

INCARCERATION AND HEALTH

Working Paper

December 5, 2012

Josiah D. Rich, MD, MPH

Brown University Medical School

and

The Center for Prisoner Health and Human Rights

The Miriam Hospital (Providence, RI)

With

Dora Dumont, PhD and Scott Allen, MD

Introduction

The dramatic increase in incarceration in the past three decades has been driven, in part, by the failure of the U.S. healthcare system to adequately treat mental illness and addiction. The resultant incarcerated population is marginalized and disadvantaged with a high burden of disease. The health of prisoners is fundamentally a public health issue, both because prisoner health reflects the failures of U.S. healthcare and because the vast majority of prisoners eventually return to the community, bringing their health conditions with them (1). Because the present scale of incarceration in this country is unprecedented, the long-term consequences for community health are still unknown. We present the current state of knowledge of the intersections between incarceration and health: how health issues contribute to incarceration, the health and healthcare of prisoners, and post-release health of prisoners and their communities. The rapid growth of evidence in this field over the past ten years makes it clear that our current challenges in incarceration and community health cannot be successfully addressed unless they are addressed together.

Health issues contributing to incarceration

The escalation of incarceration since the 1970s is due, in large part, to the failure to provide adequate community-based health care for two particular medical conditions: mental illness and addiction. Left untreated, both conditions often lead to behaviors that result in incarceration.

Prisons and jails have become the largest institutions housing the mentally ill in America. One study found that 12% of mental health service recipients in San Diego had been incarcerated during a one-year period and another study found that 24% of Los Angeles Medicaid clients

receiving mental health services were arrested over a 10-year period (2, 3). The presence of large numbers of the mentally ill prisoners has been noted for almost a hundred years (4) but has increased since the closing of mental hospitals in the 1970s. Deinstitutionalization was intended to shift patients to more humane care in the community, but insufficient funding instead left many people without access to treatment altogether (5-7). Mental illness frequently becomes de facto criminalized when people also use illegal drugs, sometimes as a form of self-medication (8) or engage in behaviors that draw attention and police responses. Even with appropriate training, police often divert people into the criminal justice rather than the mental health system out of time or resource constraints (e.g. through “mercy bookings,” when it appears that there are no mental health resources available for a person in need) (6, 7, 9, 10).

An even greater proportion of incarceration derives from the widespread incarceration of drug users and small-time dealers. With the acceleration of the War on Drugs in the 1980s, “tough on crime” rhetoric became a useful political tool, and arrests of low-level offenders were a convenient measure of how effective policies were. Eighty percent of drug arrests are for possession rather than intent to sell, and marijuana possession accounts for over 45% of drug arrests (11). Many of these offenders have substance dependence as defined by the DSM-IV. Addiction is a chronic but treatable condition; relapse is frequent, but with rates comparable to failures to adhere to treatment for other medical conditions such as hypertension and diabetes (12). However, the all-too-common perception of addiction as a moral failing rather than a medical issue contributes to the low availability of treatment in the community. As a result, drug dependence remains largely left in the hands of the criminal justice system rather than the health care system – i.e. criminalized rather than medicalized.

Health profile of prisoners

Jail and prison inmates carry a higher disease burden than the general public (16-18). Prisoners are more likely than the general U.S. population to be unemployed, poor, black or Hispanic, homeless, and uninsured, and these social variables are all strongly associated with poor health. (For instance, people without jobs are more likely to lack health insurance and thus access to health care.) We address three aspects of the health profile of the incarcerated population: infectious diseases, chronic diseases, and mental illness.

Infectious diseases

Contagious diseases such as tuberculosis (TB) have traditionally been a major health problem in correctional facilities. In contrast to some other world regions, TB has been largely controlled within U.S. prisons and jails but remains a concern, since the presence of large numbers of people in enclosed, poorly-ventilated spaces is highly conducive to its spread. Rates of sexually transmitted diseases (STDs) are also higher among prisoners than in the general population (19, 20). Prevalence is especially high among women inmates, among whom syphilis seropositivity has been as high as 28% , compared to 10% among males (21). However, reported rates may understate the true prevalence in facilities that do not perform universal screening or among sex workers, who are often released from jail before testing is conducted (22).

HIV and incarceration have many risk factors in common, especially addiction. In the U.S. overall, an estimated 25% of people living with HIV do not know they are infected. Of those who do know their status, only about 50% are in treatment. The prevalence of HIV in correctional facilities has declined steadily since the 1990s, but remains higher than in the general population. An estimated 17% of all Americans living with HIV pass through a

correctional facility annually. This includes 22-28% of black men with HIV and 22-33% of Hispanic men with HIV (23). Correctional facilities have played an important role in diagnosing HIV in people who had not been previously tested, but estimates of the number of inmates with HIV vary substantially across facilities and states depending on testing policies and practices. For instance, states or facilities that test primarily when requested by the inmate will under-diagnose HIV compared to states with opt-out testing (i.e. testing is automatic unless the inmate refuses), or mandatory testing, since those most at risk are less likely to request testing.

People living with HIV frequently have other health problems, including coexisting infectious diseases. Because injection drug use is a common route of transmission for both HIV and hepatitis C virus (HCV) infections, HIV/HCV co-infection is especially common; in one study, 65% of prisoners with HIV also had HCV (24). HCV mono-infection is a growing international problem with an especially high prevalence among prisoners; because it is a “silent” infection, often without symptoms, it can remain unsuspected and undiagnosed until a late stage. There is wide variability in point estimates of HCV prevalence among correctional populations. An estimated 16-41% of prisoners carry antibodies and 12-31% have advanced to chronic infection, which is 8-20 times higher than the general population (25, 26). Despite the fact that it now outpaces HIV in new cases, HCV has not yet gained the same awareness among the public, including correctional administrators, which may be one reason why HCV testing remains far less frequent than HIV testing. The high price tag for a course of HCV treatment (well over \$50,000 and rising) may also discourage prisons and jails from broad-based testing, since diagnosis could require treatment on the part of the correctional facility.

Other chronic conditions

Chronic diseases such as hypertension, asthma and diabetes have only recently become a substantial focus for researchers in correctional health. Chronic health problems now constitute a growing percentage of correctional healthcare needs due to a confluence of trends, especially the increase in chronic disease among younger Americans and the aging of the correctional population. In the first decade of the century, the overall prison population increased by 16% (a slower growth than previous decades) but the number of prisoners 55 or older increased by 79% (27). Those 55 and older are significantly sicker than prisoners younger than 55. A Texas study found that 41% of prisoners 45-54 years old had at least one chronic condition, compared with 65% of those 55 or older (28). However, the prevalence of chronic diseases may be underestimated in this study because prisoners under 50 years old were not screened for many conditions after intake; in addition, most studies are based on self-reported symptoms or diagnoses, and prisoners may also be untrusting of correctional staff (28), concerned about stigma associated with some health problems, or ignorant of their own health conditions. Notwithstanding, an estimated 39-43% of all inmates have at least one chronic health condition (17).

