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Model-Based Estimates of HIV Acquisition Due to Prison Rape

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Abstract

Nearly 1.4 million men are incarcerated in federal and state prisons in the United States. These men are disproportionately affected by HIV in comparison with the at-large male population. The elevated prevalence of HIV infection in U.S. prisons has raised concerns over the potential for intraprisson HIV transmission due to rape and other forms of sexual victimization. However, the number of men who acquire HIV after being raped in U.S. prisons is not known. We developed a mathematical model of HIV transmission to estimate the likelihood that an incarcerated man would become infected as a result of prison rape and to provide preliminary estimates of the number of prison rape victims who acquire HIV. Our results suggest that between 43 and 93 currently incarcerated men already have or will acquire HIV as a result of being raped in prison.

Keywords

prison rape; HIV; mathematical model

More than 2 million U.S. adults were incarcerated in federal and state prisons and local jails at the end of 2003 (Harrison & Beck, 2004). Federal and state prisons alone house nearly 1.5 million inmates, the majority (93%) of whom are men (Harrison & Beck, 2004).

A disproportionate number of U.S. prison inmates are infected with HIV—the virus that causes AIDS—in comparison with the at-large population. Approximately 1.9% of men and 2.8% of women incarcerated in state and federal prisons are known to have HIV (Maruschak, 2004); the true prevalence of infection is likely to be higher. The elevated prevalence of HIV infection in U.S. prisons has raised concerns over the potential for intraprisson HIV transmission due to rape and other forms of sexual victimization (Dumond, 1992; Krebs, 2002; Mair, Frattaroli, & Teret, 2003; Mariner, 2001; Robertson, 2003; Stop Prisoner Rape, 2005).

Although estimates of the frequency of prison rape vary widely, prisoner-on-prisoner sexual assaults occur with alarming regularity. A recent meta-analysis of published studies of prison sexual assault indicated that approximately 1.9% of all inmates are raped or otherwise seriously assaulted while in prison (Gaes & Goldberg, 2004). Notably, prison rape incidents often involve multiple perpetrators (Banbury, 2004; Mariner, 2001; Struckman-Johnson, Struckman-Johnson, Rucker, Bumby, & Donaldson, 1996) and sometimes cause serious injury to the victim, including trauma to rectal and vaginal tissue (Dumond & Dumond, 2002), both of which increase HIV risk (Schoub, 1999). Moreover, unlike sexual assault in the general community, a person who is raped in prison may be unable to remove him- or herself from the vicinity of the perpetrator or perpetrators and thus may be raped repeatedly while incarcerated (Banbury, 2004; Dumond, 2003; Mariner, 2001; Struckman-Johnson et al., 1996).

In 2003, Congress enacted the Prison Rape Elimination Act (42 U.S.C. § 15601) to address the problem of rape in U.S. correctional facilities (Mair et al., 2003). Noting the elevated rate of HIV infection in prison populations and the role that prison rape may play in facilitating the dissemination of HIV and other sexually transmitted diseases, the act states that “Prison rape undermines the public health by contributing to the spread of these diseases . . . often giving a potential death sentence to its victims.”

Although cases of HIV seroconversion subsequent to prison rape have been reported (“Breaking the Silence,” 1995; “Ex-Inmate Says,” 1997; Mariner, 2001; Stop Prisoner Rape, 2005), the number of men who acquire HIV after being raped in U.S. prisons is not known. As a first step toward addressing this knowledge gap, we developed a mathematical model of HIV transmission to estimate the likelihood that an incarcerated man would acquire HIV as a result of prison rape and to provide preliminary estimates of the number of men in U.S. prisons who acquire HIV in this manner.

