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Cost-effectiveness of hepatitis B vaccination of prison inmates

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Abstract

The purpose of this paper is to determine the cost-effectiveness of vaccinating inmates against hepatitis B. From the prison perspective, vaccinating inmates at intake is not cost-saving. It could be economically beneficial when the cost of a vaccine dose is <US$ 30 per dose, or there is no prevalence of infection upon intake, or the costs of treating acute or chronic disease are about 70% higher than baseline costs, or the incidence of infection during and after custody were >1.6 and 50%, respectively. The health care system realizes net savings even when there is no incidence in prison, or there is no cost of chronic liver disease, or when only one dose of vaccine is administered. Thus, while prisons might not have economic incentives to implement hepatitis B vaccination programs, the health care system would benefit from allocating resources to them.

Keywords: Cost-effectiveness; Prison; Hepatitis

1. Introduction

Since 1982, the Advisory Committee on Immunization Practices (ACIP) has recommended vaccination against hepatitis B virus (HBV) infection for high-risk individuals such as illicit drug users and sexually active homosexual men. Inmates in long-term correctional facilities were also included in high-risk groups because of their likelihood of using injectable drugs and practicing homosexual activities in prisons [1–4]. In general, about one-third of all new HBV-infected persons report a history of incarceration [5]. Drug addicts have a lifetime probability of acquiring infection of 100% [3]; among 17,000 drug users surveyed in US cities, 81% reported having been jailed or imprisoned at least once [6]. Thus, the Centers for Disease Control and Prevention (CDC) has recommended that prison officials consider undertaking vaccination programs for inmates with histories of high-risk behaviors [1–4].

After considering the growing number of hepatitis B cases, the high cost of the disease, and the high rate of recidivism, the National Commission on Correctional Health Care (NCCHC) has also advised that inmates be vaccinated against hepatitis B [7]. Despite these recommendations, and the strong association between HBV infection and incarceration, prison officials have been slow to implement hepatitis B immunization programs. In a controlled environment such as a prison, the incidence of infection might be perceived to be low, and prisoners might not be incarcerated long enough for the prison to realize any benefits from immunizing inmates.

The purpose of this paper is to determine the cost-effectiveness of vaccinating inmates entering prison against hepatitis B, and how this is affected by factors such as the incidence and cost of disease, the rate of recidivism, the cost of the vaccine, the number of doses administered, and the prevalence of infection at intake. By considering the perspective of a prison official working on a limited budget to address the health care needs of the inmate population, we will identify economic incentives or disincentives to adopt a vaccination program. Moreover, by considering a broader perspective we will determine whether such program is economically desirable for the entire health care system. To the best of our knowledge, there are no published studies that have addressed this issue.

2. Methods

2.1. Model

This study compares the economics of vaccinating and not vaccinating a hypothetical cohort of 1000 inmates entering

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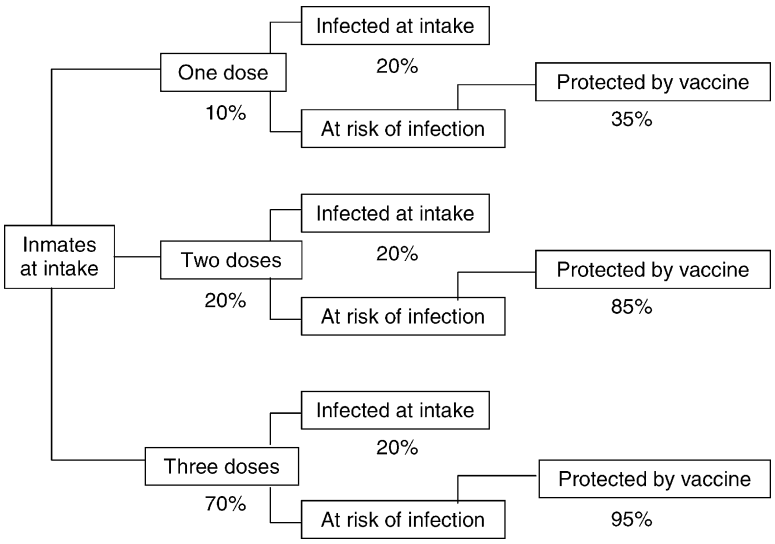