With few exceptions, there is a higher prevalence of almost all chronic conditions among inmates compared to the general population (16). In a national study, inmates had 1.2 fold more hypertension than the general population. Even in the youngest age group (18-33 years old), 10% of jail inmates and 11% of prison inmates had hypertension, compared to 7% of non-incarcerated 18-33 year-olds, and patterns were similar for other common conditions (e.g. asthma) (16). Other local studies have found that inmates are similar to the general population in hypertension, diabetes, and heart disease risk measures (28, 29). Since not all inmates receive medical

screening for chronic conditions it is possible that these conditions were underreported among prisoners. Although female inmates are only about 10% of the correctional population, they present both higher rates of disease and additional reproductive health issues; 25-40% have abnormal pap smears, compared to 7% of women in the general population (30).

Mental health and addictions

Well over half of all inmates have a mental health problem (31). Rates are substantially higher among women inmates, among whom PTSD is especially marked (32, 33) and among whites compared to blacks and Hispanics: 71% of whites in jail have a mental health problem, compared to 63% of blacks and 50% of Hispanics (31). It is possible, though, that either self-reporting bias or the accuracy of traditional measures of mental health varies by race and ethnicity. The prevalence of mental illness is slightly lower in state and federal prisons, but is still 56% for state inmates and 45% for federal prisoners (31). Serious mental illness (e.g. psychosis) is also much higher than the national average, at nearly 15% among men and 31% among women in jail (34). The estimates of inmates with an addiction are more uncertain, in part due to reliance on multiple, sometimes unvalidated, diagnostic instruments (35, 36). The Bureau of Justice Statistics reported that 68% of jail inmates have symptoms consistent with DSM-IV definitions of dependence or abuse, compared to 9% of the U.S. population at large; among jail inmates, this includes 78% of whites compared to 64% of blacks and 59% of Hispanics (13). Rates are lower in state prisons, with 59% of whites, 50% of blacks, and 51% of Hispanics meeting criteria for drug dependence or abuse. About 47% of jail inmates have alcohol dependence or abuse, compared to 54% of jail inmates with drug dependence or abuse, indicating a substantial population dealing with both substances simultaneously. A systematic

review found particularly large heterogeneity in estimates of prevalence of alcohol dependency by gender, in part due to multiple diagnostic instruments and methodologies: 18-30% of male prison inmates exhibited alcohol dependence/abuse, only slightly in excess of the U.S. general public; at 10-29% prevalence, however, women prisoners were 2-4 times as likely as non-incarcerated women to have alcohol dependence/abuse (37). Again, many inmates have both mental illness and addiction, further complicating detection of either one where staff or diagnostic instruments are insufficiently sensitive, or where overcrowding and/or understaffing reduces the time spent on medical screening.

Health care in correctional facilities

Public health advocates and healthcare providers confront a number of ethical dilemmas when working with correctional systems (38, 39). Correctional facilities are healthcare providers of last resort for many people who lack access to care in the community, but correctional medical staff also provide care with and within an environment that in itself can have adverse effects on the health of individuals and the communities disproportionately affected by incarceration.

Prisoners are one of only two groups in America with a constitutional right to health care (the other is Native Americans). The 1976 Supreme Court decision in *Estelle v Gamble* found more specifically that deliberate indifference to serious medical needs constitutes a violation of the Eighth Amendment prohibition of cruel and unusual punishment. *Estelle v Gamble* led to expanded healthcare services, especially through a series of subsequent lawsuits or threatened litigation. The duty of correctional facilities to provide healthcare was recently reinforced in *Brown v Plata* (2011), which ordered California to reduce overcrowding in prisons because of the associated failure to provide adequate healthcare to all inmates. There are in addition a

number of international guidelines for prisoner care, especially those framed by the United Nations High Commissioner for Human Rights and the World Health Organization, but the U.S. is not generally a signatory to such international agreements. Correctional facilities are more likely to adopt standards for correctional healthcare established by the American Public Health Association, the American Correctional Association, or the National Commission on Correctional Health Care (which has accredited about 500 facilities out of more than 3,000), but no follow-up studies have provided evidence of the improvement of conditions following adoption of these standards (40). There is also little consensus regarding quality of care standards for correctional systems and facilities, which would more readily permit comparisons to identify better- and worse-performing facilities or improvement in care delivery over time. There continues to be substantial variation in the quality measures employed and the underlying data systems that measures rely on (41, 42). In part, this results from the difficulties of translating “free world” quality measures to correctional facilities.

There are some examples of correctional facilities becoming important public health collaborators in the screening and diagnosis of several infectious diseases. During the 1990s, for instance, a third of all HIV cases in Rhode Island were diagnosed at the state’s correctional facilities (44, 45). Another model is provided by the Hamden County jail in Massachusetts, which partners with community health centers. The jail facilitates continuous care delivery by assigning new inmates to care based on their zip code; staff from community health centers provide health services inside the facility during incarceration and develop individualized discharge plans before release, linking releasees to their local health centers (46). Overall, however, there is a disconnect between correctional health and state or local public health departments in planning and delivering care to inmates and releasees. Testing policies and

procedures remain inconsistent across states and facilities. In jails, where many people remain for under 48 hours, testing follow-through (delivery of results and establishment of a treatment regime) is especially challenging.

Correctional facilities appear to have lower rates of screening for non-infectious conditions. At admission, about 80% of jail inmates, over 85% of state prisoners, and over 90% of federal prisoners are screened for suicide risk and medical history. Rates for post-admission medical exams and blood tests, though, are lower. In order to see a healthcare provider, inmates generally must submit sick call slips and often pay a fee. Copays have been implemented in the federal system, about 70% of state prisons, and an unknown number of jails; while they are usually small sums (e.g. \$2-5), even this low cost has been a substantial deterrent for inmates making \$0.07-\$0.13 per hour, who put off healthcare requests as long as possible (47, 48). A 2003 Centers for Disease Control and Prevention (CDC) report on a multi-state outbreak of antibiotic-resistant staph infections in correctional facilities listed copays along with staff shortages as hindering access to timely care, which contributed to the spread of the infection (49). It is possible that post-admission screening for chronic conditions is also affected.