Context of Prison Rape

Most of the available evidence regarding the experiences of men who are raped in prison is anecdotal, informal, or otherwise drawn from first-person accounts (e.g., Anderson, 2001; Brook, 2004; Chonco, 1989; Mariner, 2001). These accounts suggest that many initial rape attempts are perpetrated against young, often newly incarcerated individuals who lack experience with violence or prison culture and who have few allies in the prison environment, such as gang or race-related affiliates (Donaldson, 1995; Fagan, Wennerstrom, & Miller, 1996; Hensley, Tewksbury, & Castle, 2003; Mariner, 2001). Typically, perpetrators use some combination of subterfuge, intimidation, implicit and explicit threats, and in some cases violence to force the target into a sexually submissive role (Brook, 2004; Chonco, 1989; Knowles, 1999; Mariner, 2001). If the target is able to resist or repel his assailants during these initial confrontations, the target establishes that he is a “man” and *may* be left unmolested in the future (Dumond, 1992; Knowles, 1999; Mariner, 2001; Struckman-Johnson et al., 1996).

If the target cannot repel his assailants and they succeed in raping him, the victim is said to have been “turned out” (Knowles, 1999; Mariner, 2001; Robertson, 2003). In prison terms, he has become a “punk” and likely will be targeted for repeated assault, both by the initial perpetrators and by others (Anderson, 2001; Castle, Hensley, & Tewksbury, 2002; Mariner, 2001; Struckman-Johnson et al., 1996; Wooden & Parker, 1982). In some instances the victim will be forced to serve as a virtual “sex slave” to men throughout the prison or to a specific prison subpopulation, such as a prison gang (Castle et al., 2002; Knowles, 1999; Robertson, 2003; Wooden & Parker, 1982). Once an inmate has been turned out, it is very difficult for him to regain his status as a man (Anderson, 2001; Man & Cronan, 2001; Mariner, 2001). Some resolve to fight to death if necessary to avoid further assaults (Mariner, 2001; Nacci & Kane, 1983). Sometimes, a prisoner-on-prisoner rape is an isolated event used to establish dominance within the prisoner hierarchy (Mariner, 2001; Struckman-Johnson et al., 1996).

Some men attempt to avoid or to stop violent rape by aligning themselves with a more powerful inmate—sometimes called a “daddy”—to whom they provide “sexual service” in exchange for protection against random assault (Donaldson, 1995; Dumond, 1992; Robertson, 2003). In these situations, the punk becomes the sexual property of the daddy, who may loan, prostitute, or even sell the punk to others (Brook, 2004; Mahon, 1996; Mariner, 2001; Robertson, 2003). These “protective” relationships constitute a gray area in the literature: Although seemingly consensual, the vulnerable partner enters into the relationship only to avoid sexual exploitation by other inmates. The relationship is based on an exchange of sex for protection and therefore is inherently coercive and, in our opinion, is properly considered rape (Donaldson, 1995; Mariner, 2001).

Some of the most violent prison rapes are motivated by animus toward the target. Persons convicted of sex crimes, especially against children, persons identified as “snitches,” persons who are not well liked or who are perceived as having challenged a more powerful prisoner or prisoner group can be subject to brutal, often orchestrated attacks with multiple assailants (Fagan et al., 1996; Wooden & Parker, 1982).

In summary, men who are raped once in prison often are raped multiple times, and often by multiple perpetrators. Some men who are targeted for rape avoid random, violent assault by pairing with a more powerful inmate to whom they provide sexual service and receive protection in return. The vulnerable individual in this protective pairing may be obligated to sexually service others as well. Once turned out, those men who are not protected may remain targets for random assault, possibly involving multiple perpetrators. In short, men's prison rape experiences vary widely. There is no single, prototypical prison rape scenario.

