

**The Institutional Effects of Incarceration:
Spillovers from Criminal Justice to Health Care**

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Abstract

Context: This study examines the spillover effects of growth in state-level incarceration rates on the functioning and quality of the U.S. health care system.

Methods: Our multilevel approach first explores cross-sectional individual-level data on health care behavior merged to aggregate state-level data regarding incarceration. We then conduct an entirely aggregate-level analysis to address between-state heterogeneity and trends over time in health care access and utilization.

Findings: We find that individuals residing in states with a larger number of former prison inmates have diminished access to care, less access to specialists, reduced physician trust, and less satisfaction with the care they receive. These spillover effects are deep in the sense that they affect even those least likely to be personally affected by incarceration, including the insured, those over 50, women, non-Hispanic whites, and those with incomes far exceeding the federal poverty threshold. These patterns likely reflect the burden of uncompensated care among former inmates, who have both a greater than average need for care and higher than average levels of uninsurance. State-level analyses solidify these claims. Increases in the number of former inmates are associated simultaneously with increases in the percent uninsured within a state and increases in emergency room use per capita, both net of controls for between-state heterogeneity.

Conclusions: The analyses establish an intersection between systems of care and corrections, linked by inadequate financial and administrative mechanisms for delivering services to former inmates.

Keywords: Spillover, Incarceration, Health Care

Policy Points:

- The steady increase in incarceration is related to the quality and functioning of the health care system. US states that incarcerate a larger number of people show declines in overall access to and quality of care, rooted in high levels of uninsurance and relatively poor health among former inmates.
- Providing health care to former inmates would ease the difficulties of inmates and their families. It might also prevent broader adverse spillovers to the health care system.
- The health care system and the criminal justice system are related in real but underappreciated ways.

The Institutional Effects of Incarceration: Spillovers from Criminal Justice to Health Care

By now the consequences of incarceration are well-established for former inmates,^{1,2} their families,³⁻⁵ and groups such as African American males.⁶ This research rightly emphasizes the extreme concentration of incarceration among an already segregated, disadvantaged, and underserved population. Incarceration is, indeed, more common among African American males with low levels of education, and most of the damage of incarceration necessarily accrues to them.^{6,7} Furthermore, former inmates return to a relatively small number of communities, meaning most of the collateral consequences of incarceration remain localized, even when severe.⁸⁻¹⁰ However accurate the focus on concentration, segregation, and the persistence of disadvantage may be, it implicitly casts incarceration as a problem only for the relatively small circle of people immediately surrounding prisoners. Even the strongest moral case against mass incarceration relies on observations of this sort, as when some argue that incarceration is iatrogenic in increasing crime in neighborhoods where crime is already common.⁸

In contrast, we ask how incarceration affects the health care system as a whole – not the health of individual inmates or their families, but the broader functioning of the health care system available to everyone. We follow in a line of research addressing ties between the prison system and other social systems and, thereby, assess the broader social costs of incarceration. Other researchers have shown far-reaching effects of incarceration on labor market and political institutions. For example, Western and Beckett¹¹ show how high rates of criminal punishment can reduce the unemployment rate in the short-term while raising it in the long-term, thereby characterizing the prison system as a labor market institution. Similarly, Uggen and Manza¹² show how rising rates of punishment and felon voting restrictions have affected elections, tilting

the partisan balance in the U.S. Senate by diluting the voting strength of already underrepresented groups.

Like labor markets and politics, the health care system is a foundational institutional setting, with great complexity, generally wide geographic service areas, and critical importance to the functioning of society. The health care system also, of course, provides a sharp contrast with the prison system: the mandate and jurisdiction of the two systems are very different, and few would consider the two as residing in the same sector or sharing the same concerns.⁴ Yet consideration of the health care system is essential to evaluating the total social costs of incarceration¹³ and, on the flip side, for recognizing the social currents that affect medicine. Like other consequences of incarceration, the spillover effects we document with respect to health care are hidden from mainstream society—perhaps even more so because they are beyond the purview of any one institution—but they are nonetheless quite powerful. And while former inmates and their families certainly suffer the most with respect to health care, their situation affects the care of those far removed from them.

Background

Spillover effects occur when the behavior of some members of a community affect the situation of others. In bridging individuals and institutions, a spillover effect is similar to a neighborhood effect, in which residence in a defined geography affects the individuals therein through collective processes, such as peer-group influence or socialization.¹⁴ In setting the stage for a health care spillover, we must consider both the social context of incarceration and the relationship between the behavior of individual health care consumers and the functioning of the organizations that serve them. Several processes are relevant, including the effects of

incarceration on health, health care in prison settings, and the availability of health services outside of prison. In addition, financial mechanisms are important for understanding potential spillovers, including the relationships between incarceration, insurance, and uncompensated care. A more immediate question, though, is whether the population of former inmates is sufficiently large to produce spillovers of this sort. We will therefore review trends in incarceration, before turning to the relationship between incarceration and health care consumption.

The Rise of Incarceration

The incarceration rate has risen precipitously since the mid-1970s.¹³ In 2012, there were over 2.4 million prisoners and parolees under supervision – eight times more than in 1968.¹⁵⁻¹⁸ Although the “stock” of current prisoners is perhaps the most common way to think of incarceration, the “flow” of inmates in and out of prisons is also relevant. Because the vast majority of inmates are eventually returned to the community, any consideration of long-term spillover effects must also consider the number of *former* inmates, which has also risen precipitously over time. In 2004, more than 4 million people were previously in prison or on parole but were no longer under correctional supervision, representing 1.9% of the adult population and 3.5% of the adult male population.¹⁵ This, too, represents a remarkable shift over previous levels. Until the mid-1970s, the number of ex-prisoners remained stable at approximately 1 million, but since 1978 the number has approximately quadrupled. Recent years have seen some fluctuation in the prison population, but the absolute level remains high and the difference is close. In 2013, for example, there were 623,337 releases from state and federal prisons and 631,168 admissions.¹⁹

The overall level of incarceration is striking, but there is considerable variation between states and between demographic groups. Some of the largest states also have the highest incarceration rates, including Texas and California, both of which house more than 160,000 prisoners.²⁰ Similarly, Florida has just under 100,000 people in prison, but has one of the faster growing incarceration rates. Despite the nation-wide increase in incarceration, some states have remained relatively stable over time and, for this reason, there is substantial between-state variation. In 2013 the highest incarceration rate was in Louisiana, with a rate of 870 per 100,000, whereas the lowest rate was in Maine, with 145.¹⁹ These between-state differences reflect many factors, quite apart from state differences in crime rates. The size of the prison population is driven by each state's sentencing policies, administrative procedures, and, to some degree, political preferences for incarceration over other forms of punishment.²⁰

Incarceration is also highly concentrated among already disadvantaged groups. African American males are much more likely to be incarcerated than their non-Hispanic white counterparts. In 2004, 2.9% of the adult population was either currently or previously in prison or on parole, but among African Americans this figure was 10.2%.¹⁵ Among African American men this figure climbs to 17.1%. By one estimate, about 32% of African American men born in 2001 will go to prison in their lifetimes, compared to about 6% of white men.¹⁶ Comparing incarceration to other events of the life course further illustrates its impact. African American men born from 1965 to 1969, for example, are more likely to have a prison record than a bachelor's degree (22% versus 13%).⁷

The Social and Institutional Bases for Spillover Effects

Although the number of current and former prisoners has risen precipitously, these groups combined still only represent about 3% of the adult population.¹⁵ Yet a population of this size is sufficient to meaningfully shape unemployment figures, which are usually below 10% and for which small differences are politically and economically meaningful. Conceivably, even a relatively small number of former inmates can affect the economics of health care if former inmates are sicker than other members of the community, if they have especially costly illness configurations, or if they continue to use health services even when their ability to pay for those services is compromised.

The potential spillover effects of incarceration on health care are not premised only on the size of prison populations. They rest also on the particular health care needs of former inmates, on how they consume care, and on who does or does not pay for the services they receive. In all three ways, former inmates are unique, and it is the confluence of these factors that sets the stage for spillovers. In sufficient numbers, former inmates may increase the burden of uncompensated care, diminish the financial stability of local providers, force providers to cut services or close altogether, and, thereby, reduce the quality or availability of services to others. These incarceration effects are magnified by how the insurance system intersects with prison demographics. More than 90% of U.S. prison inmates are male and about half of them have children.^{21,22} Because health insurance is provided largely through employers, and because many families obtain insurance through the policy of a single employed subscriber, the incarceration of a large number of working-age fathers (and, increasingly, mothers) ripples outward to affect the availability of health insurance to families.