Fig. 1. Intake and vaccination. All consenting inmates receive the first dose of vaccine upon entering prison. Ten percent receive only the first dose, 20% receive only two doses, and 70% complete the vaccine series. Of those who stop the series after the first dose and are not infected at intake, 35% will be protected by the vaccine. Of the inmates who stop the vaccine series after the second dose and are not infected at intake, 85% will be protected by the vaccine. The remaining inmates complete the vaccine series and, of those not already infected at intake, 95% will be protected from infection.

prison using the decision tree described in Figs. 1–4. The values of the variables used at baseline are listed in Table 1. The software used for the analysis was Decision Analysis by TreeAge (Data^{TM}, Williamstown, MA). We refer to the prison as the health care provider for the cohort while incarcerated, and to health care system as the set of all health care providers, including prisons, that provides comprehensive health care coverage during and after incarceration. Thus, the analysis conducted under the prison perspective accounts for the costs of treating infections that prisoners contracted during the incarceration period and the cost of vaccination upon entering prison. The health care system perspective considers all infections and related costs of treatment and vaccination regardless of when they occurred.

Results are summarized by the cost per infection averted, or cost-effectiveness ratio (CE). The following formula was used:

$$\mathrm{CE} = \frac{\text{vaccination cost} - \text{averted cost of disease}}{\text{number of infections averted}}$$

2.2. Epidemiological data

We assumed that inmates entered prison at age 25. Hepatitis B prevalence surveys conducted in prisons have shown that the median and average ages of inmates are approxi-

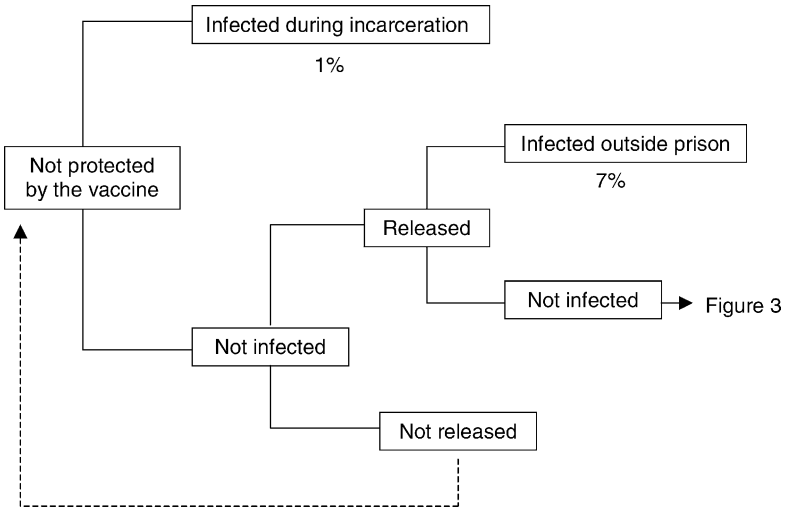

Fig. 2. Risk of infection during incarceration. A proportion of individuals who were not protected by the vaccine, or, in case of no-vaccination, did not have natural immunity, were infected during incarceration. Some of the inmates who were not infected while under custody were infected outside prison after release (Fig. 3). Of those not released, some could get HBV infection during the successive years of incarceration.