Methods

Model of HIV Acquisition Risk Because of Prison Rape

The analysis focuses on male–male anal rape (defined here as any forced or coerced act of anal intercourse) and neglects the substantially smaller possibility of acquiring HIV consequent to forced or coerced oral sex. In our model the probability that an incarcerated man would acquire HIV as a result of being raped in prison equals the product: $P(\text{HIV}) = P(\text{HIV}|\text{R}) \times P(\text{R})$, where $P(\text{R})$ is the probability that the inmate is raped and $P(\text{HIV}|\text{R})$ is the probability that he would acquire HIV if raped. The total number of currently imprisoned men who already have or will acquire HIV as a consequence of being raped in prison equals $P(\text{HIV}) \times N$, where N is the number of men incarcerated in U.S. federal and state prisons (1.4 million at the end of 2003; Harrison & Beck, 2004).

The probability that an incarcerated man would acquire HIV if raped, $P(\text{HIV}|\text{R})$, depends on (a) the number of rape episodes and the number of assailants per episode, (b) the probability that one or more of the rapists are HIV infected, and (c) the probability of HIV transmission, from an infected assailant to a previously uninfected victim, per act of anal rape. Specifically,

$$P(\text{HIV}|\text{R}) = 1 - (1 - \beta_1)(1 - \beta_2) \cdots (1 - \beta_m), \quad (1)$$

where m is the number of assailants, $\beta_k = \pi[1 - (1 - \alpha)^{n_k}]$ is the probability of acquiring HIV from the k^{th} assailant, n_k is the number of times the man is raped by the k^{th} assailant, π is the probability that the assailant is HIV infected, and α is the probability of HIV transmission during a single act of anal intercourse (Pinkerton & Abramson, 1993, 1998).

To account for heterogeneity in men's prison rape experiences, we analyzed four generic prison rape scenarios:

1. Single-incident/single-perpetrator (SI/SP) scenario. In this scenario victimized men are raped only once, by a single assailant ($m = 1$ and $n_1 = 1$ in Equation 1).
2. Single-incident/multiple-perpetrator (SI/MP) scenario. This scenario assumes a single rape incident with $m > 1$ perpetrators and $n_k = 1$ rape act for each assailant.
3. Multiple-incident/single-perpetrator (MI/SP) scenario. In this scenario a victimized man is raped $n > 1$ times, each time by the same assailant (i.e., $m = 1$).
4. Multiple-incident/multiple-perpetrator (MI/MP) scenario. In this scenario the victim is raped in $k > 1$ separate incidents, with $m > 1$ perpetrators participating in at least one of the rape incidents (the “worst-case” incident).

The risk of HIV acquisition is smallest when a single assailant is involved in each of the $(k - 1)$ non-worst-case incidents (this yields a total of $m + k - 1$ rape acts) and is largest when all m assailants participate in all k rape incidents ($m \times k$ rape acts total). In the main analysis we assumed that these two subscenarios are equally likely and averaged the minimum and maximum risk values to derive an overall HIV risk estimate for this scenario; we also conducted sensitivity analyses in which the likelihood of one subscenario was twice as large as the likelihood of the other.

The average probability of HIV acquisition was estimated by multiplying the risk associated with each of the four prison rape scenarios by the proportion of rape episodes represented by the scenario ($x_{SI/SP}$, $x_{SI/MP}$, $x_{MI/SP}$, or $x_{MI/MP}$):

$$P(HIV|R) = x_{SI/SP} P_{SI/SP} + x_{SI/MP} P_{SI/MP} + x_{MI/SP} P_{MI/SP} + x_{MI/MP} P_{MI/MP} \quad (2)$$

In addition to this base-case value, in which the low and high MI/MP estimates were averaged, we also report low and high estimates, $P_{LOW}(HIV|R)$ and $P_{HIGH}(HIV|R)$, which were obtained from Equation 2 by substituting the corresponding low and high MI/MP risk values for the average of these values.

Rape Experience Parameters

One of the most detailed sources of information regarding the context of prison rape is Struckman-Johnson et al.'s (1996) study of sexual coercion in Nebraska state prisons. In this study, 101 of 474 men (21.3%) reported having been sexually coerced while incarcerated in a Nebraska prison. In addition to providing information on sexual coercion in general—which included genital touching as well as anal, oral, and vaginal intercourse—the men in this study were asked to describe the single most severe (“worst-case”) incident of sexual victimization they experienced. For 50.5% (51 of 101) of the sexually victimized men the worst-case incident included being forced or pressured into anal intercourse with one or more assailants.