Perhaps the strongest evidence for spillover effects in health care concerns community uninsurance rates, for where there is both a strong conceptual foundation²³ and compelling

empirical evidence.^{24,25} In the case of community uninsurance, spillover effects begin with the behavior of uninsured individuals and propagate outward to other consumers, largely through financial mechanisms. Uninsurance is a major barrier to health care. It reduces the likelihood of visiting a physician and the likelihood of providers being compensated for the services they render.^{26,27} Yet uninsurance does not prevent the consumption of care altogether and it is not, on average, a reflection of decreased need. Those without health insurance generally report worse health than those with insurance, they continue to visit physicians and hospitals, and, by law, patients cannot be turned away for emergency care on the basis of their ability to pay.²⁸ If the uninsured population is sufficiently large and providers are unable to absorb the cost of uncompensated care, hospitals and other providers may reduce the availability and/or quality of services they offer, thereby reducing the services available to others. Spillover effects of this sort have been documented in several ways, including by linking a community's uninsurance rate with the likelihood of insured individuals reporting an unmet need for care (a multi-level approach)²⁴ and by linking the size of the uninsured population in a region to services available in hospitals within that region (an aggregate-level approach).²³

The case for incarceration-based spillover effects reflects many of the same influences. For instance, both types of spillovers are ultimately rooted in the financial dimensions of care. But incarceration's spillovers are likely magnified beyond uninsurance because incarceration might simultaneously affect access to care, the need for care, and the demand for care. While in prison, inmates are provided with health care services and, on average, they consume more services than they did prior to admission.^{29,30} For many inmates, prison represents an improvement in overall access to care, especially among those who are ordinarily underserved.³¹ Overall mortality among African Americans, for example, is lower in prison than outside,³¹

although, to be sure, much of this decline stems from deaths related to accidents, homicide, and drugs and alcohol rather than causes of death amenable to care.³² Even so, incarceration might increase the demand for health care through at least three key mechanisms: if it has a negative effect on health after release and, thereby, increases the real demand for care^{33,34}; if, through testing, it reveals illnesses that had been previously unknown to inmates³⁵⁻³⁸; and, if prisoners are encouraged to seek treatment as part of their reintegration efforts or are required to seek treatment for specific health issues, such as substance abuse.³⁹⁻⁴¹

It is unlikely that all of these influences affect inmates simultaneously in all instances. For example, HIV testing varies among prisons, even among prisons in the same system.³⁷ Furthermore, in some instances the demand for treatment outside prison might be quite small, even among former inmates who plainly require treatment. Along these lines, one study found that most HIV-infected inmates who received ART medications in prison failed to fill their prescriptions after release, even when those prescriptions were free or low cost.⁴² Indeed, a robust literature has documented the many ways that even the best discharge planning fails to prevent lapses in treatment. Yet the potential for spillovers rests on the net effect, and in this regard some aspects of incarceration are clear. It is well established, for example, that the health care needs of former inmates are, in fact, high. Furthermore, their need for care might increase after release if prisons maintain active testing regimens. It is also evident that for most illnesses the level of access provided in prison is unlikely to be maintained after release. For purposes of understanding spillovers, the question is whether the barriers to access are sufficiently large to prevent former inmates from seeking services altogether. This seems unlikely, but it is important to understand the precise nature of the bridge between prison care and healthcare on the outside.

Access among former inmates is limited, in part, by uninsurance. Unemployment is high among former inmates and, among those who find work, few are able to secure positions with good benefits.⁴³ There are federal and state programs to help provide health care to those who cannot afford it, but the availability of such safety-net services is limited and may be especially so for former inmates.⁴⁴ Far more states terminate rather than suspend Medicaid benefits when inmates begin their sentence, leaving a gap in care after release until former inmates reenroll.⁴⁵⁻⁴⁷ Although most states, at a minimum, support Medicaid enrollment after release not all states do. One study reports that about a third of the state prison systems that terminate or suspend Medicaid do not provide assistance in resuming benefits.⁴⁷

Yet despite these barriers former inmates do consume health care. Former inmates with health conditions tend to be heavy consumers of health services and they often utilize health care in cost-intensive ways.³⁰ For example, many use emergency rooms for care,^{30,48,49} sometimes more frequently than regular providers.⁵⁰ In addition to reflecting the limited services available to former inmates, these utilization patterns reflect their unique needs, which are difficult to treat even under ideal conditions. For instance, former inmates often have comorbid psychiatric disorders, complicating the treatment of other illnesses.⁵¹ Furthermore, many suffer from chronic illnesses that are, in themselves, associated with costly treatments, including HIV and Hepatitis B/C.³⁰ Even if HIV-infected former inmates fail to fill ART prescriptions, they might still return to the hospital when their condition worsens and treatment becomes more expensive. Even a small number of complex cases can affect the delivery of services within hospitals. In the case of emergency room visits, for instance, frequent users represent only 4.5% to 8% of patients, but make up 21% to 28% of visits.⁵² Heavy emergency room users are demographically similar to the former inmate population, suggesting important overlaps in these populations.⁵²

Figure 1 summarizes our conceptual model of spillovers between incarceration and health care. Incarceration decreases access to healthcare following release and possibly increases the demand for services. Utilization of services among former inmates, in turn, increases the amount of uncompensated care in the community. Spillover effects arise when providers respond to this uncompensated care by reducing services and/or diminishing the quality of their offerings.

--Insert Figure 1 about Here--

Although the potential for spillovers is strong, it is not a logical necessity, flowing inescapably from the situation of former inmates to the market for health services. Spillovers of this sort depend on how the local market for health care is organized and how it responds. In both respects, incarceration effects could be blunted. Furthermore, in these contingencies, the institutional effects of incarceration for health care begin to diverge even more from incarceration's other institutional effects and so deserve emphasis.

Residential Segregation and Market Segmentation

There is an irony in health care that is not apparent in other institutional effects of incarceration: the residential segregation of former inmates might limit, rather than facilitate, the potential for spillover effects in health care insofar as segregation leads to market segmentation. In particular, if those hospitals providing care to former inmates are generally distinct from those providing care to others, there may be no need for the latter to reduce services because their revenues would not be affected by the situation of former inmates. In this case, well-resourced consumers can avoid hospitals servicing uninsured individuals, resulting in a segmented market but no average decline in services across the entire market. Although there is no direct evidence on this point, there is related evidence regarding race, segregation, and hospitals. Hospital care

for African Americans is concentrated into a relatively small number of hospitals⁵³ and hospital segregation is strongly correlated with residential segregation.^{54,55} Furthermore, the burden of uncompensated care has become more concentrated over time, suggesting the insured seek services in more financially secure private hospitals while the uninsured go elsewhere.⁵⁶ In short, the factors that make prisons so powerful in perpetuating economic disadvantage may be the same forces that blunt spillovers in health care.

By the same token, spillover effects might be blunted if the needs of former inmates differ in significant ways from those of other consumers. If there are specific services former inmates are more likely to use, providers might cut those services, thereby minimizing their exposure to former inmates and preventing cuts to other services. It is unclear whether the mix of services used by former inmates differs substantially from that of other consumers. Although former inmates suffer from some diseases at especially high rates, especially addiction and psychiatric disorders, their utilization patterns likely reflect the wide range of conditions from which they are more likely to suffer.³⁴ Yet the possibility of different utilization patterns means that any empirical exploration of spillover effects requires the simultaneous examination of multiple dimensions of health care consumption.

The Empirical Dimensions of Spillover Effects

Testing for spillovers requires three key elements. First, it requires multilevel data containing aggregate information on the size of the former inmate population matched to individual-level data. Spillover effects are best demonstrated by matching information on individuals' actual utilization with information on aggregate-level characteristics. This allows the analyst to adjust for other characteristics of the individual that drive health care consumption.

Yet aggregate-level data alone can be deployed to address between-state heterogeneity, which is also a concern since the state is the level at which correctional and many public health policies are administered. In this study, we employ a two-fold design. In the first part, we focus on individual-level data, showing how individuals actually behave in regions with a large number of former inmates, controlling extensively for individual-level factors. In the second part, we explore whether traces of these individual-level patterns are detectable in key aggregate data, controlling extensively for aggregate-level characteristics. In particular, we test how *changes* in the former inmate population affect *changes* in the health care system, thereby holding constant all fixed state-level characteristics. In this way, the first part allows us to explore between-individual heterogeneity, whereas the second part allows us to explore between-state heterogeneity.

Second, testing for spillovers requires granular information on utilization patterns. Although previous research has demonstrated spillover effects of community uninsurance using basic reports of unmet need,²⁴ additional measures allow for more fine-grained conclusions. Depending on the amount of revenue strain and the characteristics of the market, hospitals might be selective in the services they cut. For example, routine primary care visits are less sensitive to scale, as most markets can accommodate more than one provider. In this situation, hospitals might cut back on emergency room services instead, which have an important community benefit but are less profitable.^{57,58} Similarly, certain specialty services require a large consumer base and, therefore, might be especially vulnerable to financial considerations. In this vein, mammography screening is capital-intensive. The number of screening facilities has been declining over time⁵⁹ and the average wait for first-time mammograms has increased.⁶⁰ Although some regions maintain excess capacity, the percentage of women living in poor capacity areas has increased.⁶¹

Distinctions across service units are important for the present study because they allow us to test the limits of spillover effects: if the size of the former inmate population is not sufficiently large, providers might cut back on specialty care but retain primary care.