Moreover, even widescale screening does not necessarily ensure the appropriate treatment is being provided once conditions have been diagnosed. We have an incomplete picture of who provides care in correctional facilities overall. The largest systems typically have a full range of in-house medical services; municipal and local jails often rely on arrangements with local providers. The type of provider also varies considerably. Many correctional doctors, nurses, and other healthcare workers are still government employees, but about 10% of all prisoners are held in privately-owned prisons and public facilities that also contract out their medical services to either private industry (e.g. Correctional Healthcare Companies, Inc.) or

academic medical centers. In 2005, 40% of all inmate medical care was done by for-profit companies (50); 77 of 88 federal institutions surveyed for a Bureau of Prisons report had comprehensive medical services contracts (51). No study has yet established whether there is a correlation between the type of provider (public, private, or academic) and the quality of care provided. It may be that correctional health-academic medicine partnerships could facilitate the former's integration into the medical community at large, rather than remaining delegated to its fringes (52). Conversely, a number of state audits and anecdotal evidence suggests that private services have been particularly ridden with substandard care. For instance, a state audit in Maryland, where health services were contracted out among six different companies, reported that eight of 37 medical contractor employees were not present as scheduled during a site visit, including six scheduled to perform the required intake medical exams that screen new arrivals for critical health problems and suicide risk (53). Timekeeping records also reported that 48% of employees were working 12 hours or more per day, contravening a state cap of 8 hours to ensure quality of care.

It should be noted that the Maryland contractors are being offered for illustrative purposes and not as especially egregious examples. Insufficient levels of healthcare staffing appear to be particularly widespread across correctional facilities. The health outcomes associated with staffing shortages were highlighted in testimony in *Brown v Plata*, which specifically linked overcrowding to the failure to abide by *Estelle v Gamble* by the role of provider-to-patient ratios. California had vacancies in 25% of its budgeted physician lines, 39% of its nurse practitioners, and 54% of its psychiatrists, and even the number of positions in the budget was declared insufficient to meet inmate needs. *Brown v Plata* further noted that the conditions of care created by overcrowding had created a staff culture of “cynicism and fear”

which made it even more difficult to attract competent clinicians and presumably affected the care provided by existing staff. The California staffing shortfalls became especially notorious in association with holding conditions for inmates awaiting treatment, above all the mentally ill who were held in phone booth-sized cages without access to toilets for extended periods of time (*Brown v Plata* 131 S Ct 1910) (2011). Similar associations between healthcare staffing levels and adequacy of care are found elsewhere. Along with absent staff, the Maryland audit cited above found a failure to respond to sick call requests in a timely manner in 39-45% of cases, over 2,700 appointment cancellations in a 6-month period, and regular medication dispensing errors.

In the absence of a systemic overview of care provided in correctional facilities, we cannot know how representative such examples are, but qualitative studies conducted in other states also indicate extensive waiting periods. It bears mentioning that there are also many correctional healthcare providers across the country who are highly trained and deeply committed to their patients' wellbeing and that a number of facilities have sought partnerships with community-based medical and public health practitioners to ensure that care begun during incarceration is continued following release. It also appears possible that prisons and jails may constitute a corrective, however slight, to disparities in access to health care. Black inmates were more likely to see a provider for some conditions than white inmates (54). We caution, though, that we do not know what care was actually provided as a result of those visits. In addition, a study of pregnancy outcomes during incarceration found that outcomes improved only for white women incarcerated during their first trimester, suggesting that the benefits of correctional health care might be experienced mostly by the worst-off, who are largely white (white women were also more likely to engage in risky sex, e.g. not using condoms) (55, 56). Thus the smaller racial

disparities in inmate mortality rates (57-59) may simply reflect the fact that non-incarcerated young black males are at excess risk of dying, particularly from vehicular and gunshot injuries, rather than any relevant benefit of incarceration for blacks compared to whites.

Finally, treatment for substance dependence is consistently insufficient to meet prisoner need. NIDA's "Principles of Effective Treatment" state that drug treatment does not need to be voluntary to be effective (60, 61). By one estimate, 70-85% of state prisoners were in need of drug treatment while only 13% received care; another survey found that on average less than 10% of inmates had access to treatment services at any given time (36, 62). Despite a body of evidence demonstrating that addiction is a chronic brain disease that can be effectively treated (62), surveys have found that few correctional facilities have adopted evidence-based treatments, relying more frequently upon less-effective drug education services (62, 63). A SAMHSA survey found that 57% of prisons and jails provided self-help programs such as Narcotics Anonymous but only 16% provided detoxification (64). Moreover, detoxification and treatment of withdrawal was most often treated with analgesics like Tylenol (65) which do not treat underlying addiction and leave prisoners vulnerable to relapse and overdose upon release. Although methadone has been found effective in reducing heroin use, criminal behavior, HIV risk behaviors, and overdose deaths, prison authorities have largely rejected its use (66, 67).

To some extent, correctional facilities simply mirror more widespread structural and organizational problems of the "addiction treatment industry" (68), but these problems are exacerbated in the correctional setting. Correctional healthcare staffs do not generally include physicians familiar with addiction medicine who might otherwise educate correctional authorities about addiction as a medical condition; as a result, addiction is frequently left off the list of medical conditions for which treatment must be provided (62). As is the case with mental

illness, the lack of proper medical management of a coexisting addiction frequently undermines successful treatment of other health conditions such as HIV or diabetes that require ongoing treatment adherence (62, 70).

Impact of incarceration on health

There is limited evidence regarding if and how inmates' health changes over the course of incarceration. One analysis found that inmates who had been in jail a year or more had the same prevalence of medical problems as those who were in jail for under seven days, with the exception of increased reporting of dental problems (71). However, this does not provide sufficient evidence to argue that health conditions remain stable during incarceration. Instead, overall health probably improves during incarceration in some ways but deteriorate in others.

For people living especially chaotic lives, incarceration can provide a respite and stabilization. It provides stable meals, a structured day, and reduced access to alcohol, drugs, and cigarettes, in addition to access to health care, especially for black men who on average have lower access than white men outside of prison (54). Prisoners are often, but far from always, receptive to whatever preventive healthcare services are available (30); a South Dakota study found that 43% of uninsured incarcerated women qualifying for the CDC WISEWOMAN program completed all the intervention sessions, compared to 4% of their non-incarcerated peers (29). Federal prisons provide over 90% of inmates with preventive care, but in only 16 of 30 possible services (51). It seems doubtful that jail inmates experience improved health from these environmental factors, given the relatively short stays.