Half of the worst-case incidents of sexual victimization involved multiple assailants, with a mean of five assailants per multiple-perpetrator assault. Although these data are not specific to the 50.5% of victimized men in the Struckman-Johnson et al. (1996) study who reported being anally raped, it seems reasonable to assume that the number of perpetrators in anal rape incidents is at least as large as the number implicated in other forms of sexual victimization, particularly as many prison rape incidents—and especially initial rape incidents—involve multiple perpetrators (Banbury, 2004; Mariner, 2001). Therefore, we assumed that $m = 5$ perpetrators participated in the worst-case rape incident (which is the only rape incident in the SI/MP scenario), as indicated in Table 1, which lists the number of rape incidents and perpetrators for each of the prison rape scenarios previously described. For the MI/MP scenario we very conservatively assumed that no additional assailants were involved in the non-worst-case rape incidents.

One third of the sexually victimized men in Struckman-Johnson et al.'s study reported that they had been victimized only once. The remaining two thirds were assaulted one or more times in addition to the worst-case incident. Multiply victimized men reported an average of 13 instances of sexual victimization. Because this average includes all types of victimization, not just anal rape, we conservatively assumed that the total number of rape episodes was no greater than this average. The number of rape incidents was varied from 2 to 13 in the sensitivity analyses and was set to the (approximate) average, 8.0, in the main (base-case) analysis.

Based on Struckman-Johnson et al.'s (1996) data we assumed that, for one third of prison rape victims, the worst-case incident was the only time they were raped and that half of the men were raped by a single assailant. Assuming independence between these estimates we derived

the following proportions for the four prison rape scenarios: $x_{SI/SP} = 1/3 \times 1/2 = 1/6$, $x_{SI/MP} = 1/3 \times 1/2 = 1/6$, $x_{MI/SP} = 2/3 \times 1/2 = 1/3$, and $x_{MI/MP} = 2/3 \times 1/2 = 1/3$.

Epidemiological Parameters

Empirical estimates of the proportion of men who have been raped while incarcerated in U.S. prisons vary widely. Although studies have found rates ranging from 0% (Tewksbury, 1989) to more than 10% (Struckman-Johnson et al., 1996), most report rates between 0.5% and 1.5% (e.g., Gaes & Goldberg, 2004; Hensley et al., 2003; Lockwood, 1980; Maitland & Sluder, 1998; Saum, Surratt, Inciardi, & Bennett, 1995). In the main analysis we assumed that 1% of incarcerated men are raped in prison (i.e., $P(R) = 1\%$). This estimate appears conservative (Gaes & Goldberg, 2004).

As of December 31, 2002, approximately 1.9% of men incarcerated in federal and state prisons were known to be infected with HIV (Maruschak, 2004). This proportion reflects a steady decline in the estimated number of HIV-infected prisoners, down from approximately 2.3% in the mid-1990s (Maruschak, 1999, 2004). Because many of the rapes considered in our analyses are likely to have occurred in past years, we assumed that the probability that an assailant was HIV infected equals the midpoint of these estimates (i.e., $\pi = 2.1\%$). The true prevalence of infection in U.S. prisons is likely to be higher because not all inmates are tested for HIV (Maruschak, 2002).

The probability of acquiring HIV consequent to a single act of consensual unprotected receptive anal sex with an HIV-infected man has been estimated at approximately .02 (Pinkerton, Holtgrave, & Bloom, 1998). The often-brutal nature of prison rape suggests that the per-act transmission probability would be greater in these circumstances, which sometimes involve multiple assailants and violent rectal entry with inadequate lubrication (possibly leading to rectal abrasions and bleeding, both of which increase the likelihood of HIV transmission). Nevertheless, our calculations conservatively assumed a per-act transmission probability of $\alpha = .02$ for anal rape.

