform. *Annual Review of Sociology* 16: 301-327.

Monohan, John. 1992. Mental Disorder and Violent Behavior. *American Psychologist* 47: 511-521.

Palermo, George B; Smith, Maurice B. and Frank J. Liska. 1991. Jails Versus Mental Hospitals: A Social Dilemna. *International Journal of Offender Therapy and Comparative Criminology* 35(2): 97-106.

Parry, John. 1994. Survey of Standards for Extended Involuntary Commitment. *Mental and Physical Disability Law Reported* 18(3): 329-336.

Penrose, Lionel. 1939. Mental Disease and Crime: Outline of a Comparative Study of European Statistics. *British Journal of Medical Psychology* 18: 1-15.

Raphael, Steven. 2000. The Deinstitutionalization of the Mentally Ill and Growth in the U.S. Prison Population: 1971 to 1996. Unpublished manuscript. Goldman School of Public Policy, UC Berkeley.

Raphael, Steven and Michael Stoll. 2009. Why Are So Many Americans in Prison? Pp 27-72 in *Do Prisons Make Us Safer? The Benefits and Costs of the Prison Boom*, edited by Steven Raphael and Michael Stoll. New York, NY: Russell Sage Foundation.

Ross, Ruth E.; Rothbard, Aileen B.; and Arie P. Schinnar. 1996. A Framework for Classifying State Involuntary Commitment Statutes. *Administration and Policy in Mental Health* 23(4): 341-356.

Steadman, Henry J.; Mulvey, Edward P.; Monahan, John; Clark Robbins, Pamela; Applebaum, Paul S.; Grisso, Thomas; Roth, Loren H.; and Eric Silver. 1998. Violence by People Discharges from Acute Psychiatric Inpatient Facilities and by Others in the Same Neighborhoods. *Archives of General Psychiatry* 55: 393-401.

Torrey, E. Fuller. 1997. *Out of the Shadows: Confronting America's Mental Illness Crisis*. New York, NY: John Wiley & Sons Inc.

Werth, James L. 2001. U.S. Involuntary Mental Health Commitment Statutes: Requirements for Persons Perceived to be a Potential Harm to Self. *Suicide and Life-Threatening Behavior* 31(3): 348-357.

Table 1
Lifetime Prevalence of Mental Illness Among Prison and Jail Inmates and the General Population

Have you ever been told by a mental health professional such as a psychiatrist or a psychologist that you have …	Prison		Jail	Non-Institutionalized	
	State, 2004	Federal, 2004	2002	All persons 18 and over, 2000-2002	All males 15 to 54, 1990-1992
A depressive disorder	0.191	0.108	0.194	0.166	0.121
Manic depression, bipolar, or mania	0.097	0.041	0.101	0.039	0.016
Schizophrenia or another psychotic disorder	0.046	0.020	0.046	0.007[a]	0.006[a]
Post-traumatic stress disorder	0.057	0.033	0.051	0.068	-
Another anxiety disorder such as panic disorder	0.071	0.046	0.071	0.057[b]	0.036[b]
Personality disorder such as antisocial or borderline	0.060	0.033	0.051	-	-
Any other mental or emotional condition	0.019	0.008	0.020	-	-
Any of the above	0.248	0.144	0.250	-	-

Prevalence levels for prison inmates are based on our analysis of the 2004 Survey of Inmates in State and Federal Corrections Facilities. Prevalence estimates for jail inmates are based on our analysis of the 2002 Survey of Inmates in Local Jails. Prevalence estimates for the total non-institutionalized population (the third column of figures) are based on analysis by Kessler et. al.(2005) of the National Comorbitity Survey Replication. This survey was conducted between 2001 and 2003. The data is nationally representative of all non-institutionalized English-speaking residents of the U.S. over 18 years of age. The estimates for men 15 to 54 come from Kessler et. al. (1994) and are based on analysis of the original National Comorbitity Survey. This data set pertains to all non-institutionalized persons between 15 and 54 years of age and was conducted from 1990 through 1992.
a. For the non-institutionalized, prevalence is measured for all individuals with a history of nonaffective psychosis, including schizophrenia, schizophreniform disorder, schizoaffective disorder, delusional disorder, and atypical psychosis. See

Kessler e. al. (1994) for details. Note, the figures in this cell pertain to the earlier NCR survey and thus measures the lifetime prevalence of non-affective psychoses as of the early 1990s.
b. For the non-institutionalized, prevalence is measured for those indicating that they have generalized anxiety disorder.

Table 2
Characteristics of State Prison Inmates by Whether They Indicate Being Diagnosed with a Mental Illness, 2004

	All State Prison Inmates	No Diagnosed Mental Illness	Diagnosed Mental Illness	Diagnosed with Bipolar, Manic, or Psychotic Disorder
Male	0.932	0.953	0.868	0.846
Married	0.164	0.167	0.154	0.142
Any Children	0.555	0.558	0.546	0.555
Homeless prior to arrest	0.086	0.065	0.151	0.173
Latino	0.181	0.199	0.125	0.110
White	0.488	0.444	0.619	0.633
Black	0.430	0.466	0.321	0.317
American Indian	0.252	0.047	0.067	0.075
Offense				
Murder/homicide/man.	0.139	0.139	0.140	0.123
Sexual assault	0.107	0.102	0.124	0.099
Robbery	0.127	0.129	0.120	0.135
Assault	0.086	0.082	0.098	0.103
Other Violent	0.020	0.019	0.024	0.023
Burglary	0.082	0.080	0.088	0.085
Fraud/Larceny	0.078	0.072	0.096	0.114
Auto Theft	0.012	0.011	0.016	0.020
Other Property	0.010	0.010	0.012	0.013
Drugs	0.213	0.230	0.161	0.155
Weapons	0.025	0.027	0.018	0.019
Other	0.101	0.100	0.104	0.112
Parent/stepparent served time	0.201	0.247	0.247	0.263
Age				
25th percentile	27	26	27	27
50th percentile	34	34	35	35
75th percentile	42	42	42	42
Age at first arrest				
25th percentile	15	15	14	14
50th percentile	17	17	17	17
75th percentile	21	21	20	20

Figures tabulated from the 2004 Survey of Inmates in State and Federal Prisons.

Table 3
Characteristics of Federal Prison Inmates by Whether They Indicate Being Diagnosed with a Mental Illness, 2004

	All Federal Prison Inmates	No Diagnosed Mental Illness	Diagnosed Mental Illness	Diagnosed with Bipolar, Manic, or Psychotic Disorder
Male	0.929	0.943	0.847	0.834
Married	0.259	0.266	0.221	0.167
Any Children	0.643	0.653	0.589	0.527
Homeless prior to arrest	0.037	0.026	0.100	0.154
Latino	0.249	0.261	0.179	0.112
White	0.435	0.412	0.575	0.574
Black	0.463	0.489	0.327	0.356
American Indian	0.040	0.036	0.064	0.044
Offense				
Murder/homicide/man.	0.029	0.029	0.026	0.029
Sexual assault	0.009	0.008	0.014	0.004
Robbery	0.085	0.077	0.134	0.205
Assault	0.017	0.017	0.019	0.029
Other Violent	0.006	0.004	0.013	0.015
Burglary	0.005	0.004	0.008	0.021
Fraud/Larceny	0.034	0.032	0.043	0.053
Auto Theft	0.001	0.001	0.003	0.009
Other Property	0.001	0.002	0.007	0.016
Drugs	0.552	0.575	0.418	0.339
Weapons	0.110	0.099	0.175	0.192
Other	0.150	0.151	0.140	0.089
Parent/stepparent served time	0.148	0.140	0.199	0.233
Age				
25th percentile	29	29	29	27
50th percentile	35	35	36	34
75th percentile	44	44	44	43
Age at first arrest				
25th percentile	16	16	15	13
50th percentile	18	18	18	17
75th percentile	23	23	22	22

Figures tabulated from the 2004 Survey of Inmates in State and Federal Prisons.

Table 4
Characteristics of Jail Inmates by Whether They Indicate Being Diagnosed with a Mental Illness, 2002

	All Jail Inmates	No Diagnosed Mental Illness	Diagnosed Mental Illness	Diagnosed with Bipolar, Manic, or Psychotic Disorder
Male	0.883	0.913	0.792	0.781
Married	0.161	0.169	0.142	0.124
Any Children	0.552	0.552	0.554	0.546
Homeless prior to arrest	0.127	0.102	0.207	0.228
Latino	0.184	0.208	0.114	0.105
White	0.500	0.462	0.614	0.617
Black	0.430	0.456	0.337	0.336
American Indian	0.045	0.041	0.057	0.053
Reason Held				
Awaiting arraignment	0.109	0.114	0.096	0.097
To stand trial	0.259	0.244	0.302	0.309
Awaiting par/prob	0.095	0.096	0.095	0.099
hearing	0.005	0.003	0.010	0.009
For safekeeping	0.002	0.001	0.005	0.002
As a witness				
	0.014	0.014	0.001	0.016
For contempt of court	0.109	0.103	0.128	0.114
Awaiting sentencing	0.353	0.362	0.325	0.302
Serving a sentence	0.072	0.071	0.075	0.085
Awaiting transfer	0.067	0.068	0.064	0.066
Other Reason				
Defining Offense				
Violent offense	0.082	0.079	0.090	0.149
Property offense	0.251	0.261	0.218	0.183
Violation for financial	0.068	0.065	0.076	0.076
gain	0.032	0.035	0.025	0.016
Drug offense	0.568	0.560	0.591	0.575
Public order offense				
Parent/stepparent served time	0.212	0.192	0.272	0.289
Age				
25th percentile	23	23	24	24
50th percentile	31	30	32	32
75th percentile	39	39	40	40
Age at first arrest				
25th percentile	15	16	15	15

50th percentile	18	18	17	17
75th percentile	21	22	21	20

Figures tabulated from the 2002 Survey of Inmates in Local Jails.

Table 5
Distribution of Institution and Non-Institutional Populations Across Age Groups, Race/Ethnicity Groups, and Gender, 1950 through 1980

	1950			1960			1970			1980		
	Mental hospital	Prison & jails	Non-Institut.	Mental hospital	Prison & jails	Non-Institut.	Mental hospital	Prison & jails	Non-Institut.	Mental hospital	Prison & jails	Non-Institut.
Age groups	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
<10	0.85	0.84	19.51	0.43	0.03	22.03	0.57	0.15	18.48	0.73	0.04	14.77
10 to 17	1.06	11.10	11.51	1.66	2.85	14.21	3.59	3.43	16.18	6.26	2.23	13.69
18 to 25	5.31	27.54	12.13	5.03	30.01	9.86	9.09	39.67	12.76	14.63	43.15	14.80
26 to 30	6.32	17.28	8.19	4.30	16.38	6.13	6.13	16.67	6.43	9.18	21.66	8.41
31 to 35	8.02	12.88	7.54	5.94	13.76	6.73	5.75	11.24	5.50	9.02	12.90	7.41
36 to 40	8.40	8.69	7.45	7.36	11.86	6.90	6.50	9.15	5.51	6.91	7.65	5.97
41 to 45	8.34	7.23	6.53	8.32	8.39	6.39	8.04	6.69	5.85	6.95	4.60	5.06
46 to 50	11.16	5.24	6.08	9.52	6.40	5.89	8.02	5.34	5.90	5.81	2.67	4.91
51 to 55	11.69	4.08	5.20	10.11	4.78	5.28	9.00	3.29	5.28	7.76	2.41	5.20
56 to 64	18.54	3.25	7.75	18.61	4.50	7.71	18.33	3.35	8.11	12.52	1.63	8.54
65+	20.30	1.88	8.10	28.72	1.03	8.88	24.99	1.03	10.00	20.24	1.06	11.24
Race/Ethnicity	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
White	87.62	62.20	87.99	85.03	58.86	86.63	82.80	54.67	85.52	79.40	47.14	81.50
Black	10.52	33.40	9.90	12.73	35.57	10.47	15.45	40.29	11.03	17.15	42.65	11.65
Other	0.43	1.26	0.43	1.00	1.87	0.89	0.93	1.82	1.18	1.95	5.14	3.41
Hispanic	1.43	3.14	1.68	1.24	3.69	2.01	0.82	3.23	2.27	1.50	5.07	3.45
Gender	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Male	52.55	90.79	49.60	53.23	95.10	49.01	55.95	94.84	48.45	60.79	94.10	48.37
Female	47.45	9.21	50.40	46.77	4.90	50.99	44.05	5.16	51.55	39.21	5.90	51.63
Population Estimate (000)	621	315	151,274	698	356	178,247	440	341	202,257	246	461	226,024

Tabulates from the 1950, 1960, 1970 and 1980 1% Public Use Micro Data Samples from the U.S. Decennial Censuses of Population and Housing.

Table 6
Institutionalization/Incarceration Rates by Race/Ethnicity and Gender, Actual (1980 and 2000) and Hypothetical Assuming Complete Mental Hospital Deinstitutionalization Since 1980 and Alternative Trans-institutionalization Rates Between Mental Hospitals and Prisons

	1980 Actual Incarceration Rate	2000 Actual Institutionalization Rate	2000 hypothetical assuming a trans-institutionalization rate of 1	2000 hypothetical assuming a trans-institutionalization rate of 0.5	2000 hypothetical assuming a trans-institutionalization rate of 0.25
White males	356	1,285	1,127	1,206	1,246
Black Males	2,625	8,467	8,136	8,301	8,384
Other Males	980	1,398	1,250	1,324	1,361
Hispanic Males	1,000	2,919	2,833	2,876	2,897
White Females	18	265	169	217	241
Black Females	144	852	716	784	818
Other Females	54	217	191	204	211
Hispanic Females	60	265	212	239	252

Hypothetical institutionalization rates assume a contribution of deinstitutionalization to the overall 2000 institutionalization rate equal to the mental hospital inpatient rate in 1980 multiplied by the assumed trans-institutionalization parameter. Average institutionalization rates within gender/race groups are calculated by averaging the age-specific estimates using the 2000 population shares within gender/race groups as weights. The hypothetical tabulations assume complete deinstitutionalization between 1980 and 2000 –i.e., the simulations assume no mental hospital inpatients in 2000

Table 7
Estimation of the Effect of Changes in Mental Hospitalization Rates on Changes in Corrections Incarceration Rates, Overall, By Gender, and by Gender and Race Based on Decade Changes Between 1950 and 1980

	Model Specifications			
	No controls	Year, age, race, and rstate effects	Adding interaction terms between year and state to previous specification	Adding interaction terms between age and state and race and state to previous specification
All Men	0.044 (0.030)	0.005 (0.031)	0.011 (0.032)	-0.001 (0.032)
White men	0.078 (0.029)	0.034 (0.034)	0.057 (0.036)	0.066 (0.036)[c]
Black men	0.034 (0.069)	-0.040 (0.069)	-0.060 (0.075)	-0.068 (0.074)
Other men	-0.045 (0.037)	-0.053 (0.046)	-0.031 (0.053)	-0.025 (0.051)
Hispanic men	0.193 (0.144)	0.162 (0.143)	0.106 (0.130)	0.187 (0.151)
All women	0.002 (0006)	0.001 (0.007)	0.001 (0.007)	-0.002 (0.007)
White women	0.003 (0.005)	0.003 (0.005)	0.001 (0.006)	-0.001 (0.006)
Black women	0.008 (0.013)	0.008 (0.013)	0.007 (0.015)	0.008 (0.015)
Other Women	-0.014 (0.015)	-0.030 (0.015)	-0.069 (0.040)	-0.055 (0.042)
Hispanic women	-0.056 (0.040)	-0.062 (0.048)	-0.037 (0.063)	-0.014 (0.061)

Standard errors are in parentheses. Standard errors are calculated assuming clustering in the error variance-covariance matrix within gender-race-age-state cells. Each coefficient comes from a regression of the inter-decade change in the corrections incarceration rate on the corresponding inter-decade change in mental hospital inpatient rates. Models are estimated by gender (pooling all racial groups within gender) and separately by gender and race. The remainder of the model specification is as specified across the top of the table. Rates are calculated for cells defined by the interaction of states, ten age groups (within the range of 18 to 64), four race/ethnicity groups, four years (1950, 1960, 1970, 1980), and gender.
a. Statistically significant at the one percent level of confidence.
b. Statistically significant at the five percent level of confidence.
c. Statistically significant at the ten percent level of confidence.

Table 8
Regression of the 1980 to 2000 Change in Institutionalization Rates On the 1980 Mental Hospital Inpatient Rate, Measured at the Level of Census Regions and at the state Level

	No Controls	Additional covariates[d]
All Men	-4.272 (0.313)[a]	-0.383 (0.136)
White men	1.358 (0.314)[a]	-0.928 (0.276)
Black men	-0.447 (0.565)	-0.501 (0.329)
Other men	-0.369 (0.171)[b]	0.013 (0.156)
Hispanic men	0.148 (0.320)	0.019 (0.251)
All Women	-0.592 (0.083)[a]	-0.110 (0.068)
White women	-0.494 (0.131)[a]	-0.157 (0.121)
Black women	-0.228 (0.190)	-0.184 (0.175)
Other women	-0.056 (0.096)	-0.008 (0.095)
Hispanic women	-0.109 (0.131)	0.008 (0.132)

Standard errors are in parentheses. Each coefficient comes from a regression of the 2000 institutionalization rate minus the 1980 incarceration rate on the 1980 mental hospital inpatient rate. Each change is measured by state, sex, race/ethnicity (four groups), and age (10 groups). a. Statistically significant at the one percent level of confidence.
b. Statistically significant at the five percent level of confidence.
c. Statistically significant at the ten percent level of confidence
d. The specifications for all men and all women include a full set of race-state and age-state fixed effects. The separate specifications by race include full sets of race-specific state)and age effects.

Figure 1: Prisoners per 100,000, Mental Hospital Inpatients per 100,000, and Total Institutionalized per 100,000, 1930 to 2000

Figure 2: Institutionalization Rates for Adults 18 to 64 Years of Age Between 1950 and 2000, Actual Rates, Rates Weighted by the 1950 Distribution of Mental Hospital Patients, and Rates Weighted by the 2000 Distribution of Institutionalized Adults

Figure 3: Comparison of the Change in Institutionalization Rates (2000 Institutionalization Minus 1980 Incarceration) to the Mental Hospital Inpatient Rate as of 1980, White Males

Figure 4: Comparison of the Change in Institutionalization Rates (2000 Institutionalization Minus 1980 Incarceration) to the Mental Hospital Inpatient Rate as of 1980, Black Males

Figure 5: Comparison of the Change in Institutionalization Rates (2000 Institutionalization Minus 1980 Incarceration) to the Mental Hospital Inpatient Rate as of 1980, White Females

Figure 6: Comparison of the Change in Institutionalization Rates (2000 Institutionalization Minus 1980 Incarceration) to the Mental Hospital Inpatient Rate as of 1980, Black Females

Figure 7: Actual Incarceration and Institutionalization Rates in 1980 and 2000 and Hypothetical Institutionalization Rates for 2000 Assuming Alternative Trans-Institutionalization Parameters

Figure 8: Scatter Plot of the 1980 to 2000 Change in Mental Hospital Inpatient Rate Against the 1980 Level of the Mental Hospital Inpatient Rate by St

Figure1

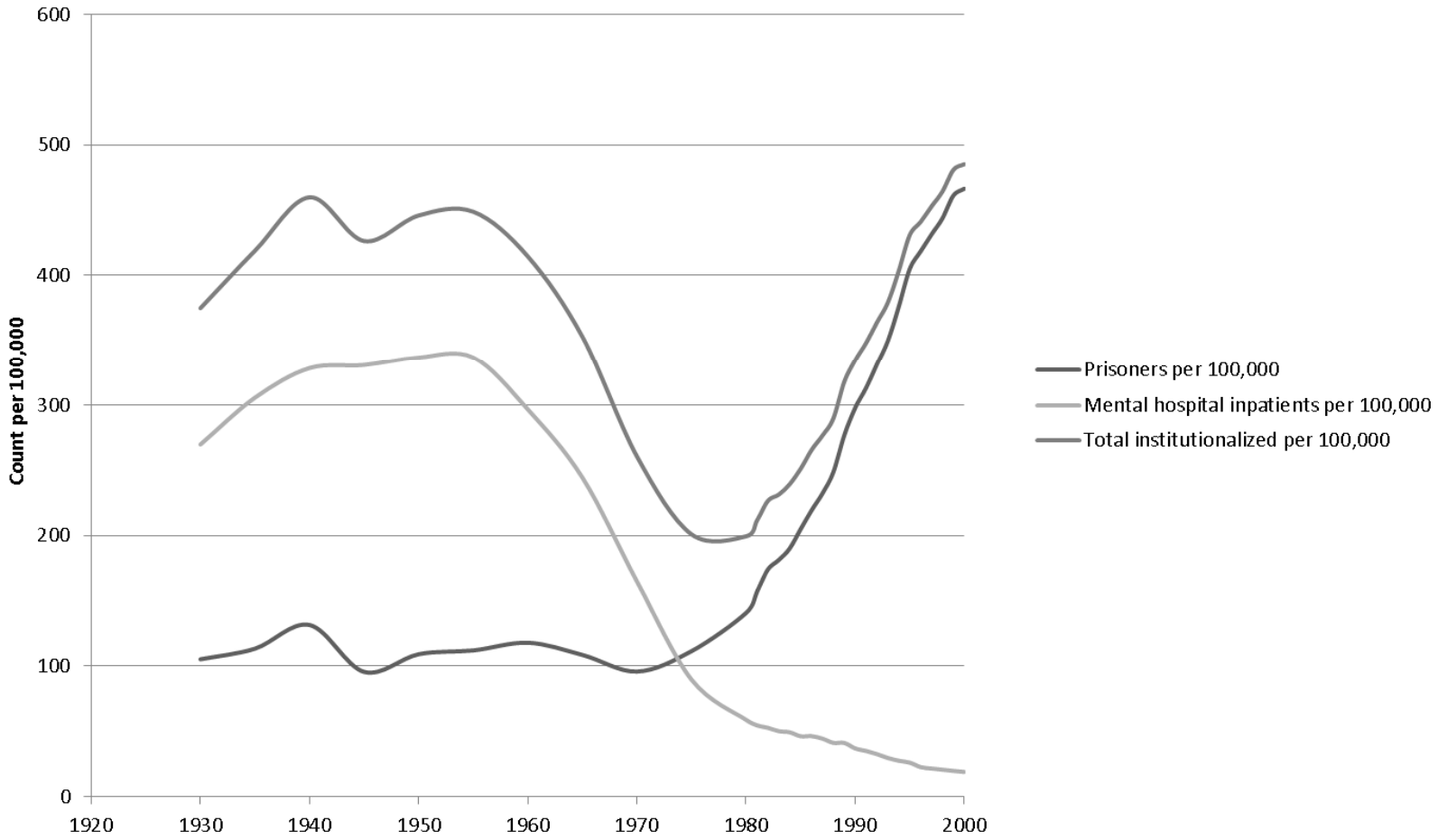

600
500
400
300
200
100
0
Count per 100,000
1920
1930
1940
1950
1960
1970
1980
1990
2000
Prisoners per 100,000
Mental hospital inpatients per 100,000
Total institutionalized per 100,000

Figure 2

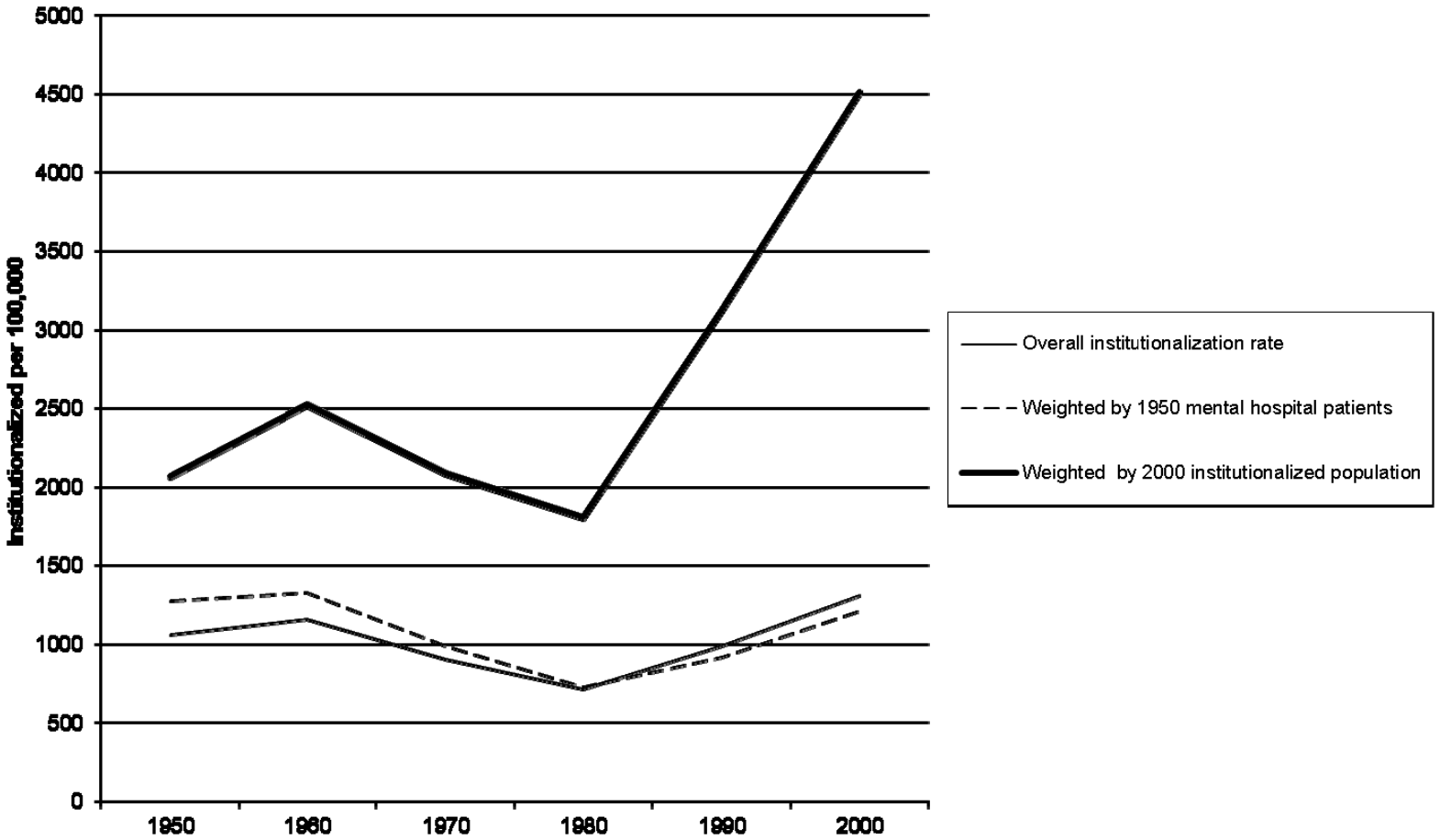

5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
Institutionalized per 100,000
1950
1960
1970
1980
1990
2000
Overall institutionalization rate
Weighted by 1950 mental hospital patients
Weighted by 2000 institutionalized population

Figure 3

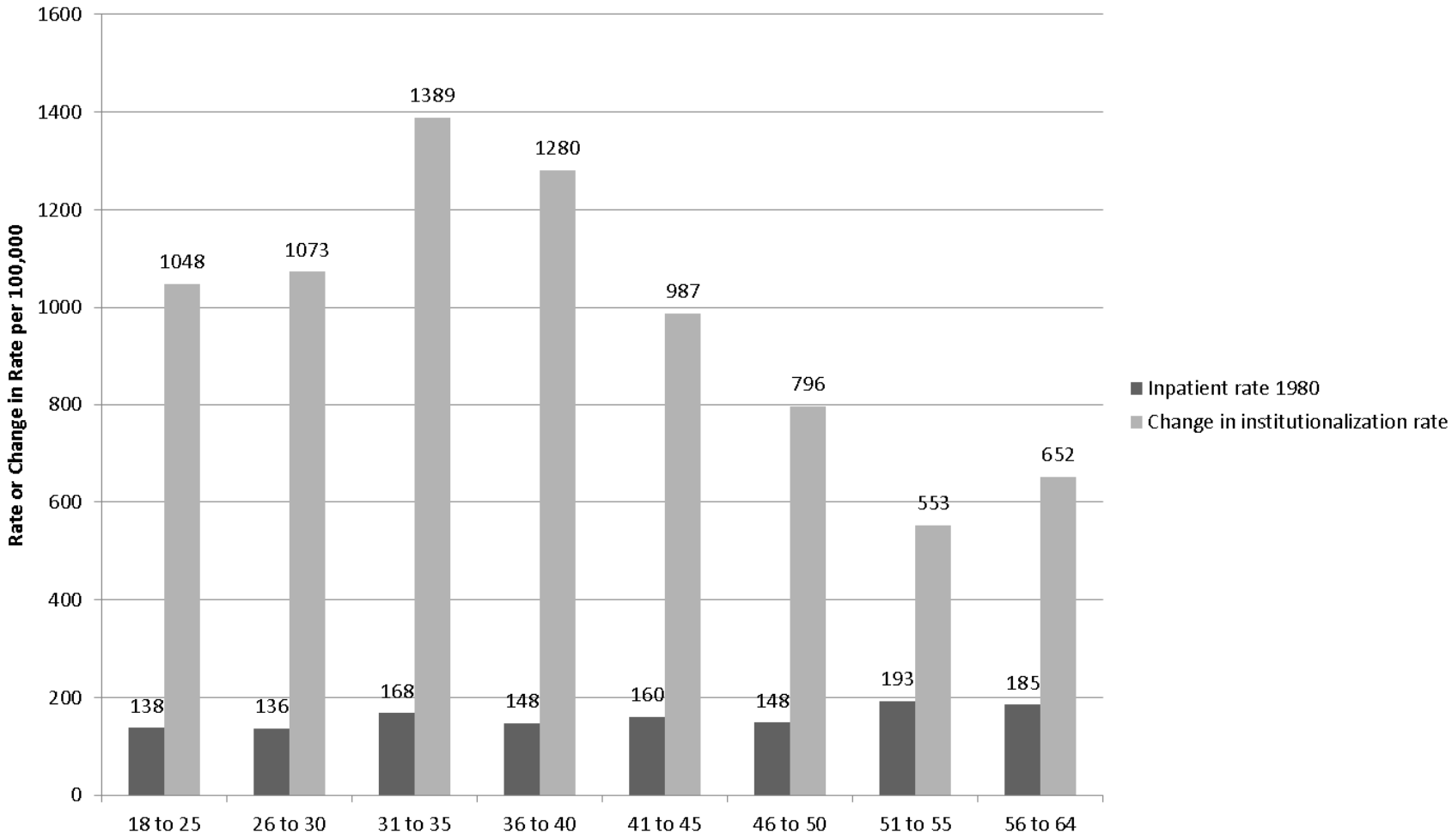

Rate or Change in Rate per 100,000
1600
1400
1200
1000
800
600
400
200
0
1048
1073
1389
1280
987
796
553
652
138
136
168
148
160
148
193
185
18 to 25
26 to 30
31 to 35
36 to 40
41 to 45
46 to 50
51 to 55
56 to 64
Inpatient rate 1980
Change in institutionalization rate

Figure 4

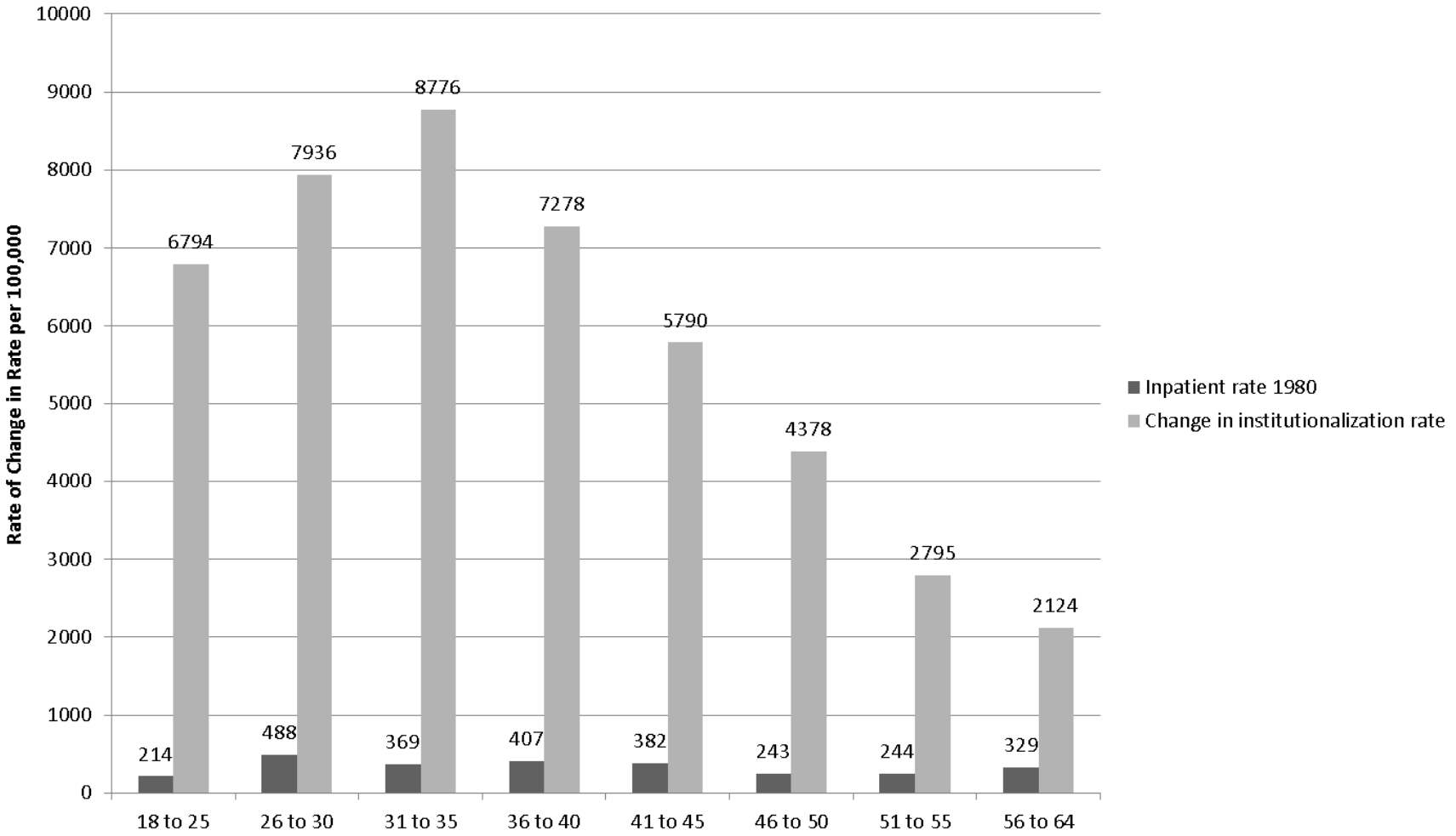

Rate of Change in Rate per 100,000
10000
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
214
6794
488
7936
369
8776
407
7278
382
5790
243
4378
244
2795
329
2124
18 to 25
26 to 30
31 to 35
36 to 40
41 to 45
46 to 50
51 to 55
56 to 64
Inpatient rate 1980
Change in institutionalization rate

Figure 5

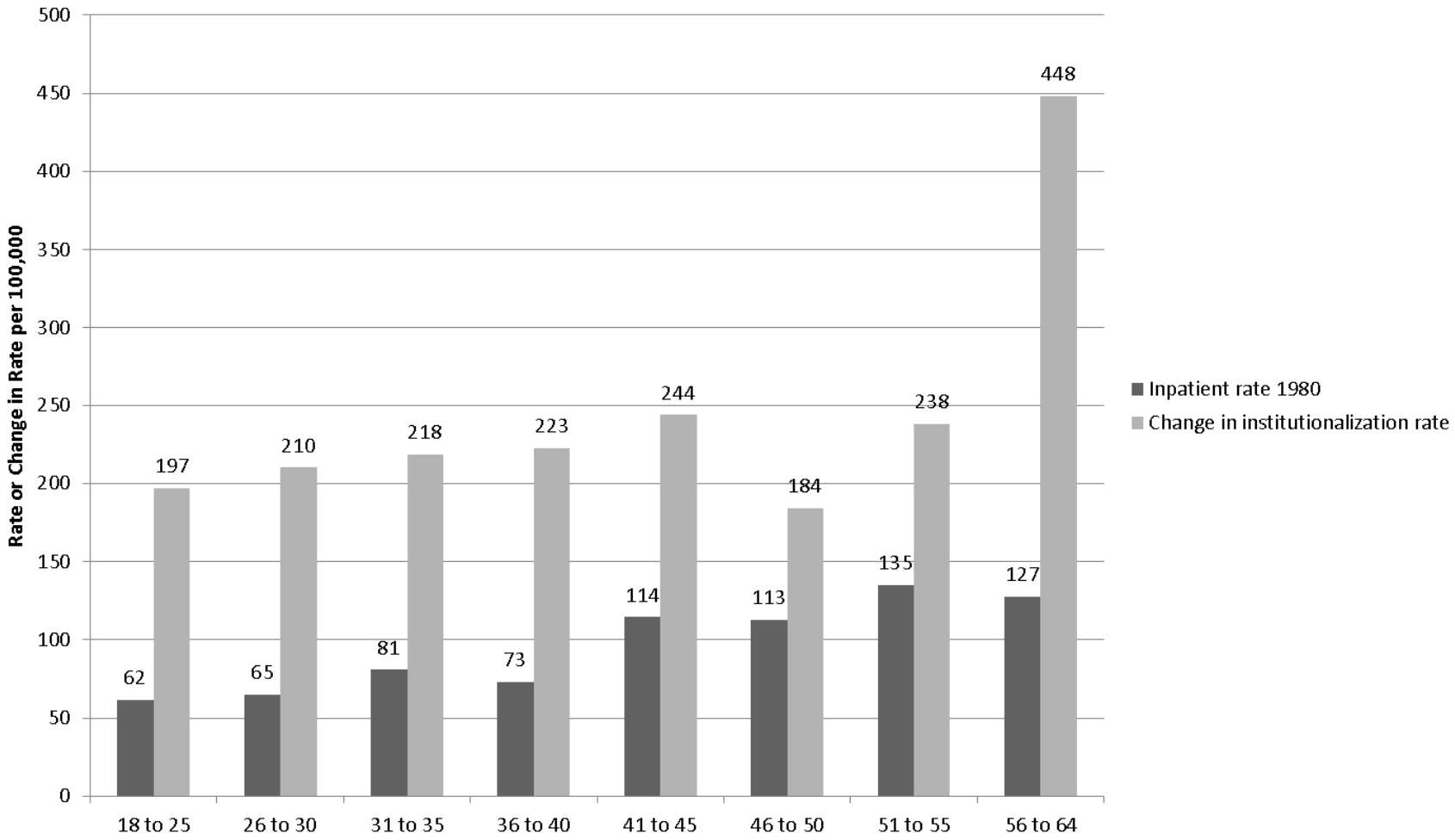

Rate or Change in Rate per 100,000
500
450
400
350
300
250
200
150
100
50
0
62
197
65
210
81
218
73
223
114
244
113
184
135
238
127
448
18 to 25
26 to 30
31 to 35
36 to 40
41 to 45
46 to 50
51 to 55
56 to 64
Inpatient rate 1980
Change in institutionalization rate

Figure 6

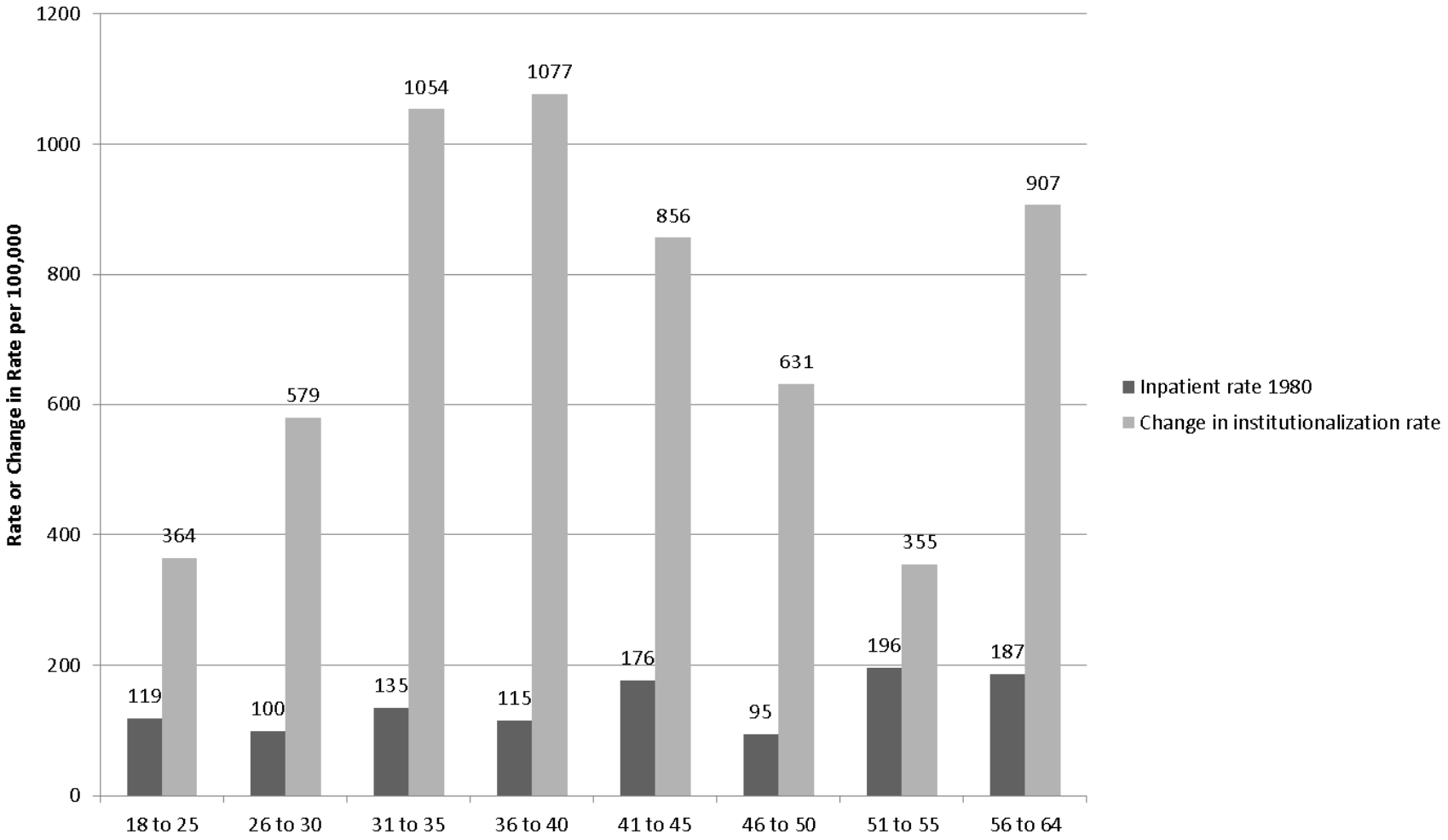

Rate or Change in Rate per 100,000
1200
1000
800
600
400
200
0
18 to 25
26 to 30
31 to 35
36 to 40
41 to 45
46 to 50
51 to 55
56 to 64
119
364
100
579
135
1054
115
1077
176
856
95
631
196
355
187
907
Inpatient rate 1980
Change in institutionalization rate

Figure 7

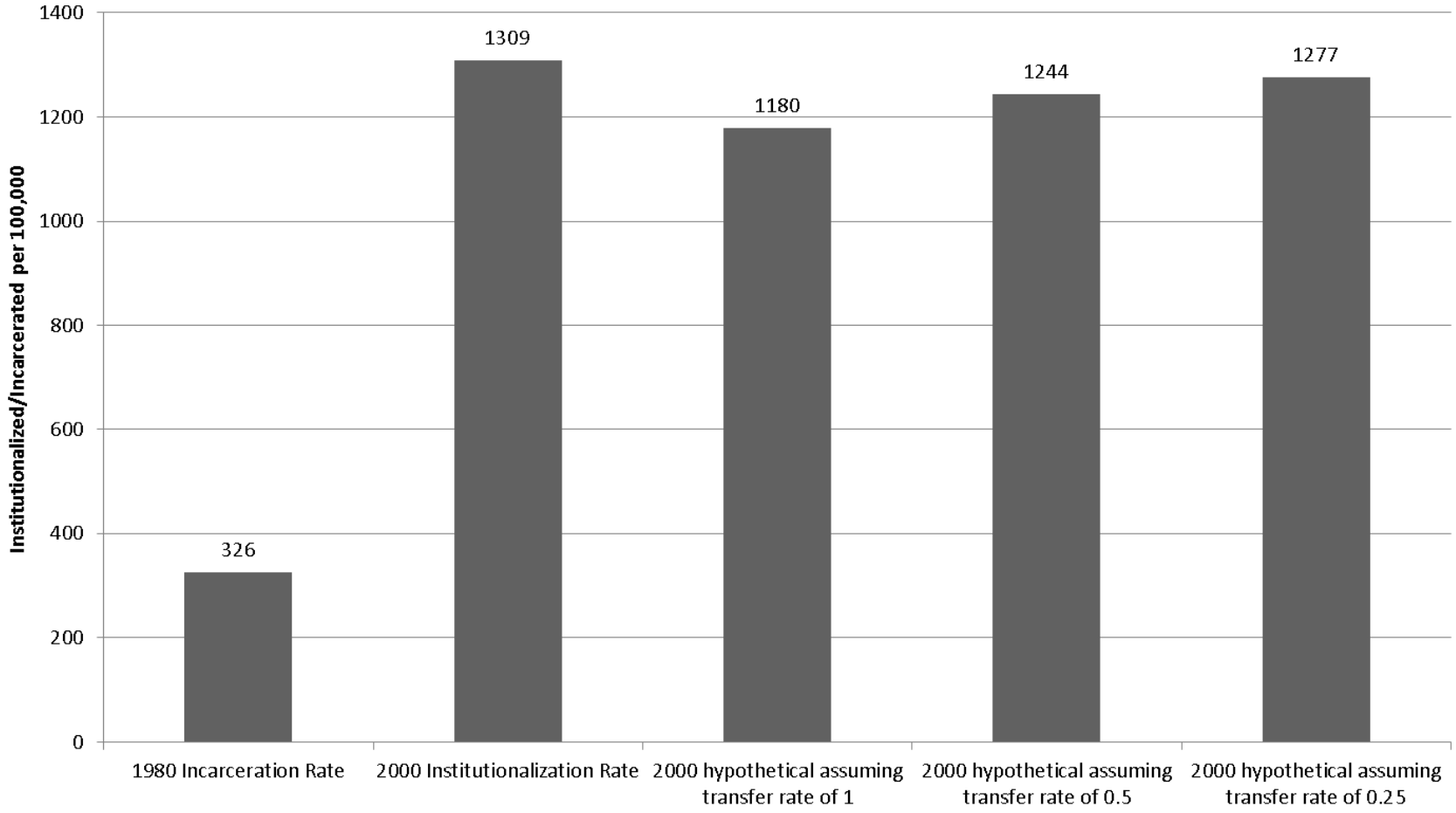
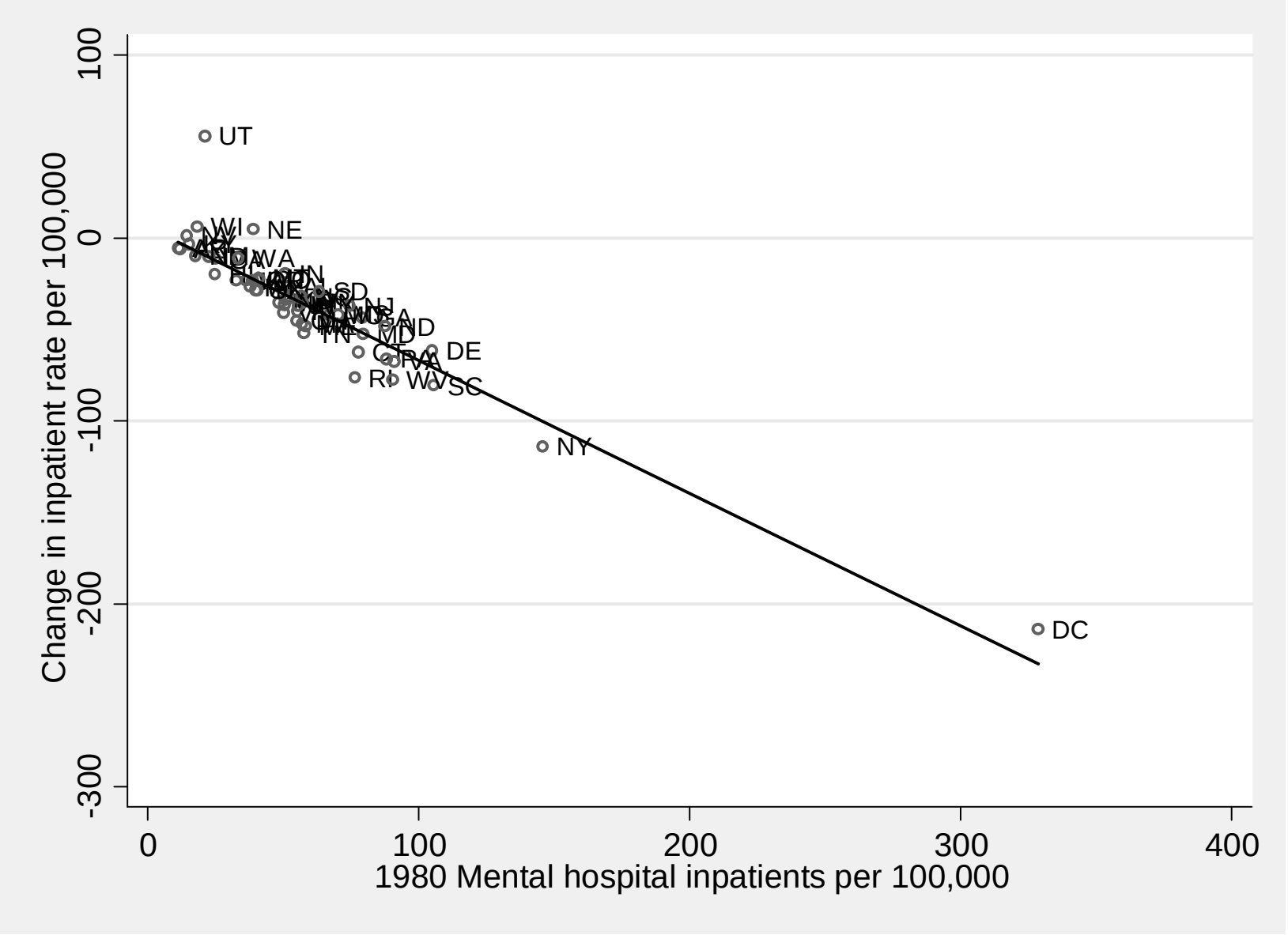

Institutionalized/Incarcerated per 100,000
1400
1200
1000
800
600
400
200
0
326
1309
1180
1244
1277
1980 Incarceration Rate
2000 Institutionalization Rate
2000 hypothetical assuming transfer rate of 1
2000 hypothetical assuming transfer rate of 0.5
2000 hypothetical assuming transfer rate of 0.25

Figure 8


Change in inpatient rate per 100,000
100
0
-100
-200
-300
0
100
200
300
400
1980 Mental hospital inpatients per 100,000
UT
NE
DE
NY
DC