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## Willingness to receive an HIV vaccine among incarcerated persons

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### Abstract

**Background**—Once an HIV vaccine becomes available, high-risk adults will be a target population for vaccination, and HIV vaccination programs for inmates may be a public health priority. Nothing is known about U.S. inmates' willingness to accept an anticipated HIV vaccine while incarcerated. The goal of this study was to examine inmates' attitudes toward a potential HIV vaccine.

**Methods**—In 2002, we interviewed 153 male and female inmates at the Rhode Island Department of Corrections (RIDOC) using a voluntary, anonymous survey.

**Results**—Ninety-three percent of inmates indicated they would be willing to receive a hypothetical HIV vaccine while incarcerated. Although 88% of inmates self-reported at least one HIV risk factor, only 20% perceived themselves to be at risk for HIV.

**Conclusion**—Once an HIV vaccine becomes available, HIV vaccination programs in the correctional setting need to become a public health priority. These would be well received by inmates in Rhode Island.

### Keywords

HIV Vaccine; Vaccine acceptance; Prisoners; Sexually Transmitted Diseases

### Introduction

Considerable progress is being made in the development of a preventive HIV vaccine (Barouch and Nable, 2005; Spearman, 2006). Once an HIV vaccine is available, it will be important to deliver the vaccine to at-risk populations. Early identification of target populations for vaccination and evaluation of the attitudes of such populations toward vaccination might help to facilitate HIV vaccine delivery once it is available.

Incarcerated individuals who are not infected with HIV represent a target population for delivery of a preventative HIV vaccine. Inmates often have a high prevalence of sexually transmitted diseases and substance abuse (Conklin et al., 2000). High HIV prevalence

among incarcerated individuals supports the need for both HIV testing and vaccination in this population. According to the Bureau of Justice Statistics in 2003, 2.0% ( $n = 22,028$ ) of State prison inmates were infected with HIV, with rates being highest in the Northeast at 4.5%. The prevalence of confirmed AIDS cases is consistently higher among inmates than among the general population; at the end of 2003 this represented a greater than 3-fold prevalence (Bureau of Justice Statistics, 2003). In Rhode Island, where HIV testing in the prison has been routine since 1989, up to one third of all HIV infections diagnosed in the state have been detected among incarcerated individuals (Desai et al., 2002).

With a turnover rate of 800% in jails and 50% in prisons, it is apparent that inmates are not separate from their communities outside of prison (Glaser and Greifinger 1993). Jails are city or county run facilities that generally house inmates for a year or less, while prisons are state-run facilities that usually house inmates for a year or more (Bureau of Justice Statistics, 2005). HIV transmission can occur in prison (Krebs and Simmons, 2002; Macalino et al., 2004). Because released inmates return to their communities and often engage in high-risk behaviors, vaccinating against HIV in the correctional setting may have a significant public health impact on HIV transmission in the community.

Research suggests that HIV vaccine acceptability among undergraduates will be influenced by individual health beliefs and behaviors as well as vaccine efficacy and degree of vaccination among others in a community (Liau and Zimet, 2000; Liau and Zimet, 2001). Among at-risk adults from different specific populations, concerns about stigma as well as concerns about the vaccine product and efficacy have been identified as issues that correlate with intent to receive an HIV vaccine (Crosby et al., 2004a,b; Newman et al., 2004, 2006). At-risk women have identified fear of vaccine-induced HIV infection, and HIV stigma as barriers to HIV vaccine uptake (Rudy et al., 2005). Incarcerated individuals may represent a target population for universal HIV vaccination once one is available. If the vaccine is offered, inmate attitudes will be critical to vaccine uptake. Fear and mistrust could cause inmates to be unaccepting of an HIV vaccine. Alternatively, the desire to be protected against AIDS may be a strong motivator to accept vaccination. Like the undergraduates who have been studied, efficacy of the vaccine may significantly correlate with vaccine acceptability among inmates. Acceptance of a novel vaccine may also increase with increased social saturation, that is increased uptake of the vaccine among the population (Liau and Zimet, 2001; Rogers 1983). In this study we examined knowledge and acceptability of a potential HIV vaccine among incarcerated individuals in Rhode Island.

## Methods

The Rhode Island Department of Corrections (RIDOC) has a single correctional facility in the state and it serves as both a prison and a jail. It has an average daily population of approximately 3300 inmates, and performs 15,000 intakes per year. From June through August 2002, we recruited and interviewed male and female inmates during intake at the RIDOC.