Sensitivity analyses were conducted to assess how varying key epidemiological and rape experience parameters affected the resulting estimate of the number of men who acquire HIV as a result of being raped in prison.

Results

The risk of acquiring HIV following a single rape incident involving five assailants is 0.21% (1 in 477; SI/MP scenario), as indicated in Table 2. If the victim subsequently is raped seven additional times by one of the assailants involved in the initial attack, his risk increases to 0.48% (1 in 208; MI/MP low-risk estimate). In the most extreme situation considered in the main analysis, a man who is raped eight times by each of five different perpetrators faces an average 1.56% (1 in 64) risk of becoming infected with HIV (MI/MP high-risk estimate).

Overall, across the four prison rape scenarios, the average risk of HIV acquisition equaled 0.49% (1 in 206). Assuming that 1% of imprisoned men are raped while incarcerated, the average probability that an incarcerated man would acquire HIV as a result of being raped in prison equals 0.0049% (1 in 20,572). These findings suggest that approximately 68.1 of the 1.4 million men incarcerated in U.S. prisons at the end of 2003 (Harrison & Beck, 2004) already have or will become infected with HIV as a consequence of prison rape.

Figure 1 illustrates the nearly linear growth in the number of HIV infections due to prison rape as a function of the number of rape episodes in the MI/SP and MI/MP scenarios. The low estimate assumes that only one assailant was involved in each non-worst-case rape MI/MP

incident, whereas the high estimate presumes that five perpetrators participated in each additional MI/MP incident (see Methods section). For the base-case value of eight rape incidents in the multiple-incident scenarios, between 42.9 and 93.2 incarcerated men would be expected to acquire HIV as a result of being raped while in prison.

Sensitivity Analyses

Table 3 presents the results of the sensitivity analyses in which the impact of varying key model parameters was assessed. Most notable among these results are the following. First, the main analysis assumed that 1% of men in U.S. prisons are raped while incarcerated. The number of men expected to become infected with HIV after being raped in prison would increase by 50% if the true prevalence of prison rape were 1.5% and would decrease by half if “only” 0.5% of incarcerated men were raped in prison. Second, the results were very sensitive to the per-act HIV transmission probability parameter but were relatively insensitive to variations in the presumed prevalence of HIV infection among prison inmates. Third, manipulating the prison rape experience parameters (percentage of victims raped in multiple episodes, percentage of men raped by multiple perpetrators, percentage of high-risk vs. low-risk MI/MP scenarios, and the total number of perpetrators) did not produce especially large deviations from the base-case results. In particular, with the exception of the probability of being raped in prison and the per-act transmission probability, all the values obtained in the sensitivity analyses fell within the low to high range (42.9 to 93.2 infections) of the main analysis.

The base-case estimate of 68.1 infections corresponds to an average over the four prison rape scenarios of 5.7 rape incidents involving three assailants, total, and 12.3 individual acts of rape. Some men may experience much more severe victimization than is captured by these scenarios. Anecdotal reports suggest that some men may be raped on a weekly or possibly even a daily basis (Donaldson, 1995), with the number of individual rape acts exceeding 100 or more during the victim's term of incarceration. A man who is raped once by five perpetrators and then 95 times by an additional perpetrator faces a 2.0% (1 in 50) risk of becoming infected with HIV as a consequence of being raped in prison.

Discussion

The preceding analysis provides preliminary estimates of the risk of HIV acquisition due to male–male rape in prison. These estimates are subject to considerable uncertainty, as discussed next. Nevertheless, the results of this analysis are cause for concern. A man who is raped just once by five assailants faces, on average, a 1 in 477 risk of acquiring HIV as a consequence of this assault. If he subsequently is raped 7 to 35 additional times, his risk of becoming infected could rise as high as 1 in 98. The implication of these findings is clear: Men who are raped in prison face a substantial risk of acquiring HIV.

