State Epidemiologists have become responsible for an expanding range of problems, such as birth defects, cancer control, maternal and child health, smoking, and injuries (*4*). As the States intensify efforts directed at such problems, they may require additional assistance from newly formed CDC units, such as the Division of Injury Control, which can provide EIS Officers and other appropriate and specific resources.

Although we report on a large number of investigations, the findings do not reflect the overall occurrence of such problems in the United States during the period examined. Many, if not most, of these problems may be investigated and managed entirely by State and local public health agencies. In addition, because this article is focused on epidemiologic field investigations done primarily by headquarters-based EIS Officers, it overlooks the substantially greater number done by those who are State-based. For these reasons, it is likely that the clusters, outbreaks, and epidemics brought to CDC's attention represent a biased sample of these problems within the United States.

The diversity of problems brought to CDC's attention and addressed by epidemiologic field investigations continue to serve an invaluable training function. The experience gained by EIS Officers who participate in these investigations has important implications for public health practice in the United States. A survey in 1983 found that 39 percent of State epidemiologists and 24 percent of all other epidemiologists working in State health departments were EIS alumni(ae) (*4*). Thus, for many EIS Officers, participation in epidemiologic field investigations helps to prepare them for eventual public-service careers as epidemiologists in State public health agencies. As new and increasingly complex public health problems challenge CDC and the States, the impetus to use epidemiologic field investigations and training experiences to solve these problems will be even greater.

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Hepatitis B Vaccination Programs for Health Care Personnel in U.S. Hospitals

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Synopsis

A random sample of 232 U.S. hospitals was surveyed. Of those hospitals, 75 percent had hepatitis B vaccination programs. The presence of a program was associated with hospital size (60 percent of those with 100 beds, 75 percent with 100–499 beds, 90 percent with 500 or more beds; P=0.0013) and hospital location (urban 86 percent; rural 57 percent; P<0.001). The frequency of needlestick exposures per month among hospital personnel and hospital location were directly related to and best predicted the existence of hepatitis B vaccination programs.

All hospitals with programs offered vaccine to high-risk personnel (as defined by the hospital). Seventy-seven percent of hospitals paid all costs for vaccinating high-risk personnel; 19 percent paid for any employee to be vaccinated regardless of risk status. Forty-six percent of hospitals with programs were estimated to have vaccinated more than 10 percent of all eligible personnel, and 13 percent to have vaccinated more than 25 percent of eligible personnel.

The highest compliance rates were associated with hospitals paying for the vaccine and requiring vaccina-

tion of high-risk personnel. Fifty-four percent of hospitals attributed noncompliance to concern regarding vaccine safety and effectiveness. The reasons why there was no vaccination program in 58 hospitals were (a) low incidence of hepatitis B virus infections among personnel, (b) cost of vaccine, and (c) vaccination being offered as part of a needlestick protocol. Full utilization of hepatitis B vaccine could eliminate the occupational hazard that hepatitis B virus presents to health care personnel.

HEPATITIS B VIRUS (HBV) infection is an occupational risk to health care personnel (*1*). The prevalence of hepatitis B markers among hospital workers is two or more times that of matched healthy controls (*2*). Studies indicate that health care workers having frequent contact with patients' blood or blood products have a higher prevalence of hepatitis B serological markers, compared with personnel with infrequent or no contact with patients' blood (*1, 3, 4*), and that risk may be higher in large, urban hospitals than in smaller, rural hospitals (*5*). It has been estimated that 1 percent to 1.5 percent of the patients in large, urban hospitals have serological markers for hepatitis B surface antigen (*6–8*). The majority of these patients are not admitted with diagnosis of hepatitis B infection (*7*). Percutaneous accident by needlestick constitutes a recognizable and significant form of HBV exposure for personnel (*9*). The frequency of such inadvertent exposures influences the degree to which personnel are at risk.

Vaccination against hepatitis B has been recommended for health care personnel and others at risk for hepatitis B infection since the plasma-derived vaccine became available in June 1982. Development of vaccination programs for health care personnel and other groups such as the developmentally disabled has progressed steadily since vaccine licensure. It is estimated that more than 85 percent of the vaccine distributed has been used for these groups (*10*). Less than 10 percent of hepatitis B cases, however, occur in health care personnel and the other groups who currently account for the bulk of the vaccine used (*10*).