Participants were randomly selected from a comprehensive daily roster. Each day, we started with the inmate whose serial number corresponded to that day's three-digit state lottery number, every 100th male and every 10th female inmate on the roster after that inmate was a candidate for recruitment that day. Each interview took approximately 30 min and an average of seven interviews were conducted per day.

Written informed consent was obtained from each participant. Data were collected through a face-to-face interviewer administered questionnaire. The questionnaire asked about

demographics and risk behavior. Knowledge and attitudes toward Hepatitis B vaccination were examined, and these have been reported separately (Vallabhamemi et al., 2004).

Participants were told, “Although there is no vaccine available for HIV right now, we think there will be one available in the near future”. They were then asked if they agreed or disagreed with statements related to a potential AIDS vaccine. These statements included the following: “If a vaccine to prevent AIDS was available, I would get vaccinated for AIDS while incarcerated”. “It would be possible for me to get AIDS from an AIDS vaccine”. Next, the interviewer stated: “I am going to describe for you different possible vaccines for AIDS, in terms of how effective they are, and how many people in the country have already been vaccinated”. Six scenarios varying hypothetical vaccine efficacy and percent of others in the country who would have also been vaccinated, or saturation, were presented. Participants were asked to indicate their willingness to receive the vaccine under these different hypothetical situations.

We assessed differences in vaccine acceptability scores between the two levels of effectiveness (across saturation levels), and among the three saturation levels (across effectiveness levels) using two-way repeated measures ANOVA, entering (1) both effectiveness and saturation as repeated measures terms, and (2) an effectiveness: saturation interaction term. We then partitioned those analyses by saturation levels and effectiveness levels, respectively, using the paired *t*-test and one-way repeated measures ANOVA.

All statistical calculations were performed with STATA v. 8 (Stata Corp. College Station, TX). The study was approved by the Miriam Hospital Human Subjects Institutional Review Board, which has a prisoner representative.

## Results

### Demographics and risk behavior

Of the 173 prisoners approached, 153 (88%) agreed to participate in the study. Participant characteristics can be found in Table 1. Fifty percent report having more than one sexual partner in the 6 months prior to incarceration, and 77% report inconsistent condom use in the same time period. Twenty-nine percent report injection drug use. Twenty percent of inmates perceive themselves to be at risk for HIV.

### Knowledge and attitudes about HIV vaccines

Ninety-three percent of inmates indicated that they would be willing to receive an HIV vaccine (responded agree or strongly agree) while incarcerated. However, over one quarter of the inmates also were concerned that there would be a chance of contracting HIV from an HIV vaccine. All of those who perceived themselves to be at risk for HIV indicated that they would receive a vaccine, and all of those who would not receive a vaccine did not perceive themselves to be at risk. Still, as many inmates who did not consider themselves to be at risk would accept an HIV vaccine, the association did not achieve statistical significance.

Mean acceptability scores for 50% and 80% vaccine effectiveness (across saturation levels) were 4.05 ( $\pm 0.88$ ) and 4.27 ( $\pm 0.77$ ) respectively ( $F=70.2$ ,  $P<0.001$ ). The results of partitioned analyses are presented in Table 2, and exhibit significant differences in acceptability scores (1) between effectiveness levels at each level of saturation, and (2) among saturation levels at each level of effectiveness. There was no interaction between effectiveness and saturation ( $F=0.42$ ,  $P=0.65$ ).

## Discussion

The major finding of our study is that 93% of a high-risk population of inmates in Rhode Island stated willingness to receive an HIV vaccine while incarcerated. Vaccine effectiveness will affect willingness of this population to be vaccinated for HIV, as will the extent to which the rest of the population has been vaccinated.

In spite of high reporting of at-risk behaviors, only 22% of inmates considered themselves to be at risk for HIV. Low perceived risk has been identified as a barrier to HIV vaccine (Crosby et al., 2004a,b; Salazar et al., 2005). The association between willingness to receive an HIV vaccine did not significantly correlate with risk perception in our study. This may be due to so few participants indicating that they would not want to be vaccinated. Also, we asked about willingness to be vaccinated while incarcerated. At least one third of participants do not have a regular health-care provider, so even those who might seek vaccination outside of prison may not be able to obtain it easily.