Fortunately, only a small minority of men are raped in U.S. prisons. Still, with the male prison population growing to 1.4 million men at the end of 2003 (Harrison & Beck, 2004), even if the prevalence of prison rape is as “low” as 1%, 14,000 incarcerated men already have been or will be raped while imprisoned. We estimate that between 43 and 93 of these men have or will acquire HIV as a result.

The physical and psychological consequences of prison rape are manifest. Victims of particularly violent sexual assaults may require hospitalization for broken bones, bleeding, or worse (Dumond & Dumond, 2002). Rape victims may experience severe psychological trauma (Cotton & Groth, 1982; Fagan et al., 1996; Robertson, 2003), which can adversely affect adjustment to prison life and subsequently interfere with successful reintegration into the community following release (Dumond & Dumond, 2002). The analysis presented here highlights another potential source of both physical and psychological harm to victims of prison

rape—specifically, the possible acquisition of HIV infection as a consequence of being raped. HIV disease is an incurable, lifelong health condition that is both difficult and costly to manage effectively, particularly in prison settings (Frank, 1999; Ruby, 2002), and that may contribute to the spread of other diseases, such as tuberculosis and sexually transmitted infections, in these settings (Braun et al., 1989; Centers for Disease Control, 1996, 1999). Moreover, upon release, persons who have acquired HIV while in prison may transmit the virus to their sexual and needle-sharing partners, helping to sustain the pool of infection in the community (Grinstead, Zack, Faigles, Grossman, & Blea, 1999; MacGowan et al., 2003; Mutter, Grimes, & Labarthe, 1994; Skolnick, 1998). Only by reducing the incidence of prison rape can these various harms be diminished.

The preceding analysis was limited by the paucity of detailed empirical data regarding the prevalence and context (number of assailants and incidents) of prison rape, the prevalence of HIV among prison rapists, and the impact of the often-violent prison rape context on the per-act HIV transmission probability. Prison rape is an underreported crime (Eigenberg, 1989; Gaes & Goldberg, 2004; Mariner, 2001), as is male–male rape in general (Groth, 1979; Lipscomb, Muram, Speck, & Mercer, 1992); estimates of HIV prevalence in prison are likely to underrepresent the true prevalence because not all persons in prisons are tested for HIV (Maruschak, 2002), and available estimates of the per-act transmission probability for anal intercourse likely underestimate the risks faced by persons with traumatic exposures such as rape. Individually and in combination our relatively conservative assumptions with regard to each of these factors would tend to minimize the impact of prison rape with regard to HIV acquisition. Conversely, our analysis incorporates several assumptions that could have inflated our estimates of the number of men who acquire HIV after being raped in prison. Specifically, we assumed that all acts of prison rape are perpetrated by other prisoners, not by prison staff (equivalently, we assumed that the prevalence of HIV infection among prison staff equals the prevalence of infection among inmates); that condoms are not used during forced or coerced anal intercourse; and that prison rapists are no more and no less likely than other inmates to be infected with HIV.

Finally, values for several key prison rape experience parameters were drawn from Struckman-Johnson et al.'s (1996) study of sexual coercion in a Nebraska prison. The generalizability of this study's findings is unknown. Moreover, our analysis required additional assumptions regarding the relationship of sexual coercion and prison rape experiences—for example, that the number of perpetrators did not differ for rape and other forms of sexual coercion. We believe that our assumptions generally are conservative. Nevertheless, in light of the acknowledged uncertainty in the analysis, the results presented here are best viewed as indicating the scope of the problem rather than as providing exact estimates of the number of HIV infections due to prison rape.