Incarceration is related to infectious disease incidence (i.e. new cases of infection) in complex ways. Compared to some other world regions, there is little incidence of infectious

diseases within U.S. correctional facilities, though evidence is growing regarding post-release transmission rates. That is, the more direct association is between the effects of incarceration in the community (see below) and infection. The primary paths of transmission for HIV and HCV, sex and drug use, are less frequent in prison though often conducted in an even riskier manner than on the outside (72). While transmission does occur inside, the vast majority of HIV and HCV incidence occurs before or shortly after incarceration (44). HIV incidence is higher among inmates than the general population (0.08 per 100 people years versus 0.02 per 100 people years) but it is much higher among people who are released and re-incarcerated (2.9/100 py), indicating that the highest risk is in the periods between incarceration rather than the prison or jail stay itself (73). Inmates with HIV who were continuously incarcerated also had lower viral loads and higher CD4 counts (i.e. their HIV was better controlled) than people who had been released and re-incarcerated, meaning that those cycling through repeatedly are not only less healthy but more infectious (74). The near-capacity occupancy of many facilities and the overcrowding of others also continue to raise concerns about infection transmission, especially diseases like tuberculosis and influenza that are airborne rather than requiring blood-to-blood transmission.

The effects of incarceration on chronic diseases are harder to evaluate. The prison environment may exacerbate health conditions like asthma due to poor ventilation, overcrowding, and stress (which may trigger asthma attacks) (75). Given the ever-growing presence of obesity-related chronic disease in the U.S., the absence of information on health behaviors and associated changes in health during incarceration is a serious omission, but health behaviors (nutrition, physical activity, and smoking) are now receiving more attention from researchers. One of the few studies to measure inmates more than once found that 71% of women gained weight over a two-week period, on average 1.1 pounds per week (76). The

nutritional value of meals is far from ideal, and energy-dense (high-fat, high-calorie) foods are common in prison canteens, but it may be better than that normally consumed by people living especially chaotic lives. Less is known about inmates' physical exercise, and studies in the UK and Australia provided contradictory evidence on the amount of physical activity by men and women within correctional facilities compared to the general population (77, 78). Smoking is also a serious problem, with a prevalence of 60-80% and secondhand smoke concentrations from 1.5 to 12 times greater than in the average smoker's home (79). There is an ongoing trend towards smoke-free correctional facilities, but although 60% of prison systems have total smoking bans and 27% more ban inside smoking, smoking remains frequent (79). A survey of women inmates in Rhode Island also found a strong inverse correlation between the number of incarcerations and willingness to remain abstinent from smoking after release (30). Thus despite some improvements with smoking bans (80), both smoking and second-hand smoke during incarceration are likely contributors to ongoing deterioration of health, including asthma.

There is more evidence regarding the effects of incarceration on mental health. Two conditions are especially associated with a serious degeneration of mental health: overcrowding and isolation units. The association between crowding and suicide or psychiatric commitment has been noted at least back to the 1980s. Strains on staffing and facilities, mentioned above in the context of *Brown v Plata*, have particularly serious repercussions on wait times and holding conditions for the mentally ill. There has been little systematic study of the more general effects of incarceration on mental health, but case studies have shown widespread and serious reactions to segregation units, in which inmates are restricted to isolated cells for 23 hours a day. The associated deprivation of movement and human contact triggers psychological responses ranging from anxiety and panic to hallucination (81).

Finally, a review of health effects of incarceration must take account of intentional injury, either self-inflicted or resulting from assault. A New York City jail study found that 66% of all inmate injuries were intentional, and 39% of those were serious enough to require care beyond the means of the facility's medical staff (82). In another Northeast state, 32% of male prison inmates reported a physical assault in a six-month period (83). Among national prisoners, 14% of white men and 18% of black men sustained fight-related injuries, but some men may have forgone medical treatment for injuries in order to be in keeping with prison cultures of masculinity (54).

More specific trends have also been identified. About 50% of women inmates engaged in self-injury (e.g. cutting or ingesting foreign objects, as distinct from suicidal behaviors), though only about half of respondent states kept data on this behavior (84). Like mental illness, self-injury was also most common in segregation units (84). There are more data available on sexual assault. About 3% of all jail inmates experience sexual assault by staff or other inmates, but the prevalence rises to 5% for female jail inmates, and women who have previously been abused are at especially heightened risk for sexual assault during incarceration (85, 86). Gay inmates were also at higher risk, with an assault rate of 19% compared to 3% for heterosexuals (83, 86). Like sexual assault, traumatic brain injury (TBI) may have distinctive repercussions for not only long-term health but recidivism, as it is associated with violence and criminal-justice involvement (87). Although few data are available on TBIs suffered during incarceration, a meta-analysis found consistently and substantially higher lifetime prevalence among prisoners than in the general population (87), indicating the need for much more extensive attention to targeted treatment and/or behavioral interventions for inmates with a TBI history.

Post-release health

Changes in health status may not fully manifest until long after release from incarceration. Still, the period immediately following release from prison is especially risky. While mortality rates within prisons and jails are comparable to those of the general population for white males and lower than non-incarcerated peers for black males, releasees are nearly 13 times more likely to die in the two weeks following release than the general population (57, 59, 88, 89). In particular, releasees are 129 times more likely than the general population to die of an overdose during that period (88), reflecting both the challenges faced by releasees as they try to return to their communities and the insufficient nature of drug treatment during incarceration, during which prisoners may not realize their tolerance to opiates has declined. Interventions that follow in-prison drug treatment programs with post-release treatment have been shown to reduce post-reentry drug use and associated recidivism. Since the most recent developments in behavioral science emphasize the role of environmental triggers over individual motivation, though, such treatment is often undermined by a return to the original environment where, regardless of intent, releasees often have little choice but to return to networks and associations that engage in risky health behaviors.

Beyond this immediate period of danger, almost 80% of inmates are without private or public insurance upon reentry (90). Because unemployment is high among releasees, Medicaid is particularly important, but a large number of releasees are ineligible until 2014 and those who were previously enrolled often lose their coverage during incarceration (91). Although federal regulations require only that states suspend Medicaid during incarceration, many states terminate it altogether. As a result, releasees lack health insurance and thus access to most health care during the critical reentry period. The full implementation of the Affordable Care Act (ACA) in

2014 will extend eligibility to a substantial number of releasees currently without insurance (92), but there appear to be few states working to ensure clear communication between Medicaid and correctional systems to facilitate their actual enrollment. Since the application process is cumbersome and often overwhelming for a low-resource population (e.g., for the 43% of jail inmates and 36% of prison inmates lacking a high school diploma (16), low literacy can hamper successful completion of paperwork, and the lack of stable housing interferes with communication from the Social Security Administration), without assistance from correctional facilities, many newly-eligible releasees are likely to remain un-enrolled and will thus continue to lack access to healthcare or rely on emergency departments. If this occurs, much of the care received in prison will continue to lapse upon release.