Process-related information provides additional leverage. A case has been made that community uninsurance diminishes the willingness of individuals to claim health as a right.²³ Similar arguments have been raised with respect to incarceration and neighborhood cohesion, with some arguing—if not empirically demonstrating—that mass incarceration undermines social bonds.^{8,9} There is a testable corollary with respect to health care: large-scale incarceration might undermine physician trust by introducing doubt about whether the physician has the patient’s best interests in mind or is, instead, considering revenue.

The outcomes we use have other useful features. For instance, to the extent that we can demonstrate a relationship between incarceration and services intended for older women, such as mammographies, the evidence for spillovers is stronger, as incarceration disproportionately affects young men. No single outcome can provide a perfect test and each is subject to multiple simultaneous influences. Moreover, unmet need is plainly determined by many factors apart from those emphasized in our framework, including the ability of individuals to schedule convenient appointments. Nevertheless, examining a rich set of outcomes and predictors enables us to draw reasonable and appropriately cautious inferences about the existence and extent of spillovers.

Data, Methods, and Results

As noted, our analysis is based on two levels of data. At the individual level, we use a large, nationally representative survey of individuals. At the state level, we construct estimates of

the number of former inmates by state and year, to which we append other state-level measures. In the first part of our analysis these two data sources are merged into a multi-level model. In the second part, we use only aggregate-level data in a time-series cross-sectional approach. We discuss each part in turn, but first describe the data common to both.

Estimates of the Number of Former Inmates by State and Year

Both parts of our analysis include estimates of mass incarceration at the state level. In this regard, our framework requires specific and unusual data. It is easy to find state-level incarceration rates, which serve as the foundation for evidence regarding mass incarceration. To understand spillovers, however, it is better to measure the number of *former* inmates rather than the number of *current* inmates. These two numbers are correlated, of course, but only former inmates will contribute to the specific spillovers we describe. We estimate the number of former inmates within a state based on demographic life tables applied to each state for each year as described previously.¹⁵ Each annual cohort of prison releases is reduced for recidivism and mortality, while subsequent cohorts refresh the population. Our recidivism rate is duration-specific and is based on national studies. We assume most former inmates will be reincarcerated, but we also assume the recidivism rate declines with time since release. We also assume a higher rate of mortality among former inmates than among those who do not serve prison time. Both of these assumptions are consequential to our estimates, although in a conservative direction. They reduce the risk of overestimating the number of ex-prisoners in state populations, but, as we will show, the estimates are still quite high. Furthermore, recidivism and mortality adjustments do not directly affect between-state variation, because we assign the same rates to all states. We use the same procedure to estimate the number released from community supervision as a sensitivity

test, as community supervision is correlated with state punitiveness, but should not yield the same spillovers as prison. Figure 2 presents a map of the percent of the adult population that are ex-prisoners by state for 2010 (Panel A), as well as the percent uninsured (Panel B).

--Insert Figure 2 Here--

Part I

The Community Tracking Study (CTS) was designed to examine the effects of changing health care markets on individuals⁶² and has been used to study, among many other topics, the spillover effects of uninsurance.^{24,63} The popularity of the CTS for this purpose is no surprise. It is a nationally-representative household survey that has been conducted since 1996 in ongoing (approximately) two-year cross-sections. Each of the surveys contains a large number of respondents (no less than 37,000 per year for the waves used here) and collects information on health, health insurance, health care utilization, and sociodemographic background. The CTS instrument was designed to cover the relevant features of health care delivery. The CTS also allows researchers to link state-level data to individual observations. Although additional waves of the CTS were collected after 2003, alterations to the sampling design prohibit linking state-level information to post-2003 waves. Our analyses draw on data from 1996-1997, 1998-1999, 2000-2001, and 2003 (for simplicity, we refer to the waves spanning two years by their initial year of collection).

The CTS sample was collected in stages across clusters. Sixty sites were selected to provide a nationally representative sample (within the continental United States) and households were randomly sampled therein. Site-based samples were supplemented by an independent national sample of households not tied to the sites. Most of these sites were metropolitan areas

(nine were not). Although the survey instrument asked some questions about experiences among children living in the household as reported by adults, our analyses are limited to adult self-reports. Because of the complex and geographically nested nature of the CTS, we employ survey weights in all models.

Individual-Level Influences

Behavioral models regard health care utilization as a function of three categories of influences: perceived need for services, predisposing factors, and enabling factors.^{64,65} By design, all three factors are well-represented in the CTS. For perceived need, we control for self-rated poor health, generally regarded as the single strongest predictor of health-care utilization.⁶⁶ For predisposing factors, we control for age, years of education, race/ethnicity (non-Hispanic white, black, Hispanic, and other), marital status, and sex. For enabling factors, we control for household income, residing in a large metropolitan area (over 200,000 residents), and health insurance, using uninsured as the reference category and dividing the insured by policy type: Medicare, private insurance, military insurance, or other public insurance (the bulk of which is Medicaid). We also control for the year of the survey.

These controls are needed to address the set of relevant influences, but including all of them together affects our interpretations. In particular, there are reasons to expect our interpretations will be conservative to the extent that incarceration has other social, economic, and health effects. For instance, if higher incarceration in a region increases the spread of infectious disease, then controlling for health at the individual level partly controls for one spillover effect of incarceration. Similarly, if incarceration adversely alters the composition of health insurance policies in a market, then controlling for type of health insurance, especially

Medicaid, partly controls for one spillover of incarceration. In short, the total spillover effect of incarceration may be greater than we estimate, although we favor more statistical control over less. The same also applies to some of our state-level influences.

State-Level Influences

Our most important variable at the state level is the percentage of former inmates in the population. But in order to estimate the effects of incarceration *per se* we must control for state-level characteristics that are associated with the number of former inmates and perhaps also with health care. We therefore control for the percent of the population African American, the percent living below poverty, the percent unemployed, and the average state-level income (in 2000 dollars, set in \$10,000 units). We also control for the percent uninsured, but as a potential mechanism rather than as a control. We assume that incarceration increases the risk of not having insurance and, therefore, that some of the total effect of incarceration will pass through state-level uninsurance rates. Nevertheless, we hypothesize that incarceration matters even beyond its relationship with uninsurance. Other state-level control variables might render some of our conclusions conservative. If one believes, for example, that the percent living below poverty is partly a consequence of incarceration, including it as a control variable will displace part of incarceration's spillover effect.

Health Care Utilization and Process

We estimate the influence of state- and individual-level influences on multiple indicators of health care utilization and process. These outcomes vary along several dimensions, including type of service and setting. Exploring different kinds of services allows us to evaluate spillover

effects regardless of whether they operate at an institutional level (e.g., hospitals cut services) or a provider level (e.g., physicians decide to practice elsewhere). All of the dependent variables are coded dichotomously for ease of comparison and comprehension.

Utilization. We examine six indicators of health care utilization, of which three refer to general utilization and three refer to specialized services. *Unmet need* refers to self-reports of foregoing or delaying necessary care. Respondents were asked, “During the past 12 months, was there any time that you didn’t get the medical care you needed?” This variable reflects a direct report of diminished access, but it conflates a perceived need for care with utilization. The remaining variables measure behavior strictly. Respondents were asked whether, over the preceding 12 months, they had *visited a doctor* (not including an emergency room or overnight stay in a hospital) or they had spent the night in a *hospital* (not including for the delivery of a child). To test the specificity of spillover effects, we also consider the utilization of specialized services. Respondents were asked whether, over the preceding 12 months, they had *surgery* or had visited a *mental health professional*, including a psychiatrist, psychologist, psychiatric nurse, or clinical social worker. Women over the age of 40 were also asked whether they had received a *mammogram* in the last year (this question was not asked in 2003, reducing the available sample for models that use mammography).

Process. Beyond affecting utilization, spillover effects may result in a decline in the quality of services received or how those services were delivered. To test this idea, we examine indicators of the health care process. Respondents were asked whether they have a *usual place* for care. A usual place indicates a more robust health care market. We also examine whether respondents were *satisfied with their care* (if they visited a health care provider), *satisfied with their choice of a primary care physician*, *satisfied with their choice of a specialist* (if they needed

a specialist or saw one), and whether they *trusted their doctor* to “put [their] medical needs above all other considerations when treating [their] medical problems” (if they had a usual physician or had visited a physician in the previous twelve months). Respondents were coded as satisfied if they report being “very satisfied” (the modal response for each satisfaction question) and as mistrusting if they disagreed “somewhat” or “strongly” that their doctor could be trusted.