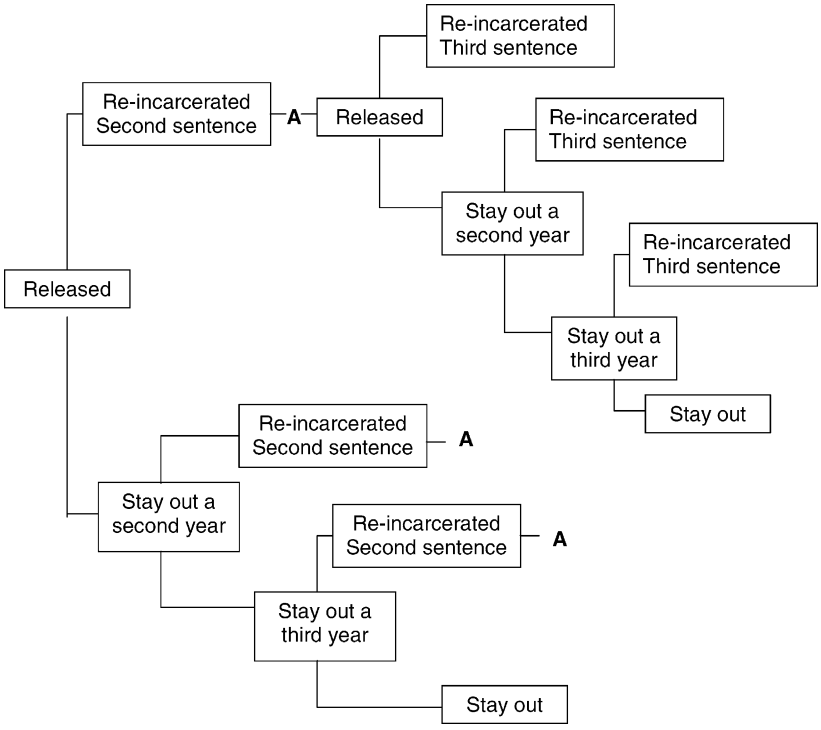

Fig. 3. Recidivism. Once released, inmates spend at least 1 year outside prison. At the end of the year, they could be reincarcerated and serve a second sentence as long as the first one. Those who do not re-enter prison at the end of the first year might be reincarcerated at the end of the second or third year from release; otherwise they are not reincarcerated at all. After serving the second sentence and being free for 1 year, ex-inmates might be reincarcerated and serve a third sentence, which is a life sentence. After the second release individuals could be reincarcerated after the second and third year, but not afterwards.

Table 1
Model input values

Variables	Baseline values	References
Prevalence at intake (%)	20	[8–10]
Incidence during incarceration (%)	1	[13,25]
Incidence after incarceration (%)	7	[20]
Inmates receiving (%)		
One dose of vaccine	10	Centers for Disease Control and Prevention (CDC), unpublished
Two doses of vaccine	20	CDC, unpublished
Three doses of vaccine	70	CDC, unpublished
Vaccine protection rate after (%)		
One dose of vaccine	35	[23,24]
Two doses of vaccine	85	[23,24]
Three doses of vaccine	95	[23,24]
Probability of release (%)		
After 2 years	10	[11]
After 5 years	27	[11]
After 10 years	35	[11]
After 15 years	39.8	[11]
Recidivism		
First year from release (%)	18.6	[29]
Second year from release (%)	17.4	[29]
Third year from release (%)	20.8	[29]
Vaccination cost per dose (US$)	40	Assumed
Expected cost of a symptomatic case (US$)	1,532	[31]
Expected cost of chronic liver disease (US$)	82,417	31, MarketScan data base
Prison share of CLD cost (%)	37	Calculated[a]
Discount rate (%)	3	[32]

[a] See text for details.

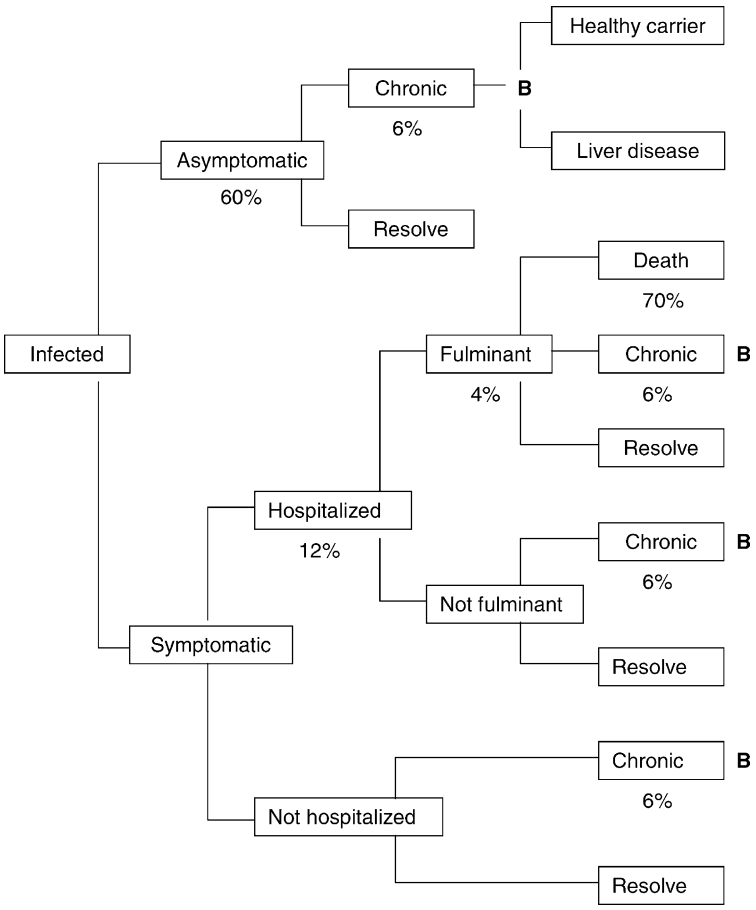

Fig. 4. Development of disease. Sixty percent of all infections are asymptomatic. Symptomatic infections may require hospitalization (12%); 4% of the hospitalized cases are fulminant with 70% resulting in death. Six percent of all infections become chronic; of these, 15% progress to liver disease in the form of either chronic active hepatitis, chronic persistent hepatitis, cirrhosis, or liver cancer.