There is growing attention (e.g. the Council of State Government's Reentry Policy Council) to improving the outcomes of prisoner reentry through assistance with employment, housing, and other transitional needs which ultimately affect health. Correctional authorities are also increasingly addressing the problem of linkage to community-based care with discharge planning, a term that broadly refers to the process of helping prisoners to prepare to make the transition from incarceration back into the community. However, only about 10% of releasees from state prisons in need of discharge planning actually receive it (93). There are examples of relatively successful programs, such as the Hampden County jail in Massachusetts where the county sheriff's office partnered with the public health department, regional medical centers, and community health centers to provide continuous health care delivery by assigning new inmates to care based on their zip code in order to facilitate continuous care delivery by linking inmates to community providers prior to their release (46). Even in this closely coordinated system, incorporating community providers into pre-release correctional care, however, releasees are

frequently lost to follow-up care. In general, mentally ill releasees are more likely than others to receive discharge planning but they are also more likely to be homeless and rely on extensive emergency department health care post-release. Even though inmates with mental illnesses are generally given a supply of medications upon release, medication maintenance has been found to decline 8-10 months post-release (90).

Linkage to community-based care following release from prison or jail has been most studied for prisoners living with HIV. Even for releasees with HIV, though, there are only piecemeal studies of healthcare and health status upon return to the community, although two major multi-site studies funded by HRSA and NIH are currently underway (94, 95). One study found that even when releasees were provided with a free prescription for HIV medications, only 5% filled the prescription in time to avoid an interruption in their HIV treatment, and only 30% had filled it at the end of two months (96). Only 28% were enrolled in outpatient care in the community within 3 months of release (74). Qualitative studies elsewhere have identified factors ranging from transportation to provider attitudes that account for a failure to link to care even when financial assistance is provided (97-99). Since people with HIV often have other health problems as well, the need to move among multiple care providers can also make treatment more difficult to sustain. There is limited evidence about the longer-term outcomes for other health conditions among former prisoners, but studies have found associations between previous incarceration and heightened risk of asthma and hypertension (75, 100).

Finally, it is essential to recognize that since nearly all prisoners eventually return to the community, prisoner health is embedded in community health. Much of the community health impact occurs through economic pathways (e.g. the cumulative impact of the removal of income-earners on family wellbeing) but a number of studies are now examining the effects of parental

incarceration on child mental health (101-103). Although no studies have yet tracked the effects of incarceration on community-level chronic disease burdens, several are now examining networks of STI/HIV transmission associated with incarceration. This has been linked variously to the removal of young men from the community or to their return; either way, it reflects the disruption of stable relationships and a sex-ratio imbalance, both of which are risk factors for STI/HIV transmission (20, 104-107). The importance of partnering with correctional facilities in addressing community health was revealed in Chicago, where following the discontinuation of universal jail-based screening the number of male STD cases reported citywide plummeted – not because actual STDs were declining but because so many men were no longer being tested. The effects of this were visible in the accompanying rise of those STDs among women in Chicago (108). As a disruptive life event experienced disproportionately by young black and Hispanic men, incarceration has been speculated to contribute the lion’s share of racial disparities in HIV/AIDS rates (104), and its role in community health may hold true for other health disparities as well. Incarceration has been shown to have adverse effects on life trajectories long after the sentence has been served. It is critical to also recognize its effects on individual and community health.

Prescription for the Future

The following are suggested activities:

- Explore Pre-incarceration Diversion Strategies

A correctional administrator, when asked about reducing correctional medical costs replied “ no problem, just stop sending me sick prisoners”. The truth is that correctional institutions have essentially no control over who enters and leaves. In order to reduce the burden of disease in

correctional facilities, diversion strategies in the court system that would connect people to more appropriate treatment are needed.

- Comprehensive Screening

During incarceration, comprehensive screening, diagnosis and treatment for this disadvantaged population would capitalize on public health opportunities and improve health.

- Quality of Prisoner Healthcare

A set of universal measures of quality healthcare and outcomes and a system that encourages improvements in care over time.

- Linkage to Treatment after Release

Many of the diagnoses that are made and treatments that are begun during incarceration do not translate into improved health after release, due to widespread failure to link to care after release. The Affordable Care Act promises to be a fundamental turning point in the nation's health, and will provide unprecedented access to healthcare for many people coming out of correctional facilities. It is crucial to take advantage of this window of opportunity as the ACA is being implemented to ensure that systems are put into place to address the complex health needs of this population. While the ACA will remove some of the financial barriers to care, many other structural and individual barriers – insufficient discharge planning, community care providers, ancillary services, etc. – will still require vast, cross-sector planning to translate that access into meaningful outcomes.

- Monitoring Outcomes

If the above objectives are achieved, monitoring the broader, population level outcomes of reduced incarceration, improved screening and healthcare and linkage, will be important to determine societal benefits.

We are hopefully past the apex of over 3 decades of increasing incarceration in the US. Our challenge is to optimize medical, public health and public safety outcomes while striving to minimize the use of incarceration.