The Occupational Safety and Health Administration (OSHA) requires employers, including health care employers, to take all feasible measures necessary to eliminate recognized occupational hazards. Although OSHA recently has initiated development of specific guidelines for prevention of bloodborne diseases in the workplace, including recommending that employers make hepatitis B vaccination available to certain at-risk health care workers at no cost (*11*), before 1987 no such broad mandate for employers existed.

To assess the status of hospital-based hepatitis B vaccination programs, we conducted a telephone survey on a random sample of U.S. hospitals in the summer of 1985. In particular, we assessed the frequency with which hospitals had started hepatitis B vaccine programs, attempted to define factors most likely to predict the presence of a hospital-based hepatitis B vaccination program for health care personnel, and identified characteristics of successful programs (that is, those programs with the greatest percentage of personnel vaccinated).

Methods

Selection of hospitals and questionnaire design. A stratified random sample of 240 hospitals was selected by computer from a 1981 American Hospital Association list consisting of a total of 6,097 U.S. hospitals. The strata were defined by number of beds with 80 hospitals drawn from each of three strata: less than 100 beds, 100–499 beds, and 500 or more beds. The 80 hospitals selected in each stratum represented 1.8 percent, 6.2 percent, and 20 percent of hospitals in the United States in stratum 1, 2, and 3, respectively. Since an equal number of hospitals were drawn from each stratum, the final sample was weighted toward larger hospitals reflecting the smaller absolute number of hospitals with 500 or more beds in the United States.

The questionnaire elicited the following information on the hospitals and their hepatitis B vaccination programs:

- basic demographic data, including size of hospital, geographic region, and urban or rural location as defined by Standard Metropolitan Statistical Area (SMSA) status (hospitals were regrouped into rural [non-SMSA], and urban [small-medium and large SMSA]),
- predictors of risk for HBV infection at hospitals; for example, frequency of recognized percutaneous needlestick exposures, number of hepatitis B cases occurring in personnel from reported needlestick exposures, and total number of HBV cases in hospital personnel,
- presence of a hospital-based vaccination program, defined as the availability of the hepatitis B vaccine to any subgroup of hospital personnel through the hospital, and the date the program was initiated, and
- characteristics of programs, such as types of personnel offered vaccine, methods of notification, numbers of personnel vaccinated, and how vaccination was financed. A vaccination program was defined as a pro-

Table 1. Relationship between hospital characteristics and the presence of a hospital-based hepatitis B vaccination program[1]

Variables	Total number	Hospitals with vaccine program: Number	Hospitals with vaccine program: Percent	P value
Hospital size				0.0013
<100 beds	75	45	60.0	
100–499	80	60	75.0	
500 or more beds	77	69	89.6	
Location				<0.001
Rural	86	49	57.0	
Urban	146	125	85.6	
Region				NS
Northeast	47	36	76.6	
Midwest	74	56	75.7	
South	83	59	71.1	
West	27	23	85.2	
Other	1	0	0.0	
Number of needlestick exposures per month				<0.001
≤5	139	89	64.0	
6–15	55	50	90.9	
≥16	30	29	96.7	
Total employee hepatitis cases within a 1-year period resulting from a reported needlestick				NS
0	209	154	73.7	
≥1	21	19	90.5	
Needlestick protocol				<0.001
Yes	209	167	79.9	
No	21	7	33.3	

[1]Totals not equal to 232 because of missing observations.
NOTE: NS = not significant.

gram through which hepatitis B vaccine was offered to personnel for preexposure prophylaxis. Vaccine given only as part of a needlestick protocol for postexposure prophylaxis was not considered a vaccination program. Hospitals designated whether specific occupational groups were considered to be at high, moderate, or low risk of HBV infection for purposes of hepatitis B vaccine programs. It was not known whether rural hospitals served populations at high risk for HBV infections.

The survey was conducted between June 24 and August 22, 1985. The questionnaire respondent from each hospital was either an employee health or infection control nurse. No validation studies of data obtained from these interviewees were done.