mately 30 years [8–10] Of state prison inmates surveyed in 1991, 68% were below the age of 34 years, with an average sentence already served of almost 3 years [11].

In the model, consenting individuals received the first dose of the vaccine at intake (Fig. 1), including those inmates who had natural immunity. The prevalence of HBV infection in correctional facilities has been found to range from 29 to 53% among prison residents [12,13] and from 19 to 34% among prison entrants [8–10]. In surveys conducted in foreign prisons, the prevalence of HBV infection among prison residents was found to be between 22 and 65% [14–18] and among entrants between 30 and 33% [19–22]. In general, studies indicate that the older the cohort the higher the prevalence. In this study, HBV prevalence was assumed to be 20%; hence, 80% of the inmates were at risk of acquiring the infection (Table 1). A strategy of testing for hepatitis B and providing vaccination only to susceptible individuals was not considered. The costs of long-term care for those inmates who were already infected before vaccination were not accounted for in this analysis since they could not be averted by the immunization program.

We allowed for the possibility that not all inmates may receive the three doses of the vaccine, completing the vaccine series (Fig. 1). In 1995, Michigan Department of Corrections statewide vaccination program, only 75% of those individuals who agreed to be vaccinated completed the vaccine series (Centers for Disease Control and Prevention (CDC), unpublished). In prisons outside the United States, the proportion of inmates who completed the series was even lower: in a Spanish prison, only 43%, and in a French prison only 60% of inmates who got the first dose of the vaccine completed the full schedule [17,22]. Thus, we assumed that 10% of participants stopped the vaccine series after the first dose and that about 20% stopped after the second (Table 1). The rates of protection and the cost of the vaccine were different depending on the number of doses received (Table 1) [23,24].

Individuals not protected by the vaccine or not already infected at intake face the probability of infection during incarceration or outside prison after their release (Table 1, Fig. 2). Although the incidence of HBV infection in prison is low, ranging from 0.82 to 1.32% [13,25], this rate is much higher than the annual incidence in the general US population (0.1 to 0.2%) [26]. No studies in the United States have inves-

tigated the incidence of infection among persons released from prison; however, this rate is thought to be higher than the rate among incarcerated individuals due to the resumption of high-risk behaviors after release [27]. In a group of Australian reincarcerated inmates, the HBV incidence was estimated to be as high as 12.6% per year (confidence interval: 6.8–23.5%) [20]. However, the proportion (43%) of injecting drug users among the surveyed Australian inmates was higher than the proportion (19–30%) found in seroprevalence surveys of inmates in US prisons [9,13,25,28]. Thus, to avoid overestimating the benefits of vaccination, we assumed that the annual incidence post-release was 7% (Table 1).

For simplicity, the benefits of preventing secondary transmission to sex partners or household contacts were not considered. We assumed that an individual could not get infected, inside or outside prison, after the age of 45 years based on the fact that, in the general population, only a few cases of infection occur in individuals older than 40 years.[1]

2.3. Recidivism

Fig. 3 illustrates how recidivism was incorporated in the model. Prisons are, by definition, institutions for sentences longer than 12 months. To calculate rates of release for the cohort under study, we assumed that the distribution of sentences was the same as the one among the state prison inmates surveyed in 1991 by the Bureau of Justice Statistics [11]. In that year, only 9% of inmates had a life or death sentence while the rest of the inmates were divided as follows: 10% had a maximum sentence between 1 and 24 months, 24% had one between 25 and 60 months, 23% between 61 and 120 months, and the rest were sentenced to more than 121 months [11]. Thus, we assumed that inmates spent either 2, 5, 10, 15, or 20 years in prison. We also assumed that individuals spent at least 1 year outside prison before reincarceration. Most surveys on recidivism follow inmates for 3 years after their release; by the end of this period, 30–47% of released inmates return to prison [29,30]. Few ex-inmates return to prison after the third year; Schmidt and Witte [30] found that only 10% of the prisoners released from the North Carolina prison system in 1978 were reincarcerated 4–6 years after release. Thus, if they were not reincarcerated by the end of the third year after release, we assumed that ex-inmates were not reincarcerated at all.