References

1. Rich JD, Wakeman SE, Dickman SL. Medicine and the epidemic of incarceration in the United States. *N Engl J Med* 2011;364(22):2081-3.
2. Cuellar AE, Snowden LM, Ewing T. Criminal records of persons served in the public mental health system. *Psychiatr Serv* 2007;58(1):114-20.
3. Hawthorne WB, Folsom DP, Sommerfeld DH, Lanouette NM, Lewis M, Aarons GA, et al. Incarceration among adults who are in the public mental health system: rates, risk factors, and short-term outcomes. *Psychiatr Serv* 2012;63(1):26-32.
4. Fazel S, Danesh J. Serious mental disorder in 23000 prisoners: a systematic review of 62 surveys. *Lancet* 2002;359(9306):545-50.
5. Baillargeon J, Hoge SK, Penn JV. Addressing the challenge of community reentry among released inmates with serious mental illness. *Am J Community Psychol* 2010;46(3-4):361-75.
6. Lamb HR, Weinberger LE. The shift of psychiatric inpatient care from hospitals to jails and prisons. *J Am Acad Psychiatry Law* 2005;33(4):529-34.
7. Lamb HR, Weinberger LE, Gross BH. Mentally ill persons in the criminal justice system: some perspectives. *Psychiatr Q* 2004;75(2):107-26.
8. Harris KM, Edlund MJ. Self-medication of mental health problems: new evidence from a national survey. *Health Serv Res* 2005;40(1):117-34.
9. Morabito MS. Horizons of context: understanding the police decision to arrest people with mental illness. *Psychiatr Serv* 2007;58(12):1582-7.
10. Yoon J. Effect of increased private share of inpatient psychiatric resources on jail population growth: evidence from the United States. *Soc Sci Med* 2011;72(4):447-55.
11. Decades of disparity: drug arrests and race in the United States. New York: Human Rights Watch; 2009.
12. McLellan AT, Lewis DC, O'Brien CP, Kleber HD. Drug dependence, a chronic medical illness: implications for treatment, insurance, and outcomes evaluation. *JAMA* 2000;284(13):1689-95.
13. Karberg J, James D. Substance dependence, abuse, and treatment of jail inmates, 2002. Washington, D.C.: Bureau of Justice Statistics; 2005.
14. Mumola C, Karberg J. Drug use and dependence, state and federal prisoners, 2004. Washington, D.C.: Bureau of Justice Statistics; 2006.
15. Taxman FS, Byrne JM, Pattavina A. Racial disparity and the legitimacy of the criminal justice system: exploring consequences for deterrence. *J Health Care Poor Underserved* 2005;16(4 Suppl B):57-77.
16. Binswanger IA, Krueger PM, Steiner JF. Prevalence of chronic medical conditions among jail and prison inmates in the USA compared with the general population. *J Epidemiol Community Health* 2009;63(11):912-9.
17. Wilper AP, Woolhandler S, Boyd JW, Lasser KE, McCormick D, Bor DH, et al. The health and health care of US prisoners: results of a nationwide survey. *Am J Public Health* 2009;99(4):666-72.
18. Fazel S, Baillargeon J. The health of prisoners. *Lancet* 2011;377:956-65.
19. Hammett TM. HIV/AIDS and other infectious diseases among correctional inmates: transmission, burden, and an appropriate response. *Am J Public Health* 2006;96(6):974-8.
20. Khan MR, Epperson MW, Mateu-Gelabert P, Bolyard M, Sandoval M, Friedman SR. Incarceration, sex with an STI- or HIV-infected partner, and infection with an STI or HIV in Bushwick, Brooklyn, NY: a social network perspective. *Am J Public Health* 2011;101(6):1110-7.
21. Parece MS, Herrera GA, Voigt RF, Middlekauff SL, Irwin KL. STD testing policies and practices in U.S. city and county jails. *Sex Transm Dis* 1999;26(8):431-7.

22. The health status of soon-to-be-released inmates: a report to Congress. Chicago: National Commission on Correctional Health Care; 2002.
23. Spaulding AC, Seals RM, Page MJ, Brzozowski AK, Rhodes W, Hammett TM. HIV/AIDS among inmates of and releasees from US correctional facilities, 2006: declining share of epidemic but persistent public health opportunity. *PLoS One* 2009;4(11):e7558.
24. Solomon L, Flynn C, Muck K, Vertefeuille J. Prevalence of HIV, syphilis, hepatitis B, and hepatitis C among entrants to Maryland correctional facilities. *J Urban Health* 2004;81(1):25-37.
25. Boutwell AE, Allen SA, Rich JD. Opportunities to address the hepatitis C epidemic in the correctional setting. *Clin Infect Dis* 2005;40 Suppl 5:S367-72.
26. Spaulding AC, Weinbaum CM, Lau DT, Sterling R, Seeff LB, Margolis HS, et al. A framework for management of hepatitis C in prisons. *Ann Intern Med* 2006;144(10):762-9.
27. Williams BA, Stern MF, Mellow J, Safer M, Greifinger RB. Aging in correctional custody: setting a policy agenda for older prisoner health care. *Am J Public Health* 2012;102(8):1475-1481.
28. Harzke AJ, Baillargeon JG, Pruitt SL, Pulvino JS, Paar DP, Kelley MF. Prevalence of chronic medical conditions among inmates in the Texas prison system. *J Urban Health* 2010;87(3):486-503.
29. Khavjou OA, Clarke J, Hofeldt RM, Lihs P, Loo RK, Prabhu M, et al. A captive audience: bringing the WISEWOMAN program to South Dakota prisoners. *Womens Health Issues* 2007;17(4):193-201.
30. Nijhawan AE, Salloway R, Nunn AS, Poshkus M, Clarke JG. Preventive healthcare for underserved women: results of a prison survey. *J Womens Health (Larchmt)* 2010;19(1):17-22.
31. James DJ, Glaze LE. Mental health problems of prison and jail inmates: Bureau of Justice Statistics; 2006.
32. Binswanger IA, Merrill JO, Krueger PM, White MC, Booth RE, Elmore JG. Gender differences in chronic medical, psychiatric, and substance-dependence disorders among jail inmates. *Am J Public Health* 2010;100(3):476-82.
33. Lewis C. Treating incarcerated women: gender matters. *Psychiatr Clin North Am* 2006;29(3):773-89.
34. Steadman HJ, Osher FC, Robbins PC, Case B, Samuels S. Prevalence of serious mental illness among jail inmates. *Psychiatr Serv* 2009;60(6):761-5.
35. Belenko S, Peugh J. Estimating drug treatment needs among state prison inmates. *Drug Alcohol Depend* 2005;77(3):269-81.
36. Mears D, Winterfield L, Hunsaker J, Moore G, White R. Drug treatment in the criminal justice system: the current state of knowledge. Washington, D.C.: The Urban Institute; 2002.
37. Fazel S, Bains P, Doll H. Substance abuse and dependence in prisoners: a systematic review. *Addiction* 2006;101(2):181-91.
38. Allen S, Wakeman S, Cohen L, Rich J. Physicians in US prisons in the era of mass incarceration. *Int J Prison Health* 2010;6(3):100-106.
39. Metzner JL, Fellner J. Solitary confinement and mental illness in U.S. prisons: a challenge for medical ethics. *J Am Acad Psychiatry Law* 2010;38(1):104-8.
40. Stern MF, Greifinger RB, Mellow J. Patient safety: moving the bar in prison health care standards. *Am J Public Health* 2010;100(11):2103-10.
41. Damberg CL, Shaw R, Teleki SS, Hiatt L, Asch SM. A review of quality measures used by state and federal prisons. *J Correct Health Care* 2011;17(2):122-37.
42. Asch SM, Damberg CL, Hiatt L, Teleki SS, Shaw R, Hill TE, et al. Selecting performance indicators for prison health care. *J Correct Health Care* 2011;17(2):138-49.
43. Williams BA, Baillargeon JG, Lindquist K, Walter LC, Covinsky KE, Whitson HE, et al. Medication prescribing practices for older prisoners in the Texas prison system. *Am J Public Health* 2010;100(4):756-61.