Data analysis. The results from the questionnaire were coded for computer analysis. Descriptive, univariate, and multivariable analyses were performed using the Statistical Analysis System from the SAS Institute, Cary, NC. Independent factors significantly associated with the existence of a vaccination program were identified using 2 × 2 contingency tables. Univariate associations were tested for significance using the chi-square test statistic (χ^2). All P values were 2-tailed, and P values less than 0.05 were considered significant. Data were analyzed initially by hospital size and then were pooled for further evaluation after stratum-specific analysis showed no major differences. A logistic regression model was used in a multivariable analysis to evaluate the association of hospital vaccine policy with those factors found to be significantly associated with the presence of a vaccination program in the univariate analysis. The odds ratio in favor of having a vaccination program was estimated from the logistic regression equation.

The success of an existing program was examined by estimating the proportion of hospital personnel eligible for vaccination that employee health or infection control nurses reported had actually completed the three-dose series. The number of eligible personnel depended on the policies in force in each hospital. Exact vaccination rates were not available. Only crude estimates of the total number of personnel, those considered to be at high risk for HBV infection, and those who actually completed the series were obtained. This crude "success rate" was then examined in conjunction with other descriptive aspects of the program such as recommendations regarding eligibility for vaccination and payment policies as well as the predictors of program existence.

Results

Characteristics of hospitals with and without vaccination programs. Of the 240 hospitals selected, 232 (96.7 percent) participated in the study. Seventy-five percent of the hospitals had hepatitis B vaccination programs. By univariate analysis, hospital size, urban versus rural location, number of needlestick accidents per month, and needlestick protocols were significantly associated with the presence of a hospital-based hepatitis B vaccination program for personnel (table 1). Among hospitals with less than 100 beds, 60 percent had vaccination programs compared with 75 percent of the 100–499-bed hospitals and 90 percent of hospitals with 500 or more beds ($P = 0.0013$, table 1). Eighty-six percent of hospitals located in urban locations had vaccination programs compared with 57 percent of rural hospitals ($P<0.001$). Among hospitals with 16 or more needlesticks per month, 97 percent had vaccination programs, compared with 91 percent of hospitals with 6–15 exposures per month, and 64 percent of the hospitals with 5 or fewer exposures per month ($P<0.0001$). Eighty percent of hospitals with needlestick protocols had vaccination programs compared with only 33 percent of hospitals without such protocols ($P<0.001$).

The initiation date of vaccination programs was significantly associated with hospital size ($P<0.001$) and location ($P = .002$), with large and urban hospitals com-

mencing programs earlier than small and rural ones. By the end of December 1983, 84 percent of the sample hospitals with 500 or more beds had vaccination programs compared with 40 percent of the sample hospitals with less than 100 beds. Over 62 percent of hospitals with early vaccination programs were located in urban areas.

The variables hospital size, location, and number of needlestick exposures per month were entered into the logistic regression analysis. The multivariable analysis showed that the independent variables representing the frequency of needlestick exposures per month among hospital personnel and hospital location were the best predictors of the existence of hepatitis B vaccination programs (table 2). Compared with rural hospitals, urban hospitals were more than twice as likely to have a vaccination program. The number of monthly needlestick exposures experienced by a hospital was directly related to the probability of having a hepatitis B vaccination program. Hospitals with 16 or more exposures per month and those with 6–15 exposures per month were 10 and 3 times more likely, respectively, to have a vaccination program than hospitals with 5 or fewer accidental needlestick exposures per month.

Occupational categories to receive vaccine and payment policy. Hospitals varied widely with respect to groups to whom they made vaccine available, for whom they recommended or required vaccine, and for whom cost of vaccination was financed by the hospital (table 3). A majority of hospitals with vaccination programs (59 percent) made vaccine available to all personnel. While all hospitals made vaccine available to high-risk personnel, approximately one-third offered vaccine solely to such personnel. Those personnel considered to be at high risk were defined by each hospital but were usually dialysis, dental, and laboratory technicians, dentists, pathologists, surgeons (including obstetricians-gynecologists), operating and emergency room staff (nurses and technicians), intravenous technicians, anesthesiology personnel (physicians and nurses), intensive care unit nurses, and medical students.

For high-risk personnel, 4 percent of hospitals with programs required vaccination, 75 percent recommended vaccination, but 21 percent left consideration of vaccination up to personnel. In 77 percent of hospitals, the hospital paid the entire cost of vaccinating high-risk personnel; in an additional 10 percent, the hospital shared cost with these personnel. For low and moderate risk personnel, vaccine was usually considered optional; nevertheless, 14 percent of hospitals with vaccination programs recommended vaccine for moderate risk personnel, and 30 percent paid for vaccination of such personnel. Only 19 percent of hospitals paid for all personnel to be vaccinated regardless of risk status.