We assumed that recidivists served a second sentence that was as long as the first one, and those reincarcerated for the third time served a life sentence. Furthermore, we assumed that the prisons used a system of records such that when previously vaccinated exconvicts returned they were not vaccinated again.

Table 2
Probabilities and costs of hepatitis B acute infection

	Percentage of all infections[a]	Cost[b] (US$)
Acute disease		
Asymptomatic infection	60	0
Symptomatic/hospitalized/fulminant/death	0.13	11,898
Symptomatic/hospitalized/fulminant/no death	0.06	26,411
Symptomatic/hospitalized/not fulminant	4.6	10,039
Symptomatic/not hospitalized	35.2	338
Chronic liver disease[b,c]		
Chronic active hepatitis (CAH)	0.225	72,660
Chronic persistent hepatitis (CPH)	0.225	44,560
Cirrhosis (CIRR)	0.225	177,450
Hepatocellular carcinoma (HCC)	0.225	34,990

[a] Source: [31].
[b] Costs of acute disease are from [31] and updated to 1998 using the medical component of the Consumer Price Index. Costs of care for chronic disease are obtained from the MarketScan data base by the MedStat Group (Bridget Lyons and FangJun Zhou, National Immunization Program, CDC, written communication, February 2000).
[c] Costs are discounted to the beginning of the 10-year period over which the liver disease develops.

2.4. Outcome probabilities and costs

The cost of vaccination (dose plus administration) was assumed to be US$ 40 per dose (Table 1). Fig. 4 depicts the outcomes of hepatitis B infection and the probabilities of the outcomes are listed in Table 2. Most infections (almost 94%) resolved without long-term sequelae, 6% became chronic, and 0.1% resulted in a fulminant death (Table 2) [31]. Fifteen percent of patients with chronic infections required long-term care for liver disease [30]. Liver disease had an equal probability of being either chronic active hepatitis (CAH), chronic persistent hepatitis (CPH), cirrhosis (CIRR), or hepatocellular carcinoma (HPC) [31].

Costs of care for chronic liver disease are obtained from the Marketscan database, a proprietary insurance claims database by the MedStat Group. The cost of care for acute cases of infection is obtained from [31] and updated to 1998 using the medical care component of the Consumer Price Index. Combining natural history probabilities with cost data, we obtained a weighted average cost of a symptomatic infection of US$ 1532, and 82,417 for the long-term chronic liver disease care (Table 2). Medical costs for chronic liver disease were assumed to begin at the age of 50 years and were spread over a 10-year period, with hospitalizations occurring during the last 5 years.

The calculation of costs differed according to the perspective examined. While the health care system was assumed to bear the cost of acute and chronic liver disease for all infections, prisons were assumed to bear only the cost of the

[1] Surveys of US prison residents showed a prevalence of HBV infection from 30% to more than 53%, and the age of inmates from 18 to 70 years old [12,13] Moreover, the incarcerated population is growing older [11]. Thus, there is a real risk of individuals being under custody at the time of development of the liver disease.

acute disease for infections that occurred while the individuals were under custody, plus a share of the chronic liver disease costs for all infections that occurred during and after custody. This share was equal to the probability that an individual who entered prison at age 25 was under custody at and after age 50; from the assumptions made about release and recidivism, we calculated this probability to be equal to 37% (Table 1).

We assumed that the cost of the infection occurred at the end of the incarceration or release period and all costs were discounted at a 3% discount rate to the year when vaccination occurred [32]. Indirect costs of lost productivity were not included. Other prison costs, such as security during hospitalizations and transportation of inmates to hospitals and medical providers, were also not included.

2.5. Sensitivity analysis

We examined the effect of changes in the prevalence at intake, cost of vaccination, and vaccine series completion on the cost per infection averted. Several threshold analyses were conducted to find the value of inputs above or below which the complete series vaccination was cost-saving with respect to no-vaccination. In such analyses, the values of the variables were changed one at a time, keeping the rest at their baseline values. Lastly, we examined situations where all inmates remained in prison for life or stayed for a short-term and never came back.