44. Beckwith CG, Zaller ND, Fu JJ, Montague BT, Rich JD. Opportunities to diagnose, treat, and prevent HIV in the criminal justice system. *J Acquir Immune Defic Syndr* 2010;55 Suppl 1:S49-55.
45. Desai AA, Latta ET, Spaulding A, Rich JD, Flanigan TP. The importance of routine HIV testing in the incarcerated population: the Rhode Island experience. *AIDS Educ Prev* 2002;14(5 Suppl B):45-52.
46. Conklin T, Lincoln T, Wilson R. A public health manual for correctional health care. Ludlow, MA: Hampden County Sheriff's Department and Massachusetts Public Health Association; 2002.
47. Fisher AA, Hatton DC. A study of women prisoners' use of co-payments for health care: issues of access. *Womens Health Issues* 2010;20(3):185-92.
48. Awofeso N. Making prison health care more efficient. *BMJ* 2005;331(7511):248-9.
49. Methicillin-resistant *Staphylococcus aureus* infections in correctional facilities---Georgia, California, and Texas, 2001-2003. *MMWR Morb Mortal Wkly Rep* 2003;52(41):992-6.
50. von Zielbauer P. As health care in jails goes private, 10 days can be a death sentence. *New York Times* 2005 Feb. 27;Sect. A1, A32.
51. Wang EA, White MC, Jamison R, Goldenson J, Estes M, Tulsy JP. Discharge planning and continuity of health care: findings from the San Francisco County Jail. *Am J Public Health* 2008;98(12):2182-4.
52. Kendig NE. Correctional health care systems and collaboration with academic medicine. *JAMA* 2004;292(4):501-3.
53. Performance Audit Report: Inmate Healthcare. Baltimore, MD: Maryland General Assembly, Office of Legislative Audits; 2007.
54. Rosen DL, Hammond WP, Wohl DA, Golin CE. Disease prevalence and use of health care among a national sample of black and white male state prisoners. *J Health Care Poor Underserved* 2012;23(1):254-72.
55. Bonney LE, Clarke JG, Simmons EM, Rose JS, Rich JD. Racial/ethnic sexual health disparities among incarcerated women. *J Natl Med Assoc* 2008;100(5):553-8.
56. Howard DL, Strobino D, Sherman SG, Crum RM. Timing of incarceration during pregnancy and birth outcomes: exploring racial differences. *Matern Child Health J* 2009;13(4):457-66.
57. Patterson EJ. Incarcerating death: mortality in U.S. state correctional facilities, 1985-1998. *Demography* 2010;47(3):587-607.
58. Rosen DL, Schoenbach VJ, Wohl DA. All-cause and cause-specific mortality among men released from state prison, 1980-2005. *Am J Public Health* 2008;98(12):2278-84.
59. Spaulding AC, Seals RM, McCallum VA, Perez SD, Brzozowski AK, Steenland NK. Prisoner survival inside and outside of the institution: implications for health-care planning. *Am J Epidemiol* 2011;173(5):479-87.
60. Matejkowski J, Festinger DS, Benishek LA, Dugosh KL. Matching consequences to behavior: implications of failing to distinguish between noncompliance and nonresponsivity. *Int J Law Psychiatry* 2011;34(4):269-74.
61. Nordstrom BR, Williams AR. Drug treatments in criminal justice settings. *Psychiatr Clin North Am* 2012;35(2):375-91.
62. Chandler RK, Fletcher BW, Volkow ND. Treating drug abuse and addiction in the criminal justice system: improving public health and safety. *JAMA* 2009;301(2):183-90.
63. McCarty D, Chandler RK. Understanding the importance of organizational and system variables on addiction treatment services within criminal justice settings. *Drug Alcohol Depend* 2009;103 Suppl 1:S91-3.
64. Substance abuse treatment in adult and juvenile correctional facilities: findings from the Uniform Facility Data Set 1997 Survey of Correctional Facilities. Washington, D.C.: Department of Health and Human Services: Substance Abuse and Mental Health Services Administration (SAMHSA); 2000.

65. Oser CB, Knudsen HK, Staton-Tindall M, Taxman F, Leukefeld C. Organizational-level correlates of the provision of detoxification services and medication-based treatments for substance abuse in correctional institutions. *Drug Alcohol Depend* 2009;103 Suppl 1:S73-81.
66. Nunn A, Zaller N, Dickman S, Trimbur C, Nijhawan A, Rich JD. Methadone and buprenorphine prescribing and referral practices in US prison systems: results from a nationwide survey. *Drug Alcohol Depend* 2009;105(1-2):83-8.
67. Rich JD, Boutwell AE, Shield DC, Key RG, McKenzie M, Clarke JG, et al. Attitudes and practices regarding the use of methadone in US state and federal prisons. *J Urban Health* 2005;82(3):411-9.
68. Taxman FS, Henderson CE, Belenko S. Organizational context, systems change, and adopting treatment delivery systems in the criminal justice system. *Drug Alcohol Depend* 2009;103 Suppl 1:S1-6.
69. Principles of drug addiction treatment: a research-based guide. Rockville (MD): National Institute on Drug Abuse; 2009.
70. Humphreys K. Federal policy on criminal offenders who have substance use disorders: how can we maximize public health and public safety? *Subst Abuse* 2012;33(1):5-8.
71. Maruschak LM. Medical problems of jail inmates. Washington, D.C.: Bureau of Justice Statistics; 2006.
72. Blankenship KM, Smoyer AB, Bray SJ, Mattocks K. Black-white disparities in HIV/AIDS: the role of drug policy and the corrections system. *J Health Care Poor Underserved* 2005;16(4 Suppl B):140-56.
73. Gough E, Kempf MC, Graham L, Manzanero M, Hook EW, Bartolucci A, et al. HIV and hepatitis B and C incidence rates in US correctional populations and high risk groups: a systematic review and meta-analysis. *BMC Public Health* 2010;10:777.
74. Baillargeon JG, Giordano TP, Harzke AJ, Baillargeon G, Rich JD, Paar DP. Enrollment in outpatient care among newly released prison inmates with HIV infection. *Public Health Rep* 2010;125 Suppl 1:64-71.
75. Wang EA, Green J. Incarceration as a key variable in racial disparities of asthma prevalence. *BMC Public Health* 2010;10:290.
76. Clarke JG, Waring ME. Overweight, obesity, and weight change among incarcerated women. *J Correct Health Care* 2012.
77. Plugge EH, Foster CE, Yudkin PL, Douglas N. Cardiovascular disease risk factors and women prisoners in the UK: the impact of imprisonment. *Health Promot Int* 2009;24(4):334-43.
78. Herbert K, Plugge E, Foster C, Doll H. Prevalence of risk factors for non-communicable diseases in prison populations worldwide: a systematic review. *Lancet* 2012;379(9830):1975-82.
79. Kauffman RM, Ferketich AK, Murray DM, Bellair PE, Wewers ME. Tobacco use by male prisoners under an indoor smoking ban. *Nicotine Tob Res* 2011;13(6):449-56.
80. Ritter C, Huynh CK, Etter JF, Elger BS. Exposure to tobacco smoke before and after a partial smoking ban in prison: indoor air quality measures. *Tob Control* 2012.
81. Haney C. Mental health issues in long-term solitary and "Supermax" confinement. *Crime & Delinquency* 2003;49(1):124-156.
82. Ludwig A, Cohen L, Parsons A, Venters H. Injury surveillance in New York City jails. *Am J Public Health* 2012;102(6):1108-11.
83. Wolff N, Jing S. Contextualization of physical and sexual assault in male prisons: incidents and their aftermath. *J Correct Health Care* 2009;15(1):58-77; quiz 80-2.
84. Appelbaum KL, Savageau JA, Trestman RL, Metzner JL, Baillargeon J. A national survey of self-injurious behavior in American prisons. *Psychiatr Serv* 2011;62(3):285-90.
85. Moloney KP, van den Bergh BJ, Moller LF. Women in prison: the central issues of gender characteristics and trauma history. *Public Health* 2009;123(6):426-30.
86. Beck A, Harrison P. Sexual victimization in local jails reported by inmates, 2007. Washington, D.C.: Bureau of Justice Statistics; 2008.