Results

Tables 1 and 2 show the initial basis for spillover effects on health care utilization and process-related outcomes, respectively. The tables present coefficients for both the individual- and state-level variables, although subsequent tables display only state-level coefficients (even though all the same individual-level covariates are also included in the model). Table 1 begins with unmet need, perhaps the most common outcome in research assessing access to care. As noted, reports of unmet need are a function of both a self-assessed need for care and whether that need for care was met. This confluence of potentially countervailing influences is apparent in the coefficients: whereas income reduces the likelihood of reporting unmet need, education increases it, even though education and income are positively correlated. Although African Americans have less access to care and worse health, they are less likely than whites to report unmet need. Other coefficients present a more consistent pattern, including those coefficients that are the focus of this study. Uninsurance represents one of the largest barriers to care. All of the insurance coefficients are statistically significant and greater in magnitude than the estimates for all other categorical covariates except self-rated poor health.

--Insert Table 1 about Here--

Net of these characteristics, however, the percent of former inmates in a state is consistently and positively related to unmet need. The average marginal effect of a unit change in the percent ex-prisoner is .007 (dy/dx[.102]). As a point of comparison with the other covariates, the marginal change from uninsurance to other public insurance is -.052. Other studies find that a percentage-point increase in the uninsured results in a 2% increase in the odds of reporting unmet need ($\exp[.020]=1.02$, Table 4, Pagán and Pauly²⁴), whereas we find that each additional percentage-point of ex-prisoners results in an 11% increase in the odds of reporting unmet need ($\exp[.102] = 1.11$). The ex-prisoner coefficient is also statistically significant controlling for state-level factors correlated with it, including the percent African American, the percent unemployed, and the percent below poverty. We will explore the mediating effects of state-level uninsurance shortly.

The relationship between incarceration and health care quality is apparent for all but one of the remaining utilization outcomes. Individuals in states with a large number of former inmates are less likely to visit a doctor, spend the night in a hospital, undergo surgery, and receive a mammogram. There is no relationship between the percent ex-prisoners and the likelihood of seeking care from a mental health professional. Notably, however, this question pertains to a wider variety of potential service providers, including clinical social workers, suggesting a broader market than available for the other outcomes. There is little variation in the size of the relationship between the percent ex-prisoners and the outcomes, although the relationship is somewhat stronger for visiting a hospital relative to visiting a physician.

Table 2 estimates the same models for the process-related outcomes. The individual-level coefficients fit well-established patterns from the treatment disparities literature. African Americans, for instance, are less likely than whites to have a usual place for care, to be satisfied

with their care and choices, and to trust their physician. Family income is also positively associated with better health care experiences.

--Insert Table 2 about Here--

In addition, however, the percent ex-prisoner within a state significantly diminishes the quality of care. It does so across each of the process outcomes: having a usual place for care, being satisfied with the care you receive, and being satisfied with your choice of a doctor and specialist. The percent ex-prisoner also increases the likelihood of mistrusting your physician. The strength of the relationship is consistent across outcomes. A percentage-point increase in the number of ex-prisoners within a state, for example, decreases the odds of a having a usual place for care by approximately 14%, a difference larger than the difference between African Americans and whites. All of the ex-prisoner coefficients for the process-related outcomes exceed in absolute magnitude the same coefficients for the utilization-related outcomes. The single largest coefficient is for satisfaction with choice of a specialist, which is expected insofar as financial strains are especially consequential for specialized services.

Table 3 turns to the mediating effects of uninsurance. State-level uninsurance should explain some of the ex-prisoner coefficient, but we do not expect uninsurance to reduce the coefficient to zero. Consistent with this, controlling for uninsurance decreases the ex-prisoner coefficient for most of the outcomes, but almost all of the coefficients that were significant without controls remains significant with controls. The ex-prisoner coefficient for unmet need, for instance, is reduced by about half, but remains significant. The most robust coefficients for state-level uninsurance apply to the process outcomes, but even there, the coefficient for percent uninsured is much smaller than the coefficient for percent ex-prisoner. With regard to the breadth

of incarceration effects, the only outcome for which the coefficient for the percent ex-prisoner is eliminated is mammogram utilization.

--Insert Table 3 about Here--

The final tables present two types of sensitivity tests, one regarding the effect of prison relative to other modes of correctional supervision (presented in Panel A) and the other regarding the potential for market segmentation (presented in Panel B). To distinguish the effects of prison per se from other forms of punishment (and, further, to distinguish the effects of simply living in a more punitive state from living in a state where prison is used more frequently), we estimated the percent of individuals within a state who were convicted of a felony but punished with *community supervision* rather than prison. The two forms of punishment are likely very different with respect to health. Community supervision does not entail exposure to the prison environment, but it also does not entail the same access to health care and it still results in a criminal record. For this reason, we expect the effects of percent ex-community supervision to be intermediary to those of percent ex-prisoner.

--Insert Tables 4 and 5 about Here--

The second test explicitly addresses the breadth of spillover effects. If the effects we have shown are truly reflective of spillovers and, thus, are applied to the entire market rather than specific consumers, they should be observed even among those furthest removed from incarceration. Most studies of the spillover effects of community uninsurance, for instance, consider the situation of the insured. In a parallel fashion, we examine the ex-prisoner effect among the insured. In addition, we also examine the ex-prisoner effect among older persons (age 50 or older), whites, those with incomes at least 200% of the federal poverty line, those with at least a four-year college degree, and women. In this way, we explore the moderating influence of

social distance as an instrument for evaluating the breadth of spillovers. Of course, we have already done this to a limited degree by examining the ex-prisoner effect on mammograms, but here we expand the scope of this idea. If the spillover effects of incarceration apply to the entire market, we should observe significant effects among each of these subpopulations.

Table 4 begins with utilization. The models include all the control variables presented in Tables 1 and 2, although we only show the coefficients for percent ex-prisoner (and the percent ex-community in the first set of models). As expected, the effects of ex-prisoner exceed those of ex-community supervision. In no case is the effect of ex-prisoners reduced a great deal and in all cases the absolute value of the ex-prisoner coefficient exceeds that of ex-community supervision. The remaining models reveal remarkably robust associations across subgroups. Of the coefficients that were significant in the initial specification only four are insignificant in the sensitivity analysis, despite a substantial reduction in the sample size in many cases. The effects of incarceration thus spill over to those least likely to be personally affected by it, including the insured, older persons, whites, the well-educated, the non-poor, and women. Among all these subsamples, the coefficients generally parallel the coefficients drawn from the entire sample.

The same is true of the process-related outcomes, presented in Table 5. Indeed, the percent ex-prisoner coefficients are particularly robust with respect to these outcomes: all the ex-prisoner coefficients remain statistically significant, regardless of the subpopulation. Of the subpopulations we explore, the college educated are perhaps most immune to the influence of the ex-prisoner population. But even in this case, the effects are significant and the coefficients are reduced at most by just over 50% (in the case of being satisfied with choice of a specialist).

Part II

The analyses presented thus far are premised on the idea that spillovers from incarceration to health care reflect incarceration *per se* and not some other aggregate-level characteristic. The models presented in Part I are strong on individual-level controls, but they are vulnerable to the influence of unobserved state-level influences. A more appropriate test for between-state heterogeneity would try to capture all potential influences at the state level, recognizing the complex set of potential influences.

In part 2, we estimate models that address unobserved heterogeneity in a rigorous way. We do so by looking at trends in two key outcomes related to our model but observed entirely at the aggregate level. What these outcomes lose in terms of specificity they gain in terms of statistical control. We first consider ex-prisoner effects on state-level uninsurance rates, a key mechanism in our framework (which is based on series in the March Current Population Survey, but reweighted by the State Health Access Data Assistance Center).⁶⁷ We next consider ex-prisoner effects on emergency room utilization per 1,000 state residents (this series is based on the American Hospital Associations Annual Survey, but drawn for our study from *Kaiser State Health Facts*).⁶⁸ Interpreted in tandem, the two outcomes allow us to glimpse the process we describe: does incarceration increase uninsurance even as it also increases emergency room use?

Each outcome is observed over time, 1987 to 2010 for percent uninsured and 1999 to 2010 for emergency room visits. The start dates for the two series differ, but we wish to use as much time-series data as possible. The fact that we observe these outcomes over time allows us to estimate the effects of *change* in the independent variables on *change* in the dependent variables. This also allows us to control for unobserved influences. In particular, we include state fixed-effects, which eliminate the influence of all stable state-level characteristics. This is especially important to our research questions, as state-level characteristics, such as political

culture, safety-net service generosity, and overall policy environment, might vary in ways that affect both health care and criminal justice.⁶⁹ Furthermore, most influences of this sort are enduring over time and most of the variation is between states, meaning state-level fixed-effects will eliminate their influence.

It is also clear, however, that some influences of this sort are dynamic. For instance, state-level demographic composition can change in meaningful ways, as does the health of state economies. Furthermore, previous research points to important dynamic policy influences: at the state level, growth in incarceration is associated with retrenchment in the welfare system.^{70,71} For this reason, we also control for time-variant demographic and policy-related influences. For the former we include the percent unemployed, the percent below poverty, the percent African American, the percent Hispanic, and the violent crime rate. For the latter, we include indicators of the generosity of the state's welfare system, drawn from the University of Kentucky Center for Poverty Research National Welfare Data.⁷² We include controls for the maximum monthly Temporary Assistance for Needy Families (TANF) benefit for a four-person household, inflation-adjusted to reflect 2000 dollars. We also control for the ratio of the state minimum wage to the federal minimum wage, thereby evaluating the relative generosity of state-level income supports. Both variables are related to poverty, which we already statistically control, but presumably also reflect the generosity of states with respect to other needs. There is considerable variation between states and over time in both of these quantities.