Table 2. Independent predictors of the presence of hepatitis B vaccination programs in U.S. hospitals: results of the multiple logistic regression analysis

Variables	*Estimated regression coefficient*	*Standard error*	*Odds ratio*	*P value*
Location:[1]				
Urban	0.89	0.31	2.44	0.01
Needlestick exposures per month:[2]				
6–15	1.23	0.54	3.42	0.02
16 or more	2.34	1.05	10.38	0.02

[1]Versus rural hospital.
[2]Versus ≤5 needlestick exposures per month.

Table 3. Descriptive aspects of hepatitis B vaccination programs for the 174 sample hospitals with programs in place

Category	*Number of hospitals*	*Percent with vaccination program*
Vaccine availability:		
High risk personnel only	55	31.6
High and moderate risk personnel	16	9.2
All personnel	103	59.2
Vaccine eligibility-high risk personnel:		
Required	7	4.0
Recommended	131	75.3
Optional	36	20.7
Vaccine eligibility-other personnel:		
Recommended—moderate risk	25	14.4
Optional—moderate or low risk	92	52.9
Not recommended	57	32.8
Vaccine payment policy:		
Hospital pays all	33	19.0
High and moderate risk personnel only	20	11.5
High risk personnel only	81	46.6
Hospital shares—high risk personnel only	18	10.3
Personnel pay or other (insurance)	22	12.6

Personnel vaccination rates. The estimated rate of vaccination among personnel was an indicator of the success of a hospital's program. Among the hospitals with programs, 46 percent estimated they had vaccinated more than 10 percent of all personnel, and about 13 percent had vaccinated more than 25 percent of their personnel. Approximately 26 percent of hospitals with programs had estimated vaccination rates for high-risk personnel of 25.1 percent to 50 percent, 23 percent had rates of 50.1 percent to 75 percent, and only approximately 9 percent of the respondents claimed that all personnel in their hospitals who were considered to be at high risk were vaccinated (table 4).

There was no statistically significant association between hospital size and location with respect to vaccination rates. Payment policy and vaccine eligibility

Table 4. Distribution of the estimated vaccination rates among all and high-risk personnel from a stratified sample of U.S. hospitals

Vaccination rate (percent)	Percent of hospitals and types of personnel vaccinated[1]	
	All eligible persons	High-risk personnel
0.0	6.0	5.7
0.1–10.0	48.5	12.9
10.1–25.0	32.3	15.0
25.1–50.0	10.8	26.4
50.1–75.0	1.8	22.9
75.1–100	0.6	8.6
100	0.0	8.6
Total	100.0	100.1

[1]Rate for all personnel obtained by number vaccinated in each hospital divided by total number of personnel reported for that hospital multiplied by 100. Rate for high-risk personnel obtained by number high-risk vaccinated in each hospital divided by number of high-risk personnel estimated in that hospital multiplied by 100.

were the only factors significantly associated with vaccination rates (table 5). Since in 54.5 percent of hospitals 10 percent or less of eligible personnel were vaccinated, factors associated with vaccination rates greater than 10 percent were examined. Forty-eight percent of the hospitals that at least paid for the vaccination of high-risk personnel had vaccination rates higher than 10 percent compared with 26 percent of the hospitals that made personnel pay for the vaccine themselves, or shared payment with personnel ($P<0.05$). Among hospitals that required the vaccination of high-risk personnel, 85.7 percent had vaccination rates greater than 10 percent, compared with approximately 52 percent of the hospitals that recommended the vaccination of high- and moderate-risk personnel and 27 percent of the hospitals that made vaccine optional for high-risk personnel (table 5). Fifty-four percent of the hospitals with programs attributed noncompliance of personnel to concern regarding the safety and effectiveness of the vaccine, including the fear of possible transmission of human immunodeficiency virus (HIV).

Information used to establish programs. More than 80 percent of the hospitals reported using the information provided by the vaccine manufacturer, Merck, Sharp & Dohme, in establishing vaccination programs. Forty-three percent used information from the Centers for Disease Control (*3*). In contrast, 17 percent of the hospitals used data on their own experiences with hepatitis B exposures and cases among personnel.