87. Farrer TJ, Hedges DW. Prevalence of traumatic brain injury in incarcerated groups compared to the general population: a meta-analysis. *Prog Neuropsychopharmacol Biol Psychiatry* 2011;35(2):390-4.
88. Binswanger IA, Stern MF, Deyo RA, Heagerty PJ, Cheadle A, Elmore JG, et al. Release from prison--a high risk of death for former inmates. *N Engl J Med* 2007;356(2):157-65.
89. Rosen DL, Wohl DA, Schoenbach VJ. All-cause and cause-specific mortality among black and white north Carolina state prisoners, 1995-2005. *Ann Epidemiol* 2011;21(10):719-26.
90. Mallik-Kane K, Visher C. Health and prisoner reentry: how physical, mental, and substance abuse conditions shape the process of reintegration. Washington, D.C.: Urban Institute; 2008.
91. Wakeman SE, McKinney ME, Rich JD. Filling the gap: the importance of Medicaid continuity for former inmates. *J Gen Intern Med* 2009;24(7):860-2.
92. Phillips S. The Affordable Care Act: implications for public safety and corrections populations. Washington, D.C.: The Sentencing Project; 2012.
93. Mellow J, Greifinger R. Successful reentry: the perspective of private correctional health care providers. *Journal of Urban Health* 2005;84(1):85-98.
94. Draine J, Ahuja D, Altice FL, Arriola KJ, Avery AK, Beckwith CG, et al. Strategies to enhance linkages between care for HIV/AIDS in jail and community settings. *AIDS Care* 2011;23(3):366-77.
95. Montague BT, Rosen DL, Solomon L, Nunn A, Green T, Costa M, et al. Tracking linkage to HIV care for former prisoners: A public health priority. *Virulence* 2012;3(3).
96. Baillargeon J, Giordano TP, Rich JD, Wu ZH, Wells K, Pollock BH, et al. Accessing antiretroviral therapy following release from prison. *JAMA* 2009;301(8):848-57.
97. Fontana L, Beckerman A. Recently released with HIV/AIDS: primary care treatment needs and experiences. *J Health Care Poor Underserved* 2007;18(3):699-714.
98. Marlow E, White MC, Chesla CA. Barriers and facilitators: parolees' perceptions of community health care. *J Correct Health Care* 2010;16(1):17-26.
99. Nunn A, Cornwall A, Fu J, Bazerman L, Loewenthal H, Beckwith C. Linking HIV-positive jail inmates to treatment, care, and social services after release: results from a qualitative assessment of the COMPASS Program. *J Urban Health* 2010;87(6):954-68.
100. Wang EA, Pletcher M, Lin F, Vittinghoff E, Kertesz SG, Kiefe CI, et al. Incarceration, incident hypertension, and access to health care: findings from the coronary artery risk development in young adults (CARDIA) study. *Arch Intern Med* 2009;169(7):687-93.
101. Wakefield S, Wildeman C. Mass imprisonment and racial disparities in childhood behavioral problems. *Am Soc Criminology* 2011;10(3):793-817.
102. Wildeman C. Parental imprisonment, the prison boom, and the concentration of childhood disadvantage. *Demography* 2009;46(2):265-80.
103. Murray J, Farrington DP, Sekol I. Children's antisocial behavior, mental health, drug use, and educational performance after parental incarceration: a systematic review and meta-analysis. *Psychol Bull* 2012;138(2):175-210.
104. Johnson R, Raphael S. The effects of male incarceration dynamics on Acquired Immune Deficiency Syndrome Infection rates among African American women and men. *Journal of Law and Economics* 2009;52:251-293.
105. Khan MR, Miller WC, Schoenbach VJ, Weir SS, Kaufman JS, Wohl DA, et al. Timing and duration of incarceration and high-risk sexual partnerships among African Americans in North Carolina. *Ann Epidemiol* 2008;18(5):403-10.
106. Thomas JC, Levandowski BA, Isler MR, Torrone E, Wilson G. Incarceration and sexually transmitted infections: a neighborhood perspective. *J Urban Health* 2008;85(1):90-9.
107. Rogers SM, Khan MR, Tan S, Turner CF, Miller WC, Erbeling E. Incarceration, high-risk sexual partnerships and sexually transmitted infections in an urban population. *Sex Transm Infect* 2012;88(1):63-8.

108. Broad J, Cox T, Rodriguez S, Mansour M, Mennella C, Murphy-Swallow D, et al. The impact of discontinuation of male STD screening services at a large urban county jail: Chicago, 2002-2004. *Sex Transm Dis* 2009;36(2 Suppl):S49-52.