In Part 2, the unit of analysis is state-years. The spatial and temporal properties of this type of data render ordinarily least squares regression problematic. In particular, state-level errors will be both geographically and temporally correlated. To address this, we use a panel-corrected standard errors approach, which allows for correlated errors between states, as well as

state-specific heteroskedasticity. Furthermore, we deal with over-time dynamics in two ways, each allowing for a different type of relationship between incarceration and health care outcomes over time. For each outcome, we present results from both a lagged dependent variable model, which assumes a more gradual impact on the outcome, and a first-order autoregressive model (AR1), which assumes an immediate impact.⁷³ Both are plausible specifications for estimating incarceration spillovers and differences between the two will be instructive.

Results

Table 6 shows the results. First, we find a positive association between the number of ex-prisoners in a state and the state-level uninsurance rate (but not between the number formerly under community supervision and the state-level uninsurance rate). The coefficient is significant at the .05 level only when assuming an enduring impact rather than an immediate impact. To be sure, the coefficient is the same when we assume an immediate impact (i.e., under the AR1 specification), although the standard error is larger and the coefficient does not reach statistical significance by conventional standards. Each percentage-point increase in the ex-prisoner population leads to a .32 percentage-point increase in the uninsured population.

--Insert Table 6 About Here--

The second pair of models predicts emergency room visits. If growth in the former inmate population was positively associated with an increase in the number of uninsured individuals but did not affect (or even reduced) the demand for care, its estimated impact would be weaker. Our models reveal, however, that an increase in the percent ex-prisoner is associated with an increase in the rate of ER visits per capita. In this case, the relationship is larger if we assume an immediate impact, perhaps reflecting the particularly strong needs of those recently

released from prison.⁷⁴ For each percentage-point increase in the ex-prisoner population, there are around 28 more ER visits for every 1,000 residents. The coefficient under the first model is not significant under conventional standards, although it is if we employ a two-tailed p -value of less than .10. The relationship seems large, although a single individual can contribute multiple ER visits. The observed range in values is as high as 901 visits per year. In the case of this model, a single former inmate would need to visit the ER 2 to 4 times per year. This number is not implausible: among Medicaid beneficiaries under the age of 65, approximately 15% had two or more ER visits in a year and 5% had four or more.⁷⁵ If the presence of former inmates in a household also increases ER use among family members, the rate of ER use among inmates need not be this high. Overall the patterns found in Table 6 are consistent with the patterns shown at the individual-level, albeit with much greater control for between-state heterogeneity (and much less insight regarding individual-level influences).

Discussion

This study establishes a robust relationship between the number of ex-prisoners within a state and the functioning and quality of its health care system. This finding contributes to particular substantive research literatures, but we start with its broadest implications.

As is the case for labor markets and political institutions, our study demonstrates that the correctional system affects another system that would seem, on its face, far-removed from criminal justice. The absolute number of former prisoners within a state is usually small, especially relative to the number who have more direct problems with access to care. For example, the percent uninsured exceeds the percent ex-prisoner by at least 5% and in many states by more than 15%. Yet the number of ex-prisoners is sufficiently large to affect the experiences

of other health care consumers. This connection is perhaps even more remarkable given the considerable heterogeneity within regional health care markets, a characteristic that might ordinarily blunt the potential for spillovers. Within any region, for example, there is variation in the quality of service providers, as well as variation in how consumers make decisions regarding where and when to seek care. Yet regardless of their personal situation, individuals are affected by the number of people who cycle through the prison system.

These spillovers are deep as well as broad. They are not limited to a particular type of service. A general indicator of health care quality is reporting an unmet need for care. An even more sensitive indicator of spillover effects is whether an individual has a difficult time receiving specialty care or technology-intensive screenings. We find spillover effects for virtually all these indicators, from basic access to care, to referrals, to the source of care, to the quality of care. We find that in states with a larger percentage of former inmates, people are less likely to report a usual place for care, to be satisfied with the care they receive, to report satisfaction with their choice of a health care provider, and to be convinced that their physician has their best interests in mind. Although some studies suggest that incarceration undermines the social fabric of neighborhoods,⁷⁶ our study is one of the few to empirically demonstrate effects on trust among agents not directly tied to criminal justice.

From the perspective of the incarceration literature, these spillovers might be surprising. In recent years, punishment research has focused on the dramatic increase in incarceration and its heavy concentration among young, African American men. Incarceration, then, is sometimes interpreted as an expanding institution oriented toward the penalization of poverty.⁷⁷ This research also emphasizes how former inmates return to a relatively small number of communities that are already disadvantaged and segregated.¹⁰ From these observations, incarceration is seen

as deepening existing forms of inequality: already disadvantaged men are further harmed by a criminal record; their families suffer as a result of their absence and their diminished socioeconomic prospects; and the communities to which they return are further stigmatized for having both high rates of crime and incarceration. These themes are relevant to health care, too, in as much as health care is also sensitive to poverty. Yet these themes do not set the stage for spillover effects *per se* and, on the contrary, make some spillovers unlikely. It is useful to consider how the institutional effects documented here differ from those documented elsewhere.

Because the communities in which incarceration is common are often isolated from the hospitals that provide services to other communities,⁷⁸ the potential for spillover effects could be minimal. In this way, segregation could blunt spillovers in health care rather than provide a pathway for them as segregation does for economic outcomes. Yet our results show that the health care system is not immune from incarceration, despite any market segmentation. Similarly, most work on the institutional effects of incarceration argues that incarceration exacerbates existing inequality. Yet spillover effects with respect to health care appear to affect the entire market for services, rather than the experiences of a particular subset of consumers.

These results also speak to debates regarding the paradoxical effects of prisons as social service institutions.⁴ One strand of the incarceration literature shows how the prison system represents a real improvement in the social services available to many inmates, albeit one that is lost once inmates are released.⁷⁹ In the same vein, some argue the prison system provides an opportunity to deliver screening and treatment to an underserved and otherwise difficult-to-reach population.⁴⁰ The results of our study do not diminish these opportunities, but they do suggest efforts to improve the health of inmates will be short-sighted if they fail to provide support *after* release or if they focus too narrowly on specific services. To date, for instance, efforts to

improve care for inmates have referred largely to the risk of spreading infectious disease, as well as the potential cost-savings of rigorous prison health programs.⁴¹ In this vein, there is some evidence that ex-prisoners with HIV who are not provided with services upon release see a rebound in their viral loads⁸⁰ and that programs providing post-release services save costs by preventing new infections.⁸¹ These arguments are compelling, but perhaps an even more persuasive case could be made if spillover effects of this sort were not limited to infectious disease. Viewing former inmates broadly as health care consumers within a revenue-sensitive system implies a much different set of possibilities than regarding them narrowly as disease vectors within neighborhoods.

Our results point to another paradox: systems that may be progressive from the standpoint of punishment may not be as progressive from the standpoint of health. We find a sharp difference in the effects of community supervision and prison. Ordinarily, community supervision is seen as a less severe form of punishment and a more affordable alternative to incarceration. The appeal of such programs has grown as the costs of maintaining overcrowded prisons have increased. Our results suggest that community supervision does not result in spillover effects in the same fashion as prison, but community supervision nonetheless has some negative effects and, in certain instances, could lead to worse outcomes. The lower average effect of community supervision likely masks considerable between-state heterogeneity, as the character of community supervision varies. Not all states provide health care to those under supervision and some serving under community supervision might benefit from the consolidated health services made available in some prison settings. Yet it is likely that virtually all those who were once under community supervision suffer the detrimental effects of a criminal record, especially on employment, which could ultimately diminish access to care. In evaluating

alternative punishments and their costs, it will be essential to consider linkages between criminal justice and health care.

Limitations

This study has several limitations, some of which affect how we interpret the findings. The first pertains to geography. We focus on state-level indicators of incarceration and health insurance, but there is a potential asymmetry between what we can gather at the state-level and the actual topography of care. We use state-level data because the state is the level at which correctional policy and many public health insurance programs, including Medicaid, are administered. For this reason, the policy levers for redressing spillover effects reside largely with states. Yet some spillover effects almost certainly occur within a much narrower geography. Consumers tend to visit providers near to them and physicians are affiliated with hospitals close to their own practices.⁸² As a result, our state-level indicators will be imperfectly correlated with the market experiences of CTS respondents. This makes our results conservative, but it also suggests some useful sensitivity tests. We find significant relationships between incarceration and health care even among well-resourced patients, including the well-educated, who are less likely to be constrained to providers in their immediate area. It is also useful to compare our estimates of the effects of uninsurance with those based on smaller geographic units. Using the 2000 Community Tracking Study, Pagán and Pauly,²⁴ like us, estimate the spillover effects of aggregate uninsurance on unmet need. They focus, however, on communities rather than states. Despite using a geography more tailored to the actual market for care, they find effects of community uninsurance that are similar in magnitude to those produced by our models. One

potential explanation for the empirical consistency over different geographies is the emergence of more regional health care systems, facilitated by the gradual consolidation of local systems.⁸³

It is also important to emphasize how our data do not allow us to easily distinguish controls from mechanisms. This uncertainty pervades both parts of our analysis, but the implications are less severe than they might appear. At the aggregate level, it is possible that both the percent below poverty and the unemployment rate are partly functions of the number of former inmates, as has been revealed in previous research.¹¹ Similarly, whether or not an individual is uninsured may be a function of the number of former inmates in a state, especially if that number is positively correlated with insurance premiums. For these reasons, our results can be regarded as conservative.

