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From Corrections to Communities as an HIV Priority

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INTRODUCTION

The health of inmates in correctional facilities has been a longstanding concern in the medical community[1] and historically has centered on the health of populations entering correctional settings, which may affect the risk of infectious disease transmission inside these facilities.[2,3] Recently, however, more attention has been devoted to public health consequences of inmates released to the community, where continuity of care represents a challenge for treatment and prevention, and there is an increasing appreciation of inmates being part of the public health in the community to which they are released.[4,5] In 1983, the first case of AIDS was reported from a prison in the United States.[6] Since that time, nearly 5% of the HIV/AIDS cases in the U.S. have been reported from correctional facilities, although the census for these facilities account for less than 1% of the population.[6] This disproportionate representation of AIDS cases has garnered attention, and AIDS in the correctional setting over the past two decades provides an illustration of the changing and evolving perspectives on health in corrections facilities and also highlights areas where improvements in knowledge and intervention efforts can be made.

PRISON ENTRY

Risk Behaviors of Inmates Entering Prison

Even before the AIDS epidemic, surveys across facilities indicated that 25–40% of male inmates entering prison had a history of injection drug use,[7–9] which is substantially higher than the estimate of 0.6% for the general population.[10] Surveys also estimated that up to 7% of males entering prison were homosexual,[7] but this estimate was not very different for estimates generated for the general population.[11] Thus, injection drug use prior to incarceration was thought to account for a substantial proportion of the HIV infection among prison inmates. Surveys of HIV infection among entrants into prison in New York and Maryland showed that about 85% of HIV infection in prisons could be attributed to pre-incarceration injection drug use.[12]

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Rates of HIV Infection Entering Prison

Given the historic risk profile of inmates, an initial concern was an estimation of rates of HIV infection in the correctional setting and whether the burden of HIV infection would increase substantially over time. Several studies at the beginning of the HIV epidemic indicated that once HIV rates among injection drug users in the communities of New York, Milan, Edinburgh, and Bangkok reached 10%, rates soared to over 40% within the subsequent two to four years.[13] Public health and correctional officials wondered whether this trend would be observed among entering prison inmates, thereby dramatically increasing the need for services in an already burdened medical care system. To assess this, extensive HIV testing was done in prisons and jails in the U.S.; rates were highest along the Eastern seaboard (approaching the rates noted above that might trigger an explosive spread of an HIV epidemic) and the South, with rates lowest in the Midwest and Western states.[6,14–30]

As single seroprevalence surveys might not capture possible increasing rates over time, several longitudinal studies were performed, and reassuringly, all showed essentially stable or modest increase in rates of HIV infection among entrants into prison.[12,14,15,27–30] For example, during the months of April through June 1985, 1986, 1987 and 1988, sera obtained from consecutive male entrants to the Maryland Division of Correction was assayed for antibody to HIV-1; the rate of HIV-1 infection among male entrants was 7.0, 7.7, 7.0, and 8.1%, respectively[12,14]; factors associated with HIV infection on entry into prison included being >25 years old, being African American, using injection drugs (ascertained by history and observation of needle-track marks), and being from urban as opposed to suburban/rural areas of the state. Pre-incarceration injection drug use accounted for 85% of HIV infections. Adjusting for demographic and drug use characteristics, multivariate analyses demonstrated no statistically significant differences in HIV seroprevalence among male entrants across the four study periods. A 1991 survey of male entrants in Maryland prisons noted an increase, albeit modest, to 8.5%,[15] and the most recent reports after 2000 indicate a modest decline in prevalence among entrants into prison.[16,17] As the earlier Maryland studies were performed during the same three months for each of the four years, the potential that seasonal variation might mask true changes in temporal trend was investigated. For 12 months in 1987–1988, all consecutive male inmates were studied, and no seasonal variation was noted; this study added confidence in inferences about the representativeness of results from the three-month survey periods across the four years.[14]