Incarceration may provide a unique opportunity to offer an HIV vaccine to a substantial portion of hard-to-reach, high-risk adults. An HIV vaccine will likely require multiple doses, but those in both jail and prison could still complete a vaccination series (Bureau of Justice Statistics, 2005; Clark et al., 2003). Offering the vaccine to all inmates and allowing them to opt-out may be an ethically acceptable approach that would also minimize the potential stigma associated with HIV vaccination.

This same group of inmates also indicated a high (93%) willingness to be vaccinated against hepatitis B while incarcerated (Vallavhaneni et al., 2004). Unfortunately, this vaccine-preventable disease continues to infect those at-risk and cause a high degree of morbidity and mortality. Hepatitis B vaccination programs have not been routinely set up in prisons due primarily to cost (Charuvastra et al., 2001).

HIV testing will be necessary prior to HIV vaccination of incarcerated individuals. In 1988, the state of Rhode Island enacted a law that mandated confidential HIV testing for all sentenced inmates. In Rhode Island, this program has allowed for up to one third of new HIV diagnoses made statewide, and has led to early and ongoing treatment in the prison of those who are infected along with linking to care in the community after release (Desai et al., 2002; Rich et al., 2001).

The myth of HIV-vaccine induced infection is prevalent among the general population, and was held by over a quarter of the inmates surveyed. Broad community education around HIV vaccines could be helpful now to dispel the myth that a vaccine could actually transmit HIV (Allen et al., 2005).

The major limitation of this study is that inmates were asked to respond to a hypothetical situation. Their indication that they will accept an HIV vaccine may not correspond to true acceptance rates; these will only be measurable when we actually offer a vaccine to inmates. Potential vaccine side effects, such as a false-positive HIV screening test, were also not discussed with the participants. However, it is anticipated that routine testing methodologies will be able to distinguish between vaccine-induced seropositivity and actual HIV infection once an HIV vaccine is available.

HIV vaccine acceptability of inmates in Rhode Island also may not be reflective of acceptability nationwide. Community education around HIV vaccines and HIV vaccine trials has been ongoing in Rhode Island for over 10 years, and this may have contributed to the high vaccine acceptability we found.

Correctional settings will provide a unique opportunity to vaccinate a high-risk population for HIV. There may be obstacles to delivering HIV vaccines here, including funding, logistics, and potential ethical concerns, but HIV vaccine acceptability among inmates is not a major impediment. While we work toward HIV vaccine development, instituting routine HIV testing and hepatitis vaccination, and now HPV vaccination among incarcerated individuals could allow for the necessary infrastructure to be in place for HIV vaccine delivery once an HIV vaccine is available.

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**Table 1**

Selected characteristics of Rhode Island prisoners 2002

<b>Independent variable (N=153)</b>	<b>n (%)</b>
Gender	
Male	100 (65)
Female	53 (35)
Race	
White	64 (42)
Black	40 (26)
Hispanic	32 (21)
Other	17 (11)
Education	
Less than high school	57 (37)
High school or equivalent	60 (39)
Some college	36 (24)
Ever vaccinated for hepatitis B?	46 (30)
Site of usual medical care	
Emergency room	51(33)
Private doctor	33 (22)
Community health center	32 (21)
Hospital Clinic	24 (16)
Other	13 (8)
Ever been to short term detox/residential drug rehab?	63 (41)
History of an STD in the past?	51 (33)
Prior testing for HIV?	152 (99)
History of at least one prior incarceration?	101 (66)

**Table 2**

Mean acceptability scores (SD) for 50% and 80% vaccine effectiveness, by saturation level among Rhode Island prisoners 2002

Saturation	50% Effective (protected half of the people)	80% Effective (protected most (80%) of the people)	<i>t</i> -test <sup>a</sup>
10% (a few)	3.97 (0.95)	4.16 (0.87)	<0.001
50% (half)	4.08 (0.85)	4.32 (0.72)	<0.001
90% (almost all (90%))	4.10 (0.83)	4.34 (0.83)	<0.001
<i>F</i> -test <sup>b</sup>	<0.001	<0.001	

Question:

“If an AIDS vaccine protected \_(effectiveness)\_ of the people who took it and \_(saturation)\_ people in the population had already taken the vaccine, I would take the vaccine”.

Answer:

1 (strongly disagree) 2 (disagree) 3 (neither agree nor disagree) 4 (agree) 5 (strongly agree).

<sup>a</sup> *P*-values from paired *t*-tests comparing scores between the two levels of effectiveness.

<sup>b</sup> *P*-values from one-way repeated measures ANOVA comparing scores among the three levels of saturation.