3. Results

In a cohort of 1000 inmates, in the time period considered there would be 230 HBV infections without a vaccination program to protect inmates; one-third of these infections would occur inside the prison while inmates are under custody. A vaccination program would avert 200 infections altogether, of them 65 would have occurred in a prison setting (Table 3). Thus, the health care system would benefit from vaccinating incoming inmates since most of the infections averted through such program would occur outside prison. In fact, the health care system would be better off vaccinating inmates at a cost of US$ 137,000 rather than incurring the cost of future infections of US$ 255,000. However, the prison system would not save but spend US$ 415 to avert one infection among incarcerated individuals (Table 3).

3.1. Sensitivity analyses

Fig. 5 illustrates how changes in the prevalence of HBV infection at intake affect the cost per infection averted. Two scenarios were examined: one where all inmates received only one dose of the vaccine, and a second where all inmates completed the vaccine series. Under each scenario, the cost-effectiveness ratios were calculated assuming three different costs of vaccination: US$ 40, 30, and 20 per dose. The higher the prevalence at intake or the cost of a one dose vaccination, the higher the cost per infection averted (Fig. 5). For relatively low rates of prevalence (e.g. lower than 10%) and low costs of vaccination (e.g. lower than US$ 30 per dose), vaccination could be cost-saving for the prison (Fig. 5).

Cost-effectiveness ratios and number of infections averted were lower if all inmates received only one dose of the vaccine instead of three (Fig. 5). At the 20% baseline prevalence rate, administering one dose to all inmates would save 80 infections to the health care system of which 26 would have occurred in prison. Our base case, however, showed that 65 in prison and 200 altogether infections could be averted by administering three doses to those willing to be immunized. Compared to administering only one dose, it would cost a prison US$ 472 to avert one additional infection (results not shown). The health care system would realize savings even if only one dose were administered to inmates since the total cost of vaccination in this case would be US$ 206,000; however, further savings would be obtained by administering the complete series (Table 3).

Under some circumstances, prisons would save by immunizing inmates. For example, the threshold analysis (Table 4) showed that if the cost of a symptomatic infection was at least 67% higher (>US$ 2560), or the cost of a case of chronic liver disease was at least 72% higher (>US$ 142,000) prisons would achieve break-even status (i.e. cost-effectiveness ratio equal to US$ 0). The cost of vaccination would have to drop to less than US$ 30 per dose in order for vaccination to become cost-saving. From the health care system perspective, cost-saving results were obtained under a wide range of input values, for example, if we used a value of US$ 0 for the cost of the chronic

Table 3
Costs and number of infections in a cohort of 1000 inmates

	Prison[a]		Society[b]	
	Total cost (US$)	No. of infections	Total cost (US$)	No. of infections
Vaccination	116,000	10	137,000	30
No-vaccination	89,000	75	255,000	230
Cost/infection averted (US$)	415		Saving	

[a] Only infections and costs during incarceration.
[b] Infections and costs during and after incarceration—see text for further details.