Methods of notification used. Fifty-five percent of the hospitals reported using inservice seminars to notify personnel about the availability of hepatitis B vaccine. However, a higher percentage of hospitals (67 percent) used memoranda and pamphlets providing information on the vaccine. In many instances, hospitals reported using both methods. Other methods used for notification included verbal announcements (28 percent), videotapes (27 percent), and orientation sessions for new personnel (26 percent).

Screening. More than half of the hospitals that offered vaccine pretested personnel before giving vaccine. However, only 40 percent of the hospitals posttested personnel after vaccination. The prescreening test used with the greatest frequency (62.2 percent) was that for antibody to hepatitis B surface antigen (anti-HBs).

Site of injection. Ninety percent of the hospitals gave the vaccine exclusively in the deltoid muscle at the time of the survey. However, 45 percent of hospitals reported initially that they used the gluteal area as the vaccination site in their starting programs but subsequently changed when recommendations on site of injection were revised (*3*).

Hospitals with no vaccination program. At the time of the survey, 58 hospitals (25 percent) had no vaccination program. Of hospitals without vaccination programs, 24 percent also lacked a needlestick protocol requiring the use of hepatitis B immune globulin (HBIG) for postexposure prophylaxis after a recognized percutaneous exposure. Ninety-two percent of these hospitals were rurally located and had less than 500 beds. Thirty-eight percent of the 58 hospitals with no programs planned to begin some type of hepatitis B vaccination program for personnel. The reasons reported for having no vaccination program included (*a*) low incidence of HBV infections among personnel (45 percent), (*b*) cost of vaccine (35 percent), and (*c*) vaccination being offered as part of a needlestick protocol (43 percent).

Discussion

Our survey showed a high percentage of hospitals (75 percent) had hepatitis B vaccination programs. Hospital size was strongly associated with the existence of hepatitis B vaccination programs, with a greater percentage of larger hospitals having programs. Hospitals in our sample with 500 or more beds represented 20.0 percent of the total population of such hospitals, whereas hospitals with less than 100 and 100–499 beds represented 1.8 percent and 6.2 percent, respectively, of their particular hospital groups.

Only two variables in the multivariable analysis—hospital location (urban versus rural) and the number of needlestick exposures per month—were strong predictors of the presence of a vaccination program, and both factors were found to be equally important. We believe these factors are also important predictors of the need

Table 5. Factors associated with hepatitis B vaccination rates greater than 10 percent in U.S. hospitals[1]

Variables	Total number of hospitals	Hospitals with more than 10 percent of personnel vaccinated	
		Number	Percent
Personnel eligible for vaccination:			
Vaccination required for high-risk personnel	7	6	85.7
Vaccination recommended for high- and moderate-risk personnel	23	12	52.2
Vaccination recommended for high-risk; optional for moderate-risk	62	31	50.0
Vaccination recommended for high-risk; not recommended for other personnel	40	17	42.5
Vaccination optional for all personnel	33	9	27.3
Payment policy:			
Hospital pays for vaccination of high-risk personnel	127	61	[2]48.0
Other payment or hospital shares cost	34	9	26.0
Location:			
Urban	49	26	53.1
Rural	118	50	42.4
Hospital size:			
<100 beds	45	23	51.1
100–499 beds	59	27	45.8
500 or more beds	63	26	41.3
Number of needlestick exposures per month:			
≤5	88	40	45.5
6–15 exposures per month	49	22	44.9
16 or more exposures per month	27	12	44.4
Not known	3	2	66.7

[1]Limited to hospitals with vaccination programs. Totals not equal to 174 due to missing observations.

[2]$\chi^2 = 4.2$, $P<0.05$.

for a vaccination program. Urban hospitals were twice as likely as rural hospitals to have a vaccination program, and hospitals with 6 or more needlestick exposures per month, and located in urban areas, were 15 times more likely to have a program, compared with hospitals experiencing 0–5 exposures per month. These findings are in accordance with the perception that personnel in rural hospitals are at lower risk for HBV infection (*5, 12, 13*). In a study of 2,064 personnel in 11 rural hospitals in Washington State, only 4.7 percent had serologic markers for hepatitis B. The prevalence of serologic markers was significantly associated with prior residence in a city with a population greater than 100,000 and increased blood contact (*5*).