In terms of national data, the Correctional Regional Infection Sentinel Surveillance Project (CRISSP) data were reported in 1991.[18] Antibody to HIV was assayed in consecutive male and female entrants to ten geographically diverse jails and prisons across the United States. The average HIV rate was 2% and was higher for inmates over 25 years old, women, racial/ethnic minorities, and Eastern seaboard states. Seroprevalence was repeated one year later in three of the ten correctional systems with no significant difference in HIV prevalence from the initial year of survey. Combined with the data over four years from the Maryland prisons, these data suggested no short-term explosion of the HIV epidemic among entrants into prison. More recent seroprevalence studies have been reported among entrants into correctional systems, and rates essentially follow the same magnitude and geographic patterns.[6] As the HIV epidemic continues to mature, ongoing monitoring of HIV rates among this population is indicated.

DURING INCARCERATION

Risk Behavior Inside Correctional Settings

Surveys of prison inmates, performed mostly prior to the AIDS epidemic, revealed that inmates engage in risky behaviors while incarcerated. In one survey, 12% of inmates in Tennessee reported injection drug use while incarcerated.[7] In other surveys, up to 33% of inmates admitted to homosexual activities while incarcerated.[31] These rates, based upon self-reports, certainly underestimate the levels of such activities. Since these early studies were published, additional reports have been published showing sex within prison is more widespread than previously appreciated,[32] and rates of injection drug use inside prison can be as high as 30%.[33,34] More to the point, given that HIV infection is observed among entering inmates, that behaviors occur within prison that facilitate transmission of infection, and that the average length of sentence is three years,[35] do prisons serve as amplifying reservoirs of infection back into the surrounding community? The theoretical concern that prisons might serve as amplifying reservoirs of HIV infection back into the community has excited considerable discussion. Some surveys studied risky behaviors (but not seroincidence data) and concluded that risk of intraprison transmission *could* be substantial.[33]

HIV and Intraprison Transmission Studies

The first intraprison transmission study of HIV infection was conducted in the Maryland Division of Correction in conjunction with the Johns Hopkins School of Public Health[36]; in 1985, a list of inmates who had been continuously incarcerated for at least 7 years was generated. As sera from entry into prison was not saved before 1985, the seven year "rule" was established because HIV was not considered to be present in the community before 1977–1978. If inmates were seropositive, the inference was that HIV infection probably could have occurred only in prison. Of 338 eligible inmates, 137 volunteered for venipuncture, and two were seropositive. These data, although possibly subject to selection and other biases, suggested that intraprison transmission probably occurs but infrequently. Subsequently, analysis based upon length of incarceration revealed an estimate of HIV incidence of 2/1,000 person-years of incarceration.

As shown in Table 1, several studies of intraprison HIV transmission have been performed in the U.S.[37–40] In military prisons, with an intake HIV prevalence of 1%, no seroconversions were observed.[37] In Nevada, with an intake HIV prevalence of 2.4%, a seroconversion rate of 1.7/1,000 person-years was observed.[38] In Maryland, with an intake HIV prevalence of 7%, a seroconversion rate of 4.1/1,000 person-years was observed.[39] In more detail, the Maryland study performed in 1987 started with a list that was generated of inmates on whom baseline sera were stored in 1985 and 1986; the list was refined to identify inmates still incarcerated in 1987. All eligible inmates were contacted at each of the 20 facilities across the state, and 50% consented to venipuncture. Of 387 inmates who consented, two had documented HIV seroconversion (initial negative, subsequent positive) for a rate of 4.2/1,000 person-years. Paired specimens from the two seroconverters (last negative/first positive) were sent for serum protein phenotype analysis to ensure that the two specimens came from the same individual. Moreover, the two inmates had been in jail for over 60 days prior to having the initial specimen drawn on entry into prison, which led to the inference that the seroconversion probably occurred in correctional facilities. As with the military and

TABLE 1. Prevalence/incidence of HIV infection by correctional system, U.S.