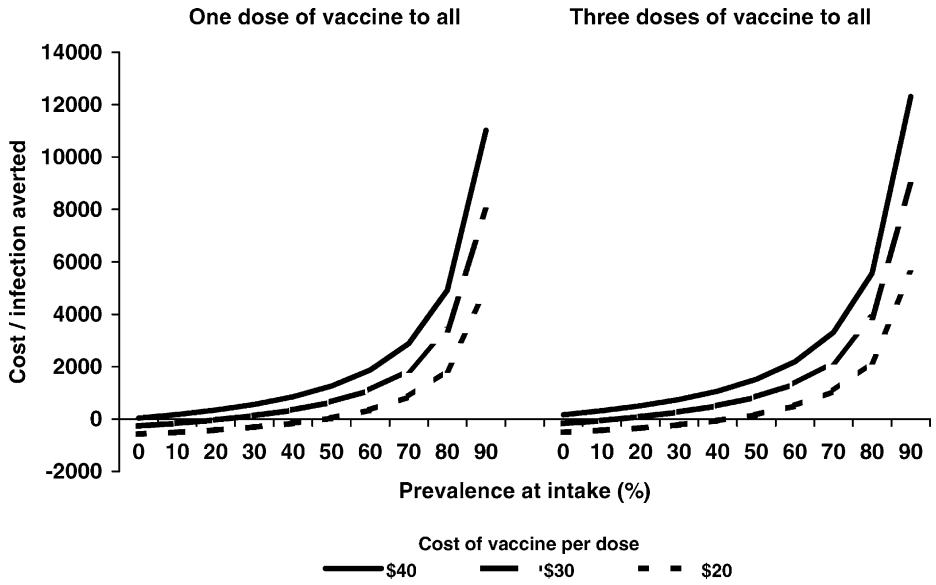

Fig. 5. Sensitivity analysis, prison perspective. Effect of a change in the prevalence at intake on the cost per infection averted. Left: all inmates receive one dose of vaccine only. Right: all inmates receive three doses of vaccine. Three vaccination costs are considered: US$ 40, 30, and 20 per dose.

Table 4
Threshold analyses comparing complete series vaccination with no-vaccination

	Base case values	Threshold values[a]	
		Prison	Society
Cost of:			
Symptomatic case (US$)	1,532	>2,560	>43
Chronic liver disease (US$)	82,417	>142,000	>0
Discount rate (%)	3.0	<1.6	<7.25
Vaccine dose cost (US$)	40	<30	<85
Incidence during incarceration (%)	1.0	>1.6	>0
Incidence after incarceration (%)	7.0	>50	>1.1
Prevalence at intake (%)	20	<0	<62.5

[a] A threshold value is the value of the variable above or below which vaccination is cost-saving with respect to no-vaccination.

liver disease, or assumed 0% for the incidence in prison, vaccination would still be cost-saving (Table 4). Further, the cost of vaccination could increase to US$ 85 per dose and still the program would have no net cost.

The results of altering some of the input values regarding recidivism are shown in Table 5. If none of the inmates were ever released, the prison and health care system perspectives would coincide because the prison would be the only health provider for this population. From the prison perspective, the CE ratio decreased notably from US$ 415 (Table 3) to US$ 44, while from the health care system perspective instead of savings there would be a cost of US$ 44 per infection averted (Table 5). Due to the lower incidence during incarceration, the total number of infections that would occur under this scenario would be much lower than that at baseline (Table 3). In the case where all inmates served a sentence of 2 years and never returned after release, prisons would have a cost per infection averted of about US$ 2200, more than five times higher than that at base case (Table 3), while the health care system would save about 2.5 times more. In this case, however, a larger number of infections would occur altogether—431 without vaccination (Table 5)—but very few (3.5%) would occur in prison.

Table 5
Impact of recidivism on cost per infection averted: results for a cohort of 1000 inmates

	Prison		Society	
	Cost (US$)	No. of infections	Cost (US$)	No. of infections
Prisoners never released				
Vaccination	119,000	14	119,000	14
No-vaccination	115,000	104	115,000	104
Cost/infection averted (US$)	44		44	
Prisoners leave after 2 years and do not return				
Vaccination	115,000	2	165,000	56
No-vaccination	86,000	15	472,000	431
Cost/infection averted (US$)	2,231		Saving	

4. Conclusions

Despite recommendations from the ACIP and the NCCHC, the majority of prisons do not have vaccination programs primarily due to lack of funding. Indeed, our model showed that the health care system, not prisons, would realize an economic benefit from immunizing inmates since a vaccination program would be cheaper than incurring the cost of disease in the unvaccinated cohort. If all 381,646 of the 1998 new court commitments to State and Federal prisons with sentences longer than 1 year [33] were vaccinated, the cost to the health care system would be US$ 52,300,000 while not vaccinating them would cost US$ 97,320,000: this would mean a saving of about US$ 45,000,000 in the course of 20 years. The health care system would realize net savings even if we did not consider the long-term consequences of HBV infection or even if there was no transmission of infection among the cohort during the years of incarceration.

Previous studies of cost-effectiveness of interventions in prisons estimated that a cost of US$ 34,000 to avert one case of HIV, and a cost of US$ 9600 to detect one case of TB [34,35]. Compared to these interventions, an investment in HBV vaccination is particularly advantageous for the health care system. On the other hand, prisons would not save but would pay US$ 415 to avert one infection. Unfortunately, we cannot compare this cost-effectiveness ratio to that of other interventions since the few studies mentioned above have only taken a health care system perspective [34,35] and not a prison perspective. Under certain conditions, however, HBV vaccination programs could be cost-saving for prisons. For example, the threshold analyses (Table 4) showed that prisons that have a higher burden of disease, either because of a higher cost of treating a symptomatic case of infection or a chronic liver disease case, and/or a higher incidence of infection, may be more likely to benefit economically from vaccinating a cohort of entering inmates.