Evidently, the low prevalence of HBV markers in personnel in rural hospitals is due to the lower incidence of hepatitis B in rural populations (*5*). Rural hospitals are likely to serve a population at lower risk than the patients of urban hospitals for HBV infection and may not offer specialized services, such as dialysis treatment, known to increase contact with the patients who are carriers of HBV (*14, 15*). Hence, the delay in implementing vaccination programs in all such hospitals is neither surprising nor alarming. It should be recognized, however, that rural hospitals serving persons from high-risk groups (for example, prison inmates, residents of mental institutions, or Southeast Asian refugees) may have higher risk than other rural hospitals and should move rapidly to establish hepatitis B vaccination programs (*5*). Fifty-seven percent of rural hospitals had vaccination programs at the time of our survey (June 24 through August 22, 1985), and this number has likely increased with time.

Percutaneous accident by needlestick is an occupational risk to health care personnel (*1*). The results from our study show that the presence of a vaccination program is highly correlated, especially in urban areas, with the number of needlestick exposures per month experienced by the hospital's personnel. The chances of inadvertent exposure to hepatitis B is increased with the frequency of these accidents. The existence of a needlestick policy was also significantly associated with the presence of a vaccination program. This finding is not surprising since hospitals perceiving their personnel at risk for HBV infection would have implemented protocols for postexposure prophylaxis before the vaccine was developed.

Ninety-six percent of the hospitals in our study with vaccination programs also had needlestick protocols. A well-defined needlestick protocol to deal with known HBV exposures remains necessary even for hospitals with successful hepatitis B vaccination programs (*3*). The effectiveness of needlestick protocols in the absence of a vaccination program, however, depends on the recognition of exposures requiring prophylaxis and initiation of prophylaxis with hepatitis B immune globulin within 24 hours of an inadvertent exposure (*3*). Administration of the hepatitis B vaccine prior to exposure decreases the element of chance that exists with needlestick protocols.

Other reports have suggested that participation of personnel in hepatitis B vaccination programs depends on factors such as perceived risk of HBV infection, occupation, cost of vaccine, and safety of vaccination (13, 16–18). One report documents a high percentage of registered nurses and laboratory technicians who refused vaccination because they perceived the vaccine as not being safe (*17*). This attitude appears to be prevalent in spite of very clear evidence demonstrating the safety of the vaccine, absence of severe side-effects, and risk of HIV infection (*19*). In our study, 40 percent of the hospitals with programs attributed personnel noncompliance to concern regarding the safety and effectiveness of the vaccine, including the possible transmission of HIV. At the time of our study, only the plasma-derived vaccine was in use. The availability of the recombinant hepatitis B vaccine should help overcome this aspect of noncompliance (*10*).

Our data demonstrated that success of vaccination programs was related most clearly to eligibility criteria and to hospital payment for vaccine. Free vaccination as a personnel health benefit was a feature of a successful hepatitis B vaccination program in which 90 percent of high-risk personnel completed the three-dose series (*8*). Encouragingly, most hospitals had already accepted responsibility for payment of vaccination costs of designated high-risk personnel at the time of our survey. Presumably, when OSHA standards stating that hospitals pay for hepatitis B vaccination costs for all at-risk personnel are issued (*11*), vaccination of health care workers in this country will be accelerated.

Conclusion

Of the hospitals in our study with vaccination programs, about 46 percent had vaccinated more than 10 percent of their at-risk personnel. The highest compliance rates were associated with hospitals paying for the vaccine and requiring vaccination of high-risk personnel. In the United States, an estimated 1,400,000 persons have received the hepatitis B vaccine, most of them health care personnel (*3*). An estimated 58 percent of health care workers, however, remain unprotected. Full utilization of the vaccine could eliminate the occupational hazard HBV presents to health care personnel (*1*). The 1987 OSHA policy now requires health care employers to make efforts to eliminate occupational hazards and includes offering hepatitis B vaccine to all persons whose work entails exposure to human blood (*11*).

Our study indicated that many hospital administrators in 1985 were already following the guidelines established by the Immunization Practices Advisory Committee. Indicators such as the number of needlestick exposures per month and hospital location appeared to be the most widely used cues for establishing and weighing the cost-effectiveness of a vaccination program. Success of vaccination programs was most clearly related to hospital payment for vaccine. The recent OSHA act is likely to stimulate increased vaccine coverage of hospital personnel and facilitate implementation of sound infection control strategies that will help eliminate occupationally acquired hepatitis B.

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