Correctional system-year reported	HIV incidence/100 PY*	HIV prevalence (%)	Reference
Maryland 1988	0.42	7.0	39
Nevada 1990	0.27	3.4	38
Rhode Island 2004	0.00	1.8	40
Military 1986	0.00	1.0	37

*PY = person-years.

Nevada studies noted above, the three studies were imperfect because they tested only those who remained in prison for the follow up testing one to two years later and thus represent an incomplete assessment of risk. Nevertheless, the combined studies showed that transmission does occur in prison and that the rate of transmission is linked to the size of the reservoir of existing infection (i.e., the prevalence at intake). At the time these studies were published, the rates were considered as suggesting that transmission was relatively uncommon. However, having been performed relatively early in the HIV epidemic, these studies have been criticized as being outdated, and newer data, although summarized accounting for person time, nevertheless suggested a more ominous picture.[41] Since then, a report from Rhode Island, based on 3,932 males tested, found HIV seroprevalence was 1.8% (95% CI 1.37–2.19); prevalence of HIV infection by calendar quarter of entry showed no significant temporal trend, and no HIV seroconversions were observed.[40]

Although data for the U.S. prisons show low rates of intraprison transmission, the data from other sites internationally suggest a different picture. More recently, "outbreaks" of HIV infection among inmates in Scottish and Australian prisons, relating to injection drug use, have been reported.[42,43] A strong study from Thailand that included 1,209 injection drug users recruited in the community showed a rate of HIV seroconversion overall of 5.8/100 person-years and a rate of 35.0/100 person-years for those with a history of injection with incarceration since the prior HIV negative visit, suggesting that HIV seroconversion in the correctional setting in Thailand is not trivial.[44] Although international data suggests that intraprison transmission of HIV infection is most likely due to injection drug use, the context of U.S. prisons might differ from that of other countries. Based upon estimates provided above, overall incidence might differ in the U.S. due to more restrictive housing arrangements in U.S. prisons. However, recent data to address these important public health issues are sparse.

ENTRY AND DURING INCARCERATION: PREVENTION OF INFECTION TRANSMISSION

On entry, it is appropriate to provide education, testing, vaccinations, treatment for infectious diseases, and treatment for drug abuse, and these public health strategies are generally indicated for transmission prevention of all of the various bloodborne infections. Early in the HIV epidemic in the U.S., surveys of prisons and jails showed that HIV education on entry into prison was commonly reported.[45] However, it is recognized that more needs to be done.[46,47]

HIV testing for entrants into correctional settings was universal in some settings, targeted to risk groups in other settings, and offered as voluntary in others.[6] Although the American Medical Association has recommended mandatory HIV

testing programs in correctional facilities, human rights concerns, including issues of confidentiality, provision of adequate levels of treatment, and the need for standards of health care in prisons to reflect community standards have served to limit implementation of the recommendation in the U.S.; subsequently, the World Health Organization recommended against mandatory and for voluntary HIV testing programs in prison.[48] Early studies in Oregon and Wisconsin prisons, states with low HIV prevalence, showed high levels of acceptance by inmates of voluntary HIV testing in prison and a high level of detection of HIV infected inmates.[49,50] However, when voluntary testing was established in Maryland state prisons, where prevalence was relatively high, at 8%, acceptance by inmates was about 50% and detection of HIV infected inmates 33%.[15] Reasons for refusal were not related to confidentiality concerns but instead were due to inaccurate perceptions of risk of knowledge of HIV status prior to incarceration.[15] These results from Maryland reflected the early experience (i.e., first year) of the voluntary HIV testing program; follow-up after several years of implementation showed similar levels of acceptance.[16] HIV testing has come to have clear clinical utility with the advent of potent antiretroviral therapies.

Vaccinations, treatments for infections, and treatment for drug abuse have an important place in the correctional setting. While many correctional systems now provide HIV treatments, the next challenge is to consider complexities inherent in treatment of other bloodborne infections, such as HCV.[51,52] Although therapy is available, there are considerable contraindications, side effects, complex administration schedules, and incomplete efficacy. Finally, numerous studies argue for drug abuse treatment[53–55]; currently, drug-free programs have been the norm in the U.S., and efforts to offer methadone in the correctional setting have been limited.[56,57] Improving access to methadone maintenance in corrections settings is warranted.