From a policy standpoint the key questions are: What incidence of prison rape is acceptable, and how many people should be allowed to acquire HIV while in the protective custody of the U.S. penal system? The answer to the first question is explicit in the Prison Rape Elimination Act of 2003, and the answer to the second is implicit therein: No man, woman, or adolescent should be raped while incarcerated, and none should acquire HIV. Our results—uncertainties notwithstanding—suggest that significant policy and structural initiatives will be needed to achieve the “zero tolerance” objective of the Prison Rape Elimination Act.

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Biographies

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David W. Seal is a social psychologist whose research explores individual, interpersonal, and contextual influences on emotionally and sexually intimate communication, decision making, negotiation, and behavior.

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Figure 1. Number of HIV Infections Because of Prison Rape as a Function of the Number of Rape Incidents for Men Who Are Raped in Multiple Episodes (SI/MP and MI/MP Scenarios)

Note: The low estimate assumes that only one assailant was involved in each non-worst-case rape MI/MP incident, whereas the high estimate presumes that five perpetrators participated in each MI/MP incident. The dotted line indicates the base-case results.

Table 1
Prison Rape Scenarios and Base-Case Model Parameters

Prison Rape Scenario	% of Victims	Rape Incidents	Assailants	Total Rape Acts
Single incident, single perpetrator	16.7	1	1	1
Single incident, multiple perpetrators	16.7	1	5	5
Multiple incidents, single perpetrator	33.3	8	1	8
Multiple incidents, multiple perpetrators	33.3	8	5	26
Low-risk estimate		8	5	12
High-risk estimate		8	5	40
<i>Average</i>		<i>5.7</i>	<i>3</i>	<i>12.3</i>

Table 2

Results of Main Analysis

Prison Rape Scenario	% of Victims	P(HIV R) ^a	P(HIV) ^b	HIV Infections ^c
Single incident, single perpetrator	16.7	0.04% (1 in 2381)	0.0004% (1 in 238,095)	1.0
Single incident, multiple perpetrators	16.7	0.21% (1 in 477)	0.0021% (1 in 47,659)	4.9
Multiple incidents, single perpetrator	33.3	0.31% (1 in 319)	0.0031% (1 in 31,908)	14.6
Multiple incidents, multiple perpetrators	33.3	1.02% (1 in 98)	0.0102% (1 in 9,814)	47.6
Low-risk estimate		0.48% (1 in 208)	0.0048% (1 in 20,800)	22.4
High-risk estimate		1.56% (1 in 64)	0.0156% (1 in 6,422)	72.7
<i>Overall</i>	<i>100</i>	<i>0.49% (1 in 206)</i>	<i>0.0049% (1 in 20,572)</i>	<i>68.1</i>

^aProbability of HIV acquisition if raped in prison.

^bProbability of acquiring HIV after being raped in prison.

^cEstimated number of men incarcerated in U.S. prisons who have or will acquire HIV as a consequence of prison rape.

Table 3

Results of Sensitivity Analyses

Parameter	Base-Case Value	New Value	HIV Infections ^a	% Change ^b
% of men raped in prison	1.0%	0.5%	34.0	-50.0%
		1.5%	102.1	50.0%
Total no. of assailants	5	3	49.7	-27.0%
		7	86.3	26.9%
% of victims raped in multiple incidents	66.7%	50.0%	55.4	-18.5%
		83.3%	80.7	18.5%
% of men raped by multiple assailants	50.0%	33.3%	55.8	-18.0%
		66.7%	80.3	18.0%
% of MI/MP scenarios that are high risk as opposed to low risk	50.0%	33.3%	59.7	-12.3%
		66.7%	76.4	12.3%
Prevalence of HIV among men in U.S. prisons	2.1%	1.9%	61.6	-9.5%
		2.3%	74.5	9.5%
Per-act HIV transmission probability	0.02	0.01	35.1	-48.4%
		0.03	99.0	45.4%

^a Number of HIV infections due to prison rape.

^b Percentage deviation from base-case average = 68.1 infections (range = 42.9–93.2).