The ACIP guidelines recommended that prison officials consider vaccinating inmates with histories of high-risk behaviors. These individuals would be characterized by a higher prevalence of infection at the time of intake than the general inmate population; for example, as many as 74% of injecting drug users entering prison are positive for HBV [8–10]. Vaccinating high-risk inmates would mean that more HBV-positive individuals would be unnecessarily vaccinated as fewer would be susceptible to infection, and hence, vaccination would be less cost-effective. However, the probability that high-risk individuals become infected inside or outside prison should also be higher, and therefore immunizing could avert more infections. For the health care system, the threshold analyses (Table 4) showed that the incentive to immunize prisoners with high-risk behaviors remains strong: savings are possible for a prevalence as high as 60% or an incidence outside prison as low as 1.1% per year or for any level of transmission of infection above 0% during incarceration.

Under the assumptions used for the baseline case, for the health care system it was still worth vaccinating entering inmates even if it was not possible to administer more than one dose to all entering inmates. This result is important when considering vaccination in jails where the length of stay of inmates is much shorter than 1 year, and inmates are released before the vaccine series can be completed. Compared to no-vaccination, prisons would not save even when inmates were administered only one dose of vaccine.

Both the ACIP and the NCCHC recognized the length of stay under custody (long-term sentence or high rate of recidivism) as an important factor that influences the decision to vaccinate inmates. In fact, the sensitivity analysis showed that for a prison it would be more cost-effective to vaccinate inmates who spend a long time incarcerated or return to prison often (Table 5). Compared to a cohort of short-term inmates, long-term prisoners would acquire more infections while under custody, and prisons would have to bear much of the cost associated with treating the disease, especially acute cases. The health care system, on the other hand, would still benefit by vaccinating short-term inmates because of the higher incidence of infection after release. If all inmates in the hypothetical cohort were released after only 2 years, many more infections would be acquired altogether, and the health care system would greatly benefit from immunization (Table 5).

Our study has several limitations that must be considered. The data available for prison costs, incidences outside and inside prison, release, and recidivism are scarce. However, we compensated by doing an extensive sensitivity analysis (Fig. 5, Tables 4 and 5). Our estimates might be conservative and underestimate the benefit of vaccination for prisons and the health care system. For instance, if indirect and security costs of morbidity were also included, the averted cost of disease would have been higher for prisons and the no-vaccination strategy more expensive. If secondary transmission were included we would find that the health care system would benefit even more from vaccinating. However, we might have overestimated benefits by not taking into account the mortality of inmates for causes other than hepatitis B, and by assuming that ex-convicts who return to prison are not vaccinated again.

We did not consider a strategy of testing for HBV markers and vaccinating only susceptible inmates. Such strategy may make vaccination more cost-effective than we found in this study, especially in the presence of groups with high rates of prevalence at the time of intake. Briefly, if we assumed that testing was done solely for the purpose of screening those individuals who had already been infected, for a testing cost of US$ 20 and a sensitivity and specificity [36] of 95%, vaccinating only individuals who test negative for HBV markers would cost prisons about US$ 116 per individual compared to no-vaccination. Vaccinating all inmates also cost US$ 116 per individual (Table 3). However, while vaccinating all consenting inmates resulted in about 65 infections averted in 1000 individuals, testing and vaccinat-

ing resulted in almost 62 infections averted. For prevalence rates below 20% vaccinating all inmates was cheaper than screening and vaccinating, although no-vaccination was still the cheapest alternative for prisons. For the health care system, vaccinating is the cheapest and most effective strategy for prevalence rates lower than 25%, while for rates above testing and vaccination is the cheapest although not the most effective strategy.

In conclusion, the health care system as a whole is more likely than the prison system to benefit from vaccinating inmates entering prison against hepatitis B. A collaboration between public health and prison systems would provide economic benefits to the health care system and might also be advantageous for the prison. Currently, the government recommends hepatitis B immunization, but only Texas, Rhode Island, Hawaii, and Michigan, are funding it recognizing the public health benefit associated with vaccinating their inmate populations. More effort could be devoted to implementing vaccination programs either providing extra funding to prisons, or better yet, providing supplies and personnel: for example, public health department personnel may conduct periodic “immunization days” in prisons and jails so that vaccination can be done without overburdening the medical personnel of the correctional facility.

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