Other approaches to HIV prevention in corrections beyond education, testing and treatment have been used. Condom availability has been policy in a number of state prisons and without reported incidents.[58] To reduce parenteral transmission, a needle exchange program has been established inside of a Swiss prison,[59] and as of April 1996, all inmates entering Canadian federal prisons receive a vial of bleach, ostensibly to permit disinfection of needles and syringes (K. Hankins, personal communication). Given that sex and drug use inside prison is illegal, such policies and programs are obviously controversial.

RE-ENTRY TO THE COMMUNITY

Risk Behaviors at Re-entry

Community-based studies of injection drug users have reported that individuals with a history of incarceration have higher HIV rates.[60] There are three possible explanations for this: (a) prisons are amplifying reservoirs of HIV infection, (b) prisons house inmates who tend to engage in riskier behaviors than injection drug users (IDUs) who have never been incarcerated, or (c) release from prison is associated with relapse to high risk behaviors that facilitate transmission. As noted above, the rates of HIV incidence within prison are considerably lower than the incidence among IDUs in the community,[39,61] suggesting that either of the other two explanations better fit the data. That prison might attract persons who cannot avoid risk (whether HIV or arrest) has intuitive appeal; however, data from Baltimore during the same calendar time show rates of HIV infection for a prison,

drug treatment, and street-recruited sample were all similar,[12,60,62] which argues against this possible explanation.

This leaves the third theory, namely, that drug users, when released from the restrictions of prison, relapse to high risk and thereby acquire HIV infection (or if already infected, transmit to others). Data on HIV incidence with release and re-entry have not been published. However, support for this line of reasoning comes from recent data showing higher rates of drug overdose following release from prison, which suggest that re-entry is a vulnerable period.[64–68] In a qualitative study with a population recently released from jail in this issue of the *Journal of Urban Health*, participants noted financial, structural and social barriers that could contribute to relapse to high risk behavior.[69] This study, along with another in this issue of the *Journal*,[70] suggest that though individuals re-entering the community face barriers to successful reintegration, these populations have interest in opportunities that could help them transition, from job training and education to drug treatment programs.

Continuity from Corrections to the Community

Model programs have been developed to address the challenge of continuity of care from corrections to community.[71–75] Recent randomized controlled interventions with populations re-entering the community are an advance over much of the previous literature and demonstrate that it is possible to have a positive impact on risk behavior in this population.[76,77] These programs are reflections of concern not just about individual barriers to community reintegration, but also realization that concern about HIV and other infectious diseases in the correctional setting cannot be limited to consideration of risk of transmission between inmates within jail or prison. The average length of sentence being a few years means that inmates, if untreated, can carry infection to others when they return to the communities from which they came. Clearly, whether having entered corrections with infection or having acquired it there, inmates need identification and treatment of infectious diseases upon entry into the correctional setting; this is not only important for inmates themselves and others in prison, but also for the communities where they eventually return. Some treatments may require administration and monitoring beyond the time spent in corrections, and lack of continuity cannot only reduce treatment effectiveness, but also lead to resistance to antimicrobials and tax community health safety net systems.[78]

CONCLUSION

The role of prisons and jails in the HIV epidemic in the community merits attention. While evidence does not support the conclusion that prisons might serve as amplifying reservoirs for infection into the community (at least not in any simple sense), this setting should be recognized as having the capacity to provide HIV programs that can benefit the community. The key is in the provision of resources and a climate that supports continuity of prevention and care from corrections to community. Certainly, health concerns need to be addressed at each stage (entry, incarceration, release). However, a broader community health perspective that appreciates evolving therapeutic advances and growing epidemiologic knowledge provides the basis for advocating that continued improvement of correctional health services and linkages to community resources is in the interest of the public's health.

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