Our various dependent variables allow us to provide a granular assessment of spillover effects, though some of the items are imperfect indicators of quality. For instance, reporting an unmet need for care entails both not receiving services and believing that such services were necessary. As is conventional for studies of this sort, we control for the need for services using self-rated health, which, because of its self-reported nature, is strongly related to the perceived need for care and, by extension, to utilization. By this logic, once self-rated health is controlled, the remaining variance in unmet need is more likely to reflect barriers to care than need for care. Nevertheless, this combination of subjective and objective influences introduces uncertainty. For example, we know African Americans have less access to care than whites, but we find in our study—as have others—that African Americans are less likely to report unmet need. A similar uncertainty is apparent in some of the other outcomes. Having a usual source of care, for example, implies needing to visit a physician with sufficient frequency to report a “usual” source, just as being satisfied with care involves having an illness that is sufficiently complex to

allow a reasonable assessment of quality. In these ways, many of the dependent variables admit a mix of countervailing influences. Despite this, the effects of the ex-prisoner population on health care are remarkably consistent. In every case in which the percent ex-prisoner is significant, the coefficient is in the direction predicted by the proposition that a larger number of former inmates reduces health care access and quality. The only other covariate in our model that shows a similarly robust and consistent pattern is whether the respondent has health insurance, suggesting both can be characterized as barriers to care.

The Affordable Care Act and the Possibility of Reform

The health care landscape has changed since 2010 (when our aggregate-level analyses end). The Affordable Care Act was passed in 2010 and its rollout is ongoing. The Act impacts ex-prisoners in several ways, including by expanding Medicaid, by requiring most individuals to obtain health insurance, and by developing health insurance exchanges that will allow low-income individuals to purchase insurance. Although these elements might mitigate some of the difficulties former inmates face, they will clearly not eliminate them. Simulations considering the take-up of Medicaid among former inmates estimate that 22% to 34% of former inmates would enroll in an insurance plan.⁸⁴ Among those not eligible for Medicaid, 24% would be eligible for insurance tax credits that might allay the cost of buying private non-employer coverage through an exchange. The Act provides an improvement over the status quo, but it is not a cure to the problems introduced by incarceration. We should not expect the Act to eliminate the spillover effects found here, although it might dampen their impact.

The fact that an unusually ambitious reform initiative fails to eliminate the problem does not mean the spillover effects of incarceration are out of reach of policy. On the contrary, the

spillover effects of incarceration on health care are subject to perhaps more points of melioration than are many other spillover effects of incarceration. Further, spillovers with respect to health care may be less subject to the political forces that make other aspects of prison reform difficult. The political effects of incarceration, for instance, ultimately depend on felon disenfranchisement laws. Eliminating these specific institutional effects of incarceration, therefore, depends on eliminating those laws in particular. Similarly, reducing the labor market effects of incarceration depends, in part, on restricting the ability of employers to discriminate on the basis of a criminal record. In the case of health care, however, efforts to reduce spillover effects need not be directed only toward current or former inmates or laws pertaining to criminal justice. The expansion of the already existing health care safety net, including Medicaid, would surely ease many of the financial pressures underlying spillovers. In this vein, some advocates recommend suspending rather than terminating Medicaid benefits among inmates, which would make it easier for them to regain benefits upon release.⁴⁵ It is also worth emphasizing that the politics of the Affordable Care Act—which are plainly quite strong—may be at least partly related to incarceration, insofar as felon disenfranchisement can tilt elections in favor of politicians less open to Medicaid expansion.⁸⁵ It is very unlikely that enfranchising former inmates would have been enough to shift elections so that most states accepted the Medicaid expansion.¹² Yet felon disenfranchisement represents another mechanism whereby political factors can accentuate disadvantage in ways that redound on the health care system.

Conclusion

The case for providing additional resources to former inmates is often made in light of the harm done by a criminal record: incarceration undermines employment, wages, and health, and, by extension, the well-being of children, families, and communities. We find this case

compelling on its own merits, but our study adds to the debate by expanding the ledger. We show that incarceration affects the institutions directly responsible for health and well-being and that individuals far removed from the criminal justice system are also affected. We also show that the institutional effects of incarceration are not limited to a finite set of pathways and, indeed, that it is worth considering a more expansive framework for understanding institutional effects. While the effects of incarceration on unemployment rates are premised on keeping inmates out of the labor market, the effects of incarceration on health care are premised on the fact that inmates will always be in the market for health services. Similarly, whereas the institutional effects of incarceration on voting might increase inequality, the effects of incarceration on health care decrease quality for everyone. Finally, whereas neighborhood segregation ordinarily deepens the impact of incarceration, the effects of incarceration on health care spread well beyond local boundaries.

Although we have not emphasized health outcomes, the pathways we document with respect to health care likely undermine health as well. Reducing access to care compromises the health of former inmates in the first instance, but in the long run it may affect the health of others as well. These results thus suggest a corollary to Dostoyevsky's⁸⁶ famous admonition. Just as a society's degree of civilization may be judged by its prisons, so too may its number of prisoners affect its capacity to provide a civilized level of care.

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Figure 1. Conceptual Model Linking Incarceration to Health Care Spillover Effects

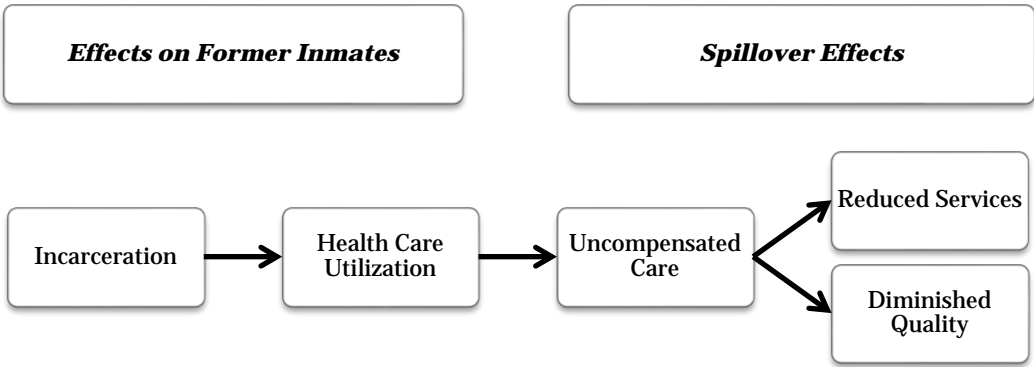
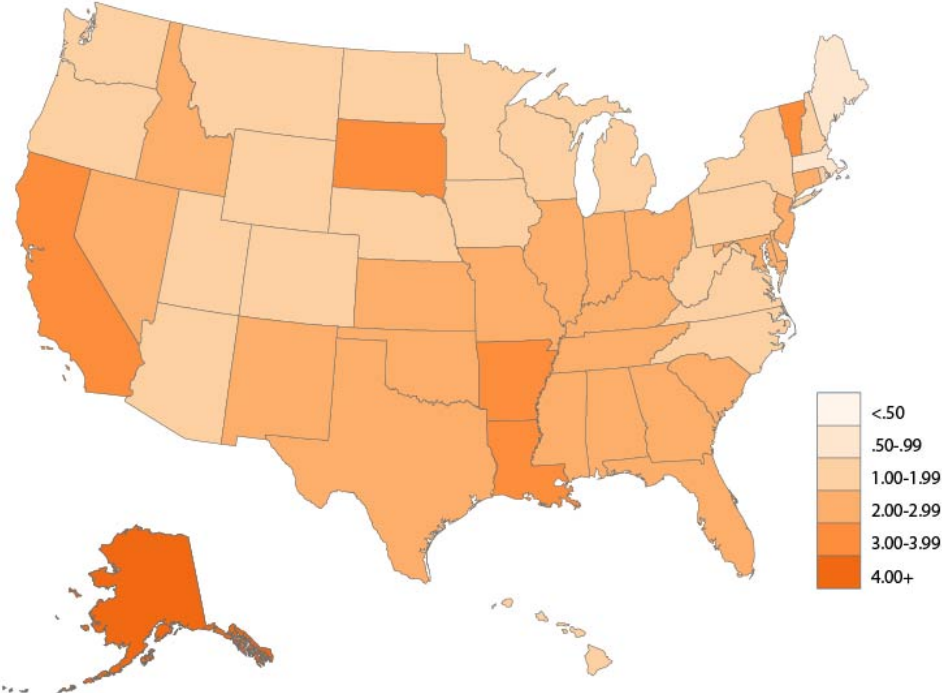


Figure 2. Percent Former Inmates and Uninsured by State, United States 2010

Panel A. Percent Former Inmates



Panel B. Percent Uninsured

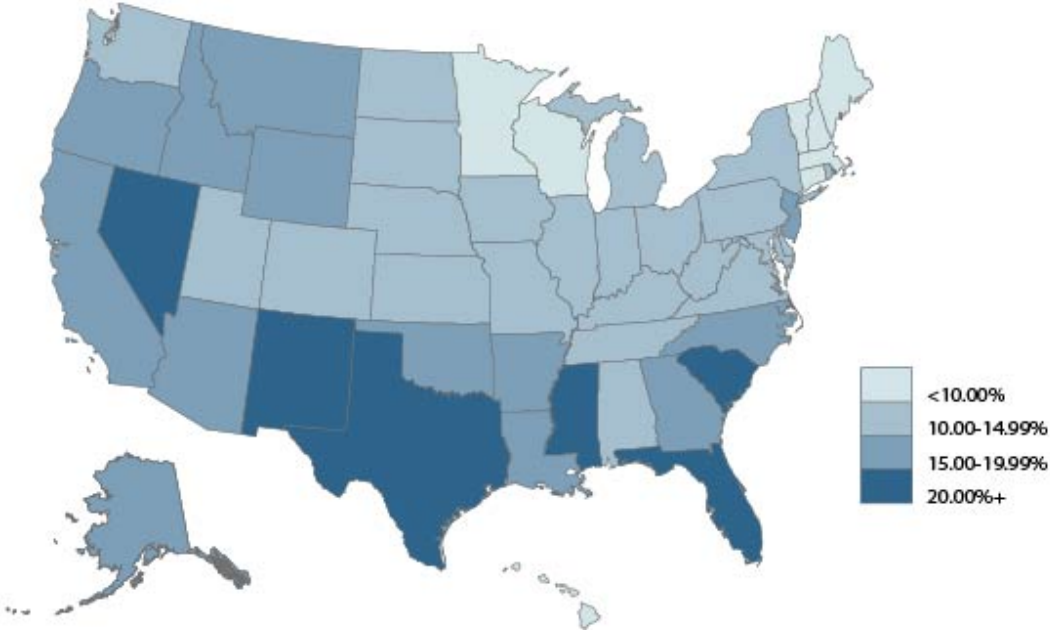


Table 1. Logit Regression Models of Utilization-Related Variables on Individual and State-Level Covariates, 1996-2003 Community Tracking Study

	Unmet Need	Visited Doctor	Visited Hospital	Surgery	Mammogram	Psychiatric Care
<i>Individual-Level Influences</i>						
Insurance (vs. none)						
Medicare	-1.295*** (0.060)	1.742*** (0.041)	0.879*** (0.029)	0.918*** (0.039)	0.901*** (0.054)	0.640*** (0.078)
Private	-1.060*** (0.030)	1.204*** (0.030)	0.379*** (0.027)	0.701*** (0.029)	1.187*** (0.042)	0.343*** (0.060)
Military	-0.585*** (0.172)	1.076*** (0.104)	0.588*** (0.048)	0.782*** (0.063)	1.224*** (0.086)	0.944*** (0.098)
Public	-0.512*** (0.033)	1.458*** (0.035)	0.805*** (0.031)	0.908*** (0.036)	1.138*** (0.039)	1.115*** (0.060)
Poor health	1.092*** (0.029)	0.648*** (0.025)	1.070*** (0.018)	0.561*** (0.016)	-0.020 (0.019)	0.962*** (0.026)
Age	-0.014*** (0.001)	0.010*** (0.001)	0.015*** (0.000)	0.006*** (0.001)	0.018*** (0.001)	-0.018*** (0.001)
Black	-0.085** (0.032)	-0.106*** (0.028)	0.032 (0.031)	-0.332*** (0.022)	0.113*** (0.027)	-0.506*** (0.055)
Hispanic	-0.315*** (0.054)	-0.480*** (0.025)	-0.124*** (0.030)	-0.368*** (0.053)	0.232*** (0.036)	-0.381*** (0.074)
Other	0.242*** (0.065)	-0.327*** (0.031)	-0.086** (0.031)	-0.263*** (0.046)	-0.172*** (0.039)	-0.300*** (0.055)
Married	0.096*** (0.027)	0.041** (0.013)	-0.127*** (0.018)	0.061*** (0.013)	0.315*** (0.017)	-0.447*** (0.026)
Female	0.284*** (0.017)	0.903*** (0.012)	0.002 (0.020)	0.200*** (0.012)		0.247*** (0.015)
Large city	0.110*** (0.024)	0.063*** (0.018)	-0.020 (0.047)	-0.015 (0.021)	0.120*** (0.038)	0.221*** (0.038)
Education	0.043*** (0.006)	0.062*** (0.003)	-0.006 (0.004)	0.032*** (0.003)	0.066*** (0.004)	0.081*** (0.005)
Ln(Family Income)	-0.039*** (0.006)	0.077*** (0.003)	-0.027*** (0.006)	0.019*** (0.006)	0.046*** (0.009)	-0.032*** (0.006)
Year	0.001 (0.005)	0.003 (0.004)	0.012*** (0.003)	0.013*** (0.004)	0.054*** (0.008)	-0.015*** (0.005)
<i>State-Level Influences</i>						
% Below Poverty	0.012 (0.007)	0.007 (0.005)	0.002 (0.006)	-0.009** (0.004)	0.026*** (0.006)	0.006 (0.009)
Adjusted Income	-0.075 (0.043)	0.145*** (0.031)	-0.095** (0.037)	-0.089*** (0.026)	0.166*** (0.034)	0.300*** (0.058)
% Unemployed	-0.041* (0.016)	-0.011 (0.010)	0.015 (0.008)	-0.010 (0.008)	-0.051** (0.020)	0.022* (0.013)
% African American	-0.012*** (0.002)	0.007*** (0.001)	0.008*** (0.002)	0.003** (0.001)	0.004*** (0.002)	-0.004 (0.002)
% Ex-Prisoners	0.102*** (0.020)	-0.075*** (0.018)	-0.118*** (0.021)	-0.061*** (0.017)	-0.081*** (0.029)	-0.044 (0.046)

Constant	-4.500	-9.366	-26.336	-29.050	-112.667	26.803
Observations	179012	179012	179012	179012	46184	179012

* p < .05; ** p < .01; *** p < .001 (two-tailed test)

Table 2. Logit Regression Models of Process-Related Variables on Individual and State-Level Covariates, 1996-2003
Community Tracking Study

	Usual Place	Satisfied with Care	Satisfied with Choice of Doctor	Satisfied with Choice of Specialist	Physician Mistrust
<i>Individual-Level Influences</i>					
Insurance (vs. none)					
Medicare	1.224*** (0.039)	0.807*** (0.026)	1.290*** (0.047)	1.306*** (0.053)	-0.774*** (0.035)
Private	1.144*** (0.029)	0.496*** (0.019)	0.787*** (0.025)	0.935*** (0.035)	-0.394*** (0.025)
Military	1.415*** (0.105)	0.468*** (0.042)	0.410*** (0.087)	0.537*** (0.106)	-0.101 (0.096)
Public	1.402*** (0.045)	0.618*** (0.022)	0.672*** (0.036)	0.781*** (0.061)	-0.337*** (0.046)
Poor health	0.254*** (0.025)	-0.427*** (0.013)	-0.467*** (0.021)	-0.581*** (0.027)	0.494*** (0.032)
Age	0.014*** (0.001)	0.012*** (0.000)	0.005*** (0.001)	0.016*** (0.001)	-0.005*** (0.001)
Black	-0.085** (0.030)	-0.136*** (0.020)	-0.065 (0.035)	-0.182*** (0.044)	0.106*** (0.029)
Hispanic	-0.698*** (0.033)	-0.083** (0.027)	-0.229*** (0.044)	-0.047 (0.050)	0.201*** (0.031)
Other	-0.470*** (0.044)	-0.369*** (0.032)	-0.208*** (0.057)	-0.409*** (0.081)	0.206*** (0.047)
Married	0.311*** (0.023)	0.003 (0.013)	0.043** (0.015)	0.107*** (0.031)	0.039* (0.019)
Female	0.567*** (0.016)	0.062*** (0.007)	0.006 (0.015)	0.001 (0.030)	-0.165*** (0.018)
Large city	-0.194*** (0.054)	-0.048** (0.017)	-0.125*** (0.032)	-0.050 (0.037)	0.156*** (0.024)
Education	0.027*** (0.004)	-0.017*** (0.003)	-0.015*** (0.004)	-0.004 (0.007)	0.011** (0.004)
Ln(Family Income)	0.082*** (0.004)	0.034*** (0.006)	0.035*** (0.004)	0.042*** (0.010)	-0.019** (0.007)
Year	-0.008 (0.010)	0.022*** (0.003)	0.034*** (0.008)	0.017* (0.007)	-0.051*** (0.006)
<i>State-Level Influences</i>					
% Below Poverty	-0.009 (0.011)	0.010 (0.006)	0.004 (0.007)	-0.002 (0.007)	0.022*** (0.007)
Income	0.041 (0.062)	0.025 (0.041)	-0.029 (0.050)	-0.038 (0.047)	0.061 (0.035)
% Unemployed	0.044* (0.019)	-0.027*** (0.008)	-0.020 (0.012)	-0.012 (0.011)	-0.001 (0.012)
% AA	0.006 (0.003)	0.006*** (0.001)	0.014*** (0.002)	0.017*** (0.002)	-0.013*** (0.001)
% Ex-Prisoners	-0.157*** (0.030)	-0.128*** (0.021)	-0.146*** (0.019)	-0.198*** (0.028)	0.167*** (0.020)

Constant	14.247	-43.516	-65.791	-32.408	98.330
Observations	179012	166087	175482	74243	161189

* p < .05; ** p < .01; *** p < .001 (two-tailed test)

Table 3. Logit Regression of Utilization and Process-Related Outcomes on Individual and State-Level Influences, with Controls for Uninsurance, 1996 – 2003 Community Tracking Study

Panel A. Utilization Outcomes

	Unmet Need	Visited Doctor	Visited Hospital	Surgery	Mammogram	Psychiatric Care
% Ex-Prisoner	0.056* (0.022)	-0.052*** (0.019)	-0.112*** (0.022)	-0.060*** (0.017)	-0.056 (0.032)	-0.019 (0.050)
% Uninsured	0.023*** (0.004)	-0.012*** (0.003)	-0.003 (0.004)	-0.001 (0.005)	-0.011* (0.004)	-0.112* (0.005)

Panel B. Process Outcomes

	Have Usual Place	Satisfied with Care	Satisfied with Choice of Doctor	Satisfied with Choice of Specialist	Physician Mistrust
% Ex-Prisoner	-0.086** (0.031)	-0.096*** (0.021)	-0.090*** (0.019)	-0.131*** (0.029)	0.098*** (0.020)
% Uninsured	-0.367*** (0.005)	-0.015*** (0.003)	-0.029*** (0.004)	-0.033*** (0.005)	0.035*** (0.005)

* $p < .05$; ** $p < .01$; *** $p < .001$ (two-tailed test)

Note: All models also include the control variables described in tables 1 and 2.

Table 4. Logit Regression of Utilization-Related Variables, Sensitivity and Subgroup Analyses, 1996 - 2003
Community Tracking Study

	Unmet Need	Visited Doctor	Visited Hospital	Surgery	Mammogram	Psychiatric Care
Panel A. Prisons vs. Community Supervision						
% Ex-Prisoners	0.100*** (0.020)	-0.075*** (0.018)	-0.123*** (0.020)	-0.062*** (0.017)	-0.083*** (0.030)	-0.047 (0.045)
% Ex-Community Supervision	0.019* (0.009)	0.001 (0.005)	0.026*** (0.007)	0.004 (0.014)	0.003 (0.009)	0.013 (0.010)
Panel B. Social Distance Analysis						
<i>Among the Insured</i>						
% Ex-Prisoners	0.154*** (0.023)	-0.069*** (0.018)	-0.101*** (0.022)	-0.049** (0.017)	-0.084** (0.029)	-0.043 (0.047)
<i>Among those 50 and Older</i>						
% Ex-Prisoners	0.140*** (0.030)	-0.129*** (0.029)	-0.118*** (0.015)	-0.049** (0.017)	-0.028 (0.033)	0.015 (0.046)
<i>Among Whites</i>						
% Ex-Prisoners	0.162*** (0.027)	-0.083*** (0.023)	-0.089*** (0.021)	-0.041 (0.031)	-0.087** (0.029)	0.032 (0.048)
<i>Among those at least 2 × Poverty Level</i>						
% Ex-Prisoners	0.163*** (0.024)	-0.080*** (0.017)	-0.086** (0.028)	-0.047** (0.018)	-0.102*** (0.024)	-0.011 (0.042)
<i>Among the College Educated</i>						
% Ex-Prisoners	0.125*** (0.028)	-0.042 (0.024)	0.004 (0.031)	-0.005 (0.027)	-0.104** (0.037)	0.009 (0.048)
<i>Among Women</i>						
% Ex-Prisoners	0.139*** (0.026)	-0.075*** (0.018)	-0.115*** (0.026)	-0.062** (0.020)	-0.081** (0.029)	-0.076 (0.044)

* $p < .05$; ** $p < .01$; *** $p < .001$ (two-tailed test)

Note: All models also include covariates described in Table 1. Coefficients from 49 separate models.

Table 5. Logit Regression of Process-Related Variables, Sensitivity and Subgroup Analyses, 1996 - 2003 Community Tracking Study

	Usual Place	Satisfied with Care	Satisfied with Choice of Doctor	Satisfied with Choice of Specialist	Physician Mistrust
Panel A. Prisons vs. Community Supervision					
% Ex-Prisoners	-0.154*** (0.030)	-0.124*** (0.020)	-0.141*** (0.018)	-0.193*** (0.027)	0.162*** (0.019)
% Ex-Community Supervision	-0.030*** (0.009)	-0.023*** (0.006)	-0.046*** (0.010)	-0.034* (0.015)	0.037*** (0.009)
Panel B. Social Distance Analysis					
<i>Among the Insured</i>					
% Ex-Prisoners	-0.167*** (0.029)	-0.135*** (0.021)	-0.157*** (0.020)	-0.232*** (0.027)	0.167*** (0.019)
<i>Among those 50 and Older</i>					
% Ex-Prisoners	-0.119*** (0.024)	-0.104*** (0.017)	-0.181*** (0.026)	-0.138*** (0.041)	0.172*** (0.032)
<i>Among Whites</i>					
% Ex-Prisoners	-0.153*** (0.031)	-0.149*** (0.032)	-0.210*** (0.025)	-0.258*** (0.026)	0.203*** (0.027)
<i>Among those at least 2 × Poverty Level</i>					
% Ex-Prisoners	-0.164*** (0.026)	-0.121*** (0.023)	-0.163*** (0.025)	-0.202*** (0.038)	0.182*** (0.024)
<i>Among the College Educated</i>					
% Ex-Prisoners	-0.115** (0.038)	-0.158*** (0.026)	-0.071* (0.036)	-0.097** (0.033)	0.194*** (0.023)
<i>Among Women</i>					
% Ex-Prisoners	-0.156*** (0.032)	-0.115*** (0.019)	-0.168*** (0.021)	-0.234*** (0.034)	0.158*** (0.024)

* $p < .05$; ** $p < .01$; *** $p < .001$ (two-tailed test)

Note: All models also include covariates described in Table 2. Coefficients from 49 separate models.

Table 6. Panel Corrected Standard Errors Regression of State-Level Health Care System Variables on Felon Estimates and other Independent Variables

	<i>Percent Uninsured</i>		<i>Emergency Room Visits</i>	
	Lagged Dependent Variable	Autoregressive Model (AR1)	Lagged Dependent Variable	Autoregressive Model (AR1)
% Ex-Prisoner	.316* (.148)	.316 (.200)	17.567+ (10.110)	28.174* (12.515)
% Ex-Community Supervision	-.039 (.066)	-.098 (.082)	1.003 (1.455)	1.682 (1.677)
% Below Poverty	.227*** (.031)	.251*** (.031)	.003 (.952)	-.218 (.945)
% Unemployed	.130** (.043)	.177*** (.055)	1.340 (1.150)	2.462* (1.136)
% African American	-.103 (.103)	-.028 (.141)	11.093** (4.033)	12.402** (4.342)
% Hispanic	.102** (.036)	.155*** (.043)	.304 (1.825)	1.223 (2.695)
Violent Crime Rate	-.0001 (.0006)	.0006 (.0007)	.0851* (.0383)	.1006* (.0438)
Maximum TANF Benefit	-.0009 (.0006)	-.0026*** (.0008)	-.1138** (.0371)	-.1355*** (.0406)
State minimum wage/ Federal minimum wage	.810* (.409)	.774 (.528)	39.490 (25.594)	39.468 (23.513)
Lagged Dependent Variable	.346*** (.049)		.354* (.176)	
Rho		.336		.428
State Fixed-Effects	✓	✓	✓	✓
Constant	6.156*	8.602*	-88.019	10.332
Observations	1150	1200	550	600
States	50	50	50	50

Years	1987-2010	1987-2010	1999-2010	1999-2010
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+ $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$ (standard errors